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Vol. XL. }

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{ NEW SERIES,
Vol. XXXII. }

The Auk

A Quarterly Journal of Ornithology

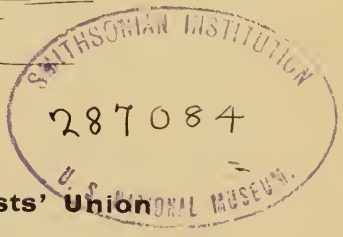
EDITOR
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CONTENTS OF VOLUME XXXII.

NUMBER I.

	PAGE
ON THE TRAIL OF THE IVORY-BILL. By <i>Frederic H. Kennard</i> . (Plates I-III)	1
LIST OF THE BIRDS OF LOUISIANA. Part VI. By <i>H. H. Kopman</i>	15
ANATOMICAL AND OTHER NOTES ON THE PASSENGER PIGEON (<i>Ectopistes migratorius</i>) LATELY LIVING IN THE CINCINNATI ZOOLOGICAL GARDENS. By <i>Dr. R. W. Shufeldt</i> . (Plates IV-VI) .	29
TEN HOURS AT FERNANDO NORONHA. By <i>Robert Cushman Murphy</i>	41
NOTES ON AMERICAN AND OLD WORLD ENGLISH SPARROWS. By <i>John C. Phillips</i>	51
A NEW SUBSPECIES OF SCREECH OWL FROM CALIFORNIA. By <i>J. Grinnell</i>	59
EARLY RECORDS OF THE WILD TURKEY. III. By <i>Albert Hazen Wright</i>	61
THE PRESENT STATUS OF THE TRUMPETER SWAN (<i>Olor buccinator</i>). By <i>Henry K. Coale</i> . (Plates VII-X).	82
NOTES ON A CAPTIVE VIRGINIA RAIL. By <i>Alvin R. Cahn</i>	91

GENERAL NOTES.

Concealing Posture of Grebes, 95; The Double-crested Cormorant in the Chicago Area, 95; Note on the Feeding of the Mallard, 96; Piping Plover, at Cape May, N. J., 97; The Yellow-crowned Night Heron in Colorado. A Correction, 97; The American Bittern Nesting on Long Island, N. Y., 97; Cory's Least Bittern in Illinois, 98; Willow Ptarmigan in Minnesota, 99; Audubon's Caracara in New Mexico, 100; Actions of the Red-shouldered Hawk, 100; Richardson's Owl in Illinois, 101; An albinistic Bobolink, 101; Leconte's Sparrow in Wisconsin, 101; The Evening Grosbeak at Portland, Maine, 102; Two Species of Cliff Swallow Nesting in Kerr County, Texas, 102; The Cape May Warbler in Eastern Massachusetts, 104; The Records of the Tennessee and Cape May Warblers in Southwestern Maine, 104; Cape May and Tennessee Warblers in Philadelphia, 106; San Lucas Verdin in Arizona, 106; Bluegray Gnatcatcher nesting in Wisconsin, 106; Robin's Nests, 106; Two New Records for British Columbia, 107; Some Unusual Breeding Records from South Carolina, 108; Notes on Some Birds of the Maryland Alleghanies: An Anomaly in the Check-List, 108; The Status of the Song Sparrow and the Chipping Sparrow as Early Birds, 110.

RECENT LITERATURE.

Cooke's 'Distribution and Migration of North American Rails,' 113; Wetmore on the Growth of the Tail Feathers of the Giant Hornbill, 113; Chapman on New Colombian Birds, 114; Shufeldt on the Young of *Phalacrocorax atriceps georgianus*, 114; 'Alaskan Bird-Life,' 114; Mrs. Bailey's 'Handbook of Birds of the Western United States,' Fourth Edition, 115; McIlhenny's 'The Wild Turkey and Its Hunting,' 115; Mathews' 'Birds of Australia,' 116; Kuroda's Recent Ornithological Publications, 116; The Annual Report of the National

Association of Audubon Societies, 117; Recent Literature on Bird Protection, 117; Studies in Egg Production in the Domestic Fowl, 118; Birds as Carriers of the Chestnut-Blight Fungus, 119; Reichenow's 'Die Vögel,' 119; Second Report on the Food of Birds in Scotland, 121; Feilden on Birds of Trinidad and Tobago, 121; The Ornithological Journals, 123; Ornithological Articles in Other Journals, 128; Publications Received, 131.

CORRESPONDENCE.

Obituary Notices, 133; Time of Incubation, 134; Changes in By-Laws of the A. O. U., 134.

NOTES AND NEWS.

Obituary: Theodore N. Gill, 139; The San Francisco Meeting of the A. O. U., 140; Importation of Rhea plumage, 142; Full Names of Authors in 'The Auk,' 143; Book Notice, 144; Exhibition of Water colors of Birds, 144.

NUMBER II.

	PAGE
THE CLASSIFICATION OF THE FAMILY DENDROCOLAPTIDÆ. By <i>Dr. Herman von Ihering</i> . (Plates XI-XII)	145
THE OKALOOCOCHEE SLOUGH. By <i>Frederic H. Kennard</i> . (Plates XIII-XV)	154
CABOT'S TYPES OF YUCATAN BIRDS. By <i>Outram Bangs</i>	166
THE ATLANTIC RANGE OF LEACH'S PETREL (<i>Oceanodroma leucorhoa</i> (VIEILLOT)). By <i>Robert Cushman Murphy</i>	170
SOME SUGGESTIONS FOR BETTER METHODS OF RECORDING AND STUDYING BIRD SONGS. By <i>Aretas A. Saunders</i>	173
LIST OF THE BIRDS OF LOUISIANA. PART VII. By <i>H. H. Kopman</i>	183
PHAËTHON CATESBYI BRANDT. By <i>Gregory M. Mathews</i>	195
SIMULTANEOUS ACTION OF BIRDS: A SUGGESTION. By <i>Winsor M. Tyler, M. D.</i>	198
THE OLD NEW ENGLAND BOB-WHITE. By <i>John C. Phillips</i> . (Plate XVI)	204
EARLY RECORDS OF THE WILD TURKEY. IV. By <i>Albert Hazen Wright</i>	207

GENERAL NOTES.

The Red-throated Loon (*Gavia stellata*) at Berwyn, Pa., 225; Mallards Wintering in Saskatchewan, 225; European Widgeon in Washington, 225; Harlequin Duck in the Glacier National Park, Montana, 225; The Blue Goose (*Chen caerulescens*) in Rhode Island, 226; Occurrence of the Pectoral Sandpiper (*Pisobia maculata*) near Salem, N. J., 226; The Wimbrel, Ruff, Buff-breasted Sandpiper, and Eskimo Curlew on Long Island, N. Y., 226; The Diving Instinct in Shore-birds, 227; The Little Black Rail on Long Island, N. Y., 227; Richardson's Owl and Other Owls in Franklin County, New York, 228; Lewis's Woodpecker taken in Saskatchewan, 228; Prairie Horned Lark in Rhode Island in Summer, 229; Crows Nesting on the Ground, 229; The Bermuda Crow, 229; The Orange-crowned Warbler in Cambridge, Mass., in December, 230; A Winter Record for the Palm

Warbler on Long Island, N. Y., 230; The Blackburnian and Bay-breasted Warblers at Martha's Vineyard, Mass., 230; The Cape May Warbler (*Dendroica tigrina*) as an Abundant Autumnal Migrant and as a Destructive Grape Juice Consumer at Berwyn, Pa., 231; Cape May Warbler Eating Grapes, 233; Addendum, 234; The Rock Wren at National, Iowa, 234; *Corthylio* — A Valid Genus for the Ruby-crowned Kinglet, 234; A Note on the Migration at Sea of Shore Birds and Swallows, 236; Rare Birds near Waynesburg, Pa., 236; Some New York City Notes, 237; Notes from Wisconsin, 237; Changes and Additions to the 'List of the Birds of Gallatin County, Montana, 238; What Bird Lovers Owe to the Late Professor King, 239; Morning Awakening Notes at Jefferson Highland, N. H., 240.

RECENT LITERATURE.

'The Auk' Index, 1901-1910, 242; The New B. O. U. List, 243; Hankin on Animal Flight, 245; Snethlage's 'Catalogue of the Birds of Amazonia,' 247; Hornaday's 'Wild Life Conservation in Theory and Practice,' 248; Hartert's 'Die Vögel der palaarktischen Fauna,' 248; Phillips on Experimental Studies of Hybridization among Ducks and Pheasants, 249; Allen on Pattern Development in Mammals and Birds, 249; Shufeldt on the Skeleton of the Ocellated Turkey, 250; Smith's 'Handbook of the Rocky Mountain Park Museum,' 250; Mearns on New African Birds, 251; Von Ihering on Brazilian Birds, 251; Allen's 'Birds in their Relation to Agriculture in New York State,' 251; Simpson's 'Pheasant Farming,' 252; Recent Biological Survey Publications, 252; Economic Ornithology in Recent Entomological Publications, 253; Two Recent Papers on Bird Food by Collinge, 254; First Report of the Brush Hill Bird Club, 255; Recent Reports on Game and Bird Protection, 255; The Ornithological Journals, 256; Ornithological Articles in Other Journals, 261; Publications Received, 263.

CORRESPONDENCE.

A Bird Census of the United States, 267.

NOTES AND NEWS.

Louis di Zerega Mearns, 268; 'The Auk' Review of Ornithological Journals, 269; The Delaware Valley Ornithological Club's Quarter-century, 269; Systematists and Experimental Biologists, 270; S. N. Rhoads' Expedition to Guatemala, 271; The A. O. U. California Meeting, 271.

NUMBER III.

	PAGE
SOME BIRDS FROM SINAI AND PALESTINE. By <i>John C. Phillips</i> . (Plate XVII)	273
THE FOSSIL REMAINS OF A SPECIES OF <i>HESPERORNIS</i> FOUND IN MONTANA. By <i>R. W. Shufeldt, M. D.</i> (Plate XVIII)	290
SUMMER BIRDS OF FORRESTER ISLAND, ALASKA. By <i>George Willett</i> . (Plates XIX-XX)	295
NOTES ON THE ROCK DOVE (<i>Columba domestica</i>). By <i>Charles W.</i> <i>Townsend, M. D.</i>	306

	PAGE
ON THE NESTING OF CERTAIN BIRDS IN TEXAS. By <i>George Finlay Simmons</i> . (Plates XXI-XXII)	317
THE BIRD LIFE OF TRINIDAD ISLET. By <i>Robert Cushman Murphy</i> . (Plates XXIII-XXV)	332
EARLY RECORDS OF THE WILD TURKEY. V. By <i>Albert Hazen Wright</i>	348

GENERAL NOTES.

The Red-throated Loon (*Gavia stellata*) in Jackson Park, Ill., 367; Another European Widgeon in Virginia, 367; Snow Geese and Swans in Massachusetts, 367; Wilson's Snipe Wintering in Nova Scotia, 368; Spotted Sandpiper and Water, 368; Gray Sea Eagle off Nantucket, 368; Young Kingbird on a Cherry and Dragon-fly Diet, 368; The Bohemian Waxwing (*Bombycilla garrula*) at Ithaca, N. Y., 369; Prothonotary Warbler at South Vineland, N. J., 370; Brown Thrasher Wintering in Mass., 370; Birds Observed in Trinity Church Yard, New York City, 371; Type Locality of Lewis's Woodpecker and Clarke's Nutcracker, 371.

RECENT LITERATURE.

Levick's 'Antarctic Penguins,' 372; Miller on Ptilosis, with Special Reference to the Feathering of the Wing, 373; Cory on New South American Birds, 374; Shufeldt on the Tree Ducks, 374; Shufeldt on Fossil Birds in the Marsh Collection, 375; White on an Expedition to the Interior of Australia, 376; Cassinia, 1914, p. 376; Publications on Bird Protection, 377; Bird Enemies of two Beetle Pests, 377; Dissemination of the Chestnut-blight Fungus, 378; The Ornithological Journals, 378; Ornithological Articles in Other Journals, 383; Publications Received, 384.

NOTES AND NEWS.

Obituary: Harry K. Pomeroy, 386; Lord Brabourne, 387; The Generic Problem, 387; Thirty-third Meeting of the American Ornithologists' Union at San Francisco, California, May 17-20, 1915, 388.

NUMBER IV.

	PAGE
IN MEMORIAM: THEODORE NICHOLAS GILL. By <i>T. S. Palmer</i> . (Plate XXVI.)	391
THE MORE NORTHERN SPECIES OF THE GENUS <i>Scytalopus</i> Gould. By <i>Frank M. Chapman</i>	406
THE PLUM ISLAND NIGHT HERONS. By <i>S. Waldo Bailey</i>	424
BIRD MIGRATION IN THE MACKENZIE VALLEY. By <i>Wells W. Cooke</i>	442
LIST OF WATER AND SHORE BIRDS OF THE PUGET SOUND REGION IN THE VICINITY OF SEATTLE. By <i>Samuel F. Rathbun</i>	459
THE BIRDS' BATH. By <i>Heyward Scudder</i>	465
A FOUR-WINGED WILD DUCK. By <i>Charles Eugene Johnson</i> . (Plates XXVII-XXIX.)	469
NOTES ON DICHROMATIC HERONS AND HAWKS. By <i>Outram Bangs</i>	481
FOSSIL REMAINS OF THE EXTINCT CORMORANT PHALACROCORAX MACRUPUS FOUND IN MONTANA. By <i>R. W. Shufeldt, M. D.</i>	485
THIRTY-THIRD STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION. By <i>John Hall Sage</i>	488

GENERAL NOTES.

Yellow-billed Loon (*Gavia adamsi*) in Colorado.—A Correction, 494; The Puffin (*Fratercula arctica arctica*) on Lond Island, N. Y., 495; A Near View of an Iceland Gull, 495; The Arkansas Kingbird (*Tyrannus verticalis*) in Eastern Minnesota, 495; Starlings (*Sturnus vulgaris*) in New Hampshire, 496; Bachman's Sparrow near Chicago, Illinois, 496; Leconte's Sparrow in Wisconsin, 497; Junco Breeding in Concord and Lexington, Mass., 497; The Indigo Bunting in Colorado, 498; Numerous Migrant Pine Warblers (*Dendroica vigorsii*) at Fort Lee, N. J., 498; Black-throated Blue Warbler in Colorado, 498; Cape May Warblers Destructive to Grapes on Long Island, 498; The Resident Chickadee of Southwestern Pennsylvania, 498; Winter Birds at Wareham, Mass., 499; Notes on Some Manibotan Birds, 500; Bird-Notes from Cambridge, Isanti County, Minnesota, 501.

RECENT LITERATURE.

Dall's Biography of Baird, 505; Baynes' 'Wild Bird Guests,' 507; Job on Wild Fowl Propagation, 509; Laing's 'Out with the Birds,' 510; Cooke on Bird Migration, 510; Faxon on Relics of Peale's Museum, 512; Mathew's 'Birds of Australia,' 512; Recent Monographs by Oberholser, 513; Nature and Science on the Pacific Coast, 513; Murphy on the Penguins of South Georgia, 514; Chapman on New Birds from Central and South America, 515; Cory on New South American Birds, 515; Burns on Periods of Incubation, 516; Henshaw on American Game Birds, 517; Taverner on The Double-crested Cormorant and its Relation to the Salmon Industry, 517; Shufeldt on the Osteology of the Limpkin and Stone Plover, 517; Recent Publications of the Biological Survey, 518; Da Costa on the Economic Value of the Birds of São Paulo, Brazil, 518; Third Report of Food of Birds in Scotland, 519; Economic Ornithology in Recent Entomological Publications, 520; The Ornithological Journals, 521; Ornithological Articles in Other Journals, 528; Publications Received, 531.

CORRESPONDENCE.

Method of Recording Bird Songs, 535.

NOTES AND NEWS.

Obituaries: Graf Hans von Berlepsch, 539; Dr. Otto Herman, 539; Egbert Bagg, 540; Ewen Somerled Cameron, 540; Prof. Frederick Ward Putnam, 541; Frank B. Armstrong, 541; Appointment of Dr. T. S. Roberts in the University of Minnesota, 541.

	PAGE.
INDEX	543
ERRATA	568
DATES OF ISSUE	568
CONTENTS	i
OFFICERS AND MEMBERS	ix

ILLUSTRATIONS.

PLATES.

Plate	I.	Nests of Audubon's Caracara and Florida Red-shouldered Hawk (two views).
"	II.	Florida Wild Turkeys in Deep Lake Grove (two views).
"	III.	Peter Hogan and the 'Schooner': Deep Lake, Florida (two views).
"	IV-VI.	Anatomy of the Passenger Pigeon.
"	VII-VIII.	Trumpeter Swan (<i>Olor buccinator</i>) (four views).
"	IX-X.	Trachea and Sternum of the Trumpeter Swan.
"	XI-XII.	Skulls of Dendrocolaptidæ and Formicariidæ.
"	XIII.	Nests and Haunts of the Wood Ibis (two views).
"	XIV.	Florida Burrowing Owls and Nests of Ward's Heron (two views).
"	XV.	Bonnet Lake and Nest of Sandhill Crane (two views).
"	XVI.	Bob-white Skins.
"	XVII.	Butler's Owl, <i>Strix butleri</i> (Hume).
"	XVIII.	Remains of Hesperornis.
"	XIX.	Forrester Island, Alaska.
"	XX.	Forked-tailed Petrel and Horned Puffin (two views).
"	XXI-XXII.	Views in Harris Co., Texas (four views).
"	XXIII.	Map of Trinidad Island.
"	XXIV.	Boobies, Noddy and Trinidad Petrel (four views).
"	XXV.	Skins of <i>Æstrelata</i> .
"	XXVI.	Theodore Nicholas Gill.
"	XXVII-XXIX.	Anatomy of a Four-winged Duck (four views).
"	XXX.	Remains of <i>Phalacrocorax macropus</i>
"	XXXI.	Otto Herman.

TEXT-CUTS.

	PAGE
Outline Elevation of Fernando Noronha	42
Burrows of Florida Burrowing Owl	156
Song Records of the Purple Finch, Red-winged Blackbird and Robin	178
Three Songs of the Meadowlark	180
Migration Routes to the Mackenzie Valley	443
Breeding Range of the Rose-breasted Grosbeak	446
Migration of the Red-eyed Vireo	448
Migration Routes from the Pacific Coast to the Mackenzie Valley	453
Migration Route of the Western Tanager	456

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FÜRBRINGER, Prof. MAX, University of Heidelberg, Heidelberg, Germany.....	1891
GADOW, Dr. HANS, University Museum of Zoology, Cambridge, England.....	1884
GIRTANNER, Dr. A., St. Galle, Switzerland.....	1884
GODWIN-AUSTEN, Lieut.-Col. HENRY HAVERSHAM, Nore, Hascombe, Godalming, Surrey, England.....	1884
GOELDI, Prof. Dr. EMIL A., Zieglerstrasse 36, Bern, Switzerland.....	1903
GRANDIDIER, ALFRED, 6 Rond-Point des Champs Elysées, Paris.....	1883
GURNEY, JOHN HENRY, Keswick Hall, Norwich, England.....	1883
HARTING, JAMES EDMUND, Edgewood, Weybridge, Surrey, England.....	1883
HENNICKE, Dr. CARL R., Gera, Reuss, Germany.....	1907
HENSON, HARRY V., Yokohama, Japan.....	1888
HUDSON, WILLIAM HENRY, Tower House, St. Luke's Road, West- bourne Park, London, W.....	1895
KRUKENBERG, Dr. E. F. W., Würzburg, Germany.....	1884
KRÜPER, Dr. THEOBALD J., University Museum, Athens, Greece.....	1884
LEGGE, Col. WILLIAM V., Cullenswood House, St. Mary's, Tasmania.....	1891
LE SOUËF, DUDLEY, Zoölogical Gardens, Melbourne, Australia.....	1911
MACFARLANE, RODERICK, Winnipeg, Manitoba.....	1886
MADARÁSZ, Dr. JULIUS VON, National Museum, Budapest, Hungary.....	1884
MATHEWS, GREGORY M., Langley Mount, Watford, Herts, England.....	1911
MENZBIER, Prof. Dr. MICHAEL, Imperial Society of Naturalists, Moscow, Russia.....	1884
MILLAIS, JOHN GUILLE, Compton's Brow, Horsham, England.....	1911
NAMIYE, M., Tokio, Japan.....	1886
NICHOLSON, FRANCIS, The Knoll, Windermere, Westmoreland, Eng- land.....	1884
NORTH, ALFRED J., Australian Museum, Sydney, New South Wales.....	1902
OGILVIE-GRANT, WILLIAM ROBERT, British Museum (Nat. Hist.), Cromwell Road, London, S. W.....	1899
PALMÉN, Dr. J. T., Helsingfors, Finland.....	1883
RAMSEY, E. P., Sydney, New South Wales.....	1884
RINGER, FREDERIC, Nagasaki, Japan.....	1888
SCLATER, WILLIAM LUTLEY, 10 Sloane Court, Chelsea, London, S. W.....	1906
SUSHKIN, Dr. PETER, University, Kharkov, Russia.....	1903
THEEL, Dr. HJALMAR, University of Upsala, Upsala, Sweden.....	1884
TSCHUSI ZU SCHMIDHOFFEN, VICTOR, RITTER VON, Villa Tännenhof, bei Hallein, Salzburg, Austria.....	1884
VAN OORT, EDWARD DANIEL, Museum Nat. Hist., Leyden, Holland.....	1913
WATERHOUSE, F. H., 3 Hanover Square, London, W.....	1889
WINGE, Dr. HERLUF, Univ. Zoölogical Museum, Copenhagen, Den- mark.....	1903
WORCESTER, Prof. DEAN C., Manila, P.I.....	1903
ZELEDON, Don JOSÉ C., San José, Costa Rica.....	1884

MEMBERS.

- ALLEN, ARTHUR A., McGraw Hall, Cornell University, Ithaca, N. Y.
(1909)1914
- ALLEN, FRANCIS H., 4 Park St., Boston, Mass. (1888)1901
- ALLEN, DR. GLOVER M., 234 Berkeley St., Boston, Mass. (1896)1904
- ANDERSON, DR. RUDOLPH M., 901 Virginia St., Sioux City, Ia. . . (1907)1914
- ATTWATER, H. P., 2120 Genesee St., Houston, Texas. (1891)1901
- BAGG, EGBERT, 406 Genesee St., Utica, N. Y. (1883)1914
- BAILEY, VERNON, 1834 Kalorama Ave., Washington, D. C. . . (1887)1901
- BAILEY, MRS. VERNON, 1834 Kalorama Ave., Washington, D. C. (1885)1901
- BAILY, WILLIAM L., Ardmore, Pa. (1886)1901
- BARBOUR, DR. THOMAS, Mus. Comp. Zoölogy, Cambridge, Mass. (1903)1914
- BARTSCH, PAUL, Smithsonian Inst., Washington, D. C. (1896)1902
- BERGTOLD, DR. W. H., 1159 Race St., Denver, Colo. (1889)1914
- BOND, FRANK, 3127 Newark St., Cleveland Park, Washington, D. C.
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- BOWLES, JOHN HOOPER, Tacoma, Wash. (1891)1910
- BRAISLIN, DR. WILLIAM C., 556 Washington Ave., Brooklyn, N. Y. (1894)1902
- BROOKS, ALLAN, Okanagan Landing, B. C. (1902)1909
- BRYAN, WILLIAM ALANSON, College of Hawaii, Honolulu, Hawaiian
Islands. (1898)1901
- BURNS, FRANK L., Berwyn, Pa. (1891)1901
- BUTLER, AMOS W., 52 Downey Ave., Irvington, Indianapolis, Ind. (1885)1901
- CAMERON, E. S., Marsh, Montana. (1903)1910
- CHAMBERS, W. LEE, Eagle Rock, Cal. (1907)1913
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bridge, Mass. (1886)1902
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- DEANE, WALTER, 29 Brewster St., Cambridge, Mass. (1897)1901
- DEARBORN, NED, Linden, Md. (1902)1907
- EATON, ELON HOWARD, Hobart College, Geneva, N. Y. (1895)1907
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- GAULT, BENJAMIN TRUE, Glen Ellyn, Ill. (1885)1903
- GOLDMAN, EDWARD ALFONSO, Biological Survey, Washington, D. C.
(1897)1902
- HOFFMANN, RALPH, 11 W. Concord Ave., Kansas City, Mo. . . (1893)1901
- HOLLISTER, NED, U. S. Nat. Museum, Washington, D. C. . . . (1894)1910
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- KENNARD, F. H., Dudley Road, Newton Centre, Mass. (1892)1912
- KNOWLTON, F. H., U. S. Nat. Mus., Washington, D. C. (1883)1902
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- MAILLIARD, JOHN W., 300 Front St., San Francisco, Cal. (1895)1901
- MILLER, Mrs. OLIVE THORNE, 5928 Hays Ave., Los Angeles, Cal. (1887)1901
- MOORE, ROBERT THOMAS, King's Highway, Haddonfield, N. J. (1898)1914
- MORRIS, GEORGE SPENCER, Olney, Philadelphia, Pa. (1887)1903
- MORRIS, ROBERT O., 82 Temple St., Springfield, Mass. (1888)1904
- MURDOCH, JOHN, 16 High Rock Way, Allston, Mass. (1883)1901
- MURPHY, ROBERT C., Museum Brooklyn Institute, Eastern Parkway,
Brooklyn, N. Y. (1905)1914
- NICHOLS, JOHN TREADWELL, Am. Mus. Nat. Hist., New York City (1901)1914
- NORTON, ARTHUR H., Museum Natural History, 22 Elm St., Port-
land, Maine. (1890)1902
- PEARSON, T. GILBERT, 1974 Broadway, New York City (1891)1902
- PHILLIPS, JOHN C., Wenham, Mass. (1904)1912
- PREBLE, EDWARD A., 3027 Newark St., Washington, D. C. (1892)1901
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- RILEY, JOSEPH H., U. S. National Museum, Washington, D. C. (1897)1905
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(1885)1901
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- SETON, ERNEST THOMPSON, Cos Cob, Conn. (1883)1901
- *SHERMAN, Miss ALTHEA R., National via McGregor, Iowa . (1907)1912
- STEPHENS, FRANK, 3746 Park Boulevard, San Diego, Cal. (1883)1901
- STRONG, Dr. REUBEN M., Univ. of Mississippi, University, Miss. (1889)1903
- SWALES, BRADSHAW HALL, Mus. of Zool., Ann Arbor, Mich. (1902)1909
- SWARTH, HARRY S., Mus. Hist. Sci. & Art, Los Angeles, Cal. (1900)1909
- TAVERNER, PERCY A., Victoria Memorial Museum, Ottawa, Canada
(1902)1909
- THAYER, JOHN ELIOT, Lancaster, Mass. (1898)1905
- TODD, W. E. CLYDE, Carnegie Museum, Pittsburgh, Pa. (1890)1901
- TOWNSEND, CHARLES H., Aquarium, Battery Park, New York City
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- TOWNSEND, Dr. CHARLES WENDELL, 76 Marlborough St., Boston, Mass.
Mass. (1901)1905
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*Life Member.

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WETMORE, ALEX., Biological Survey, Washington, D. C.	(1908)1912
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WOOD, NORMAN A., Museum Univ. of Mich., Ann Arbor, Mich.	(1904)1912
WRIGHT, MRS. MABEL OSGOOD, Fairfield, Conn.	(1895)1901

ASSOCIATES.

ABBOTT, CLINTON GILBERT, Plandome, N. Y.	1898
ADAMS, BENJAMIN, 476 5th Ave., New York City.	1911
ADAMS, WALLACE, U. S. Indian Service, Florence, Ariz.	1901
ADAMS, DR. Z. B., 42 Cottage Farm Rd., Brookline, Mass.	1908
AIKEN, HON. JOHN, Superior Court, Court House, Boston, Mass.	1905
AKELEY, CARL E., American Museum Nat. Hist., New York City.	1913
ALEXANDER, MISS ANNIE M., 92 Sea View Ave., Piedmont, Cal.	1911
ALLEN, MARY P., 206 Moon St., Hackettstown, N. J.	1913
AMES, JOHN S., North Easton, Mass.	1913
ANDERSON, MRS. J. C., Great Barrington, Mass.	1903
ANDREWS, ROY C., Amer. Mus. Nat. Hist., New York City.	1906
ANGELL, WALTER A., 33 Westminster St., Providence, R. I.	1901
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BAILEY, PROF. G. A., Geneseo, N. Y.	1910
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BALL, MRS. BENNET F., Oakville, Conn.	1905
BALL, DAVID S., 622 W. 113 St., New York City.	1913
BALL, MISS HELEN AUGUSTA, 43 Laurel St., Worcester, Mass.	1893
BALL, JAS. P., 5001 Frankford Ave., Philadelphia, Pa.	1911
BANKS, MISS MARTHA B., Westport, Conn.	1911

BARBOUR, REV. ROBERT, Y. M. C. A., Montclair, N. J.	1902
BARNARD, JUDGE JOB, 1306 Rhode Island Ave., Washington, D. C.	1886
BARNES, HON. R. MAGOON, Lacon, Ill.	1889
BARRETT, CHAS. H. M., Biological Survey, Washington, D. C.	1912
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BARRY, MISS ANNA K., 5 Bowdoin Ave., Dorchester, Mass.	1907
BARTLETT, MISS MARY F., 227 Commonwealth Ave., Boston, Mass.	1912
BARTLETT, WM. M., 410 Hotel Princeton, Allston, Mass.	1913
BARTRAM, EDWIN B., 131 Beech Tree Lane, Wayne, Pa.	1913
BATTEN, GEORGE, 93 Union St., Montclair, N. J.	1911
BATTEN, GEORGE, JR., 381 Fourth Ave., New York City.	1914
BAYNARD, OSCAR E., Box 328, Clearwater, Fla.	1910
BAYNES, ERNEST H., Meriden, N. H.	1912
BECK, ROLLO HOWARD, San José, R. D. 21, Cal.	1894
BELL, Prof. W. B., Agricultural College, N. D.	1912
BENNETT, REV. GEO., Iowa City, Ia.	1913
BENNETT, WILLIAM J., 1941 1st St. N. W., Washington, D. C.	1901
BERIER, DE LAGNEL, 171 Monte Vista Place, Ridgewood, N. J.	1885
BETTS, NORMAN DE WITT, Forest Products Lab., Madison, Wis.	1908
BICKNELL, MRS. F. T., 319 S. Normandie Ave., Los Angeles, Cal.	1913
BIDDLE, MISS EMILY WILLIAMS, 2201 Sansom St., Philadelphia, Pa.	1898
BIGELOW, ALBERT F., 84 State St., Boston, Mass.	1910
BIGELOW, HENRY BRYANT, Concord, Mass.	1897
BIGELOW, DR. LYMAN F., 80 Winter St., Norwood, Mass.	1914
BIGGLESTONE, HARRY C., 3918 Fourth Ave., Sioux City, Ia.	1913
BLACKWELDER, ELIOT, Univ. of Wisconsin, Madison, Wis.	1895
BLAIN, MERRILL W., 1026 N. Coronado St., Los Angeles, Cal.	1910
BLAKE, SIDNEY F., 154 Walnut St., Stoughton, Mass.	1910
BLOOMFIELD, MRS. C. C., 723 Main St., W., Jackson, Mich.	1901
BOARDMAN, MISS E. D., 416 Marlborough St., Boston, Mass.	1906
BODINE, DONALDSON, 4 Mills Place, Crawfordsville, Ind.	1913
BOGARDUS, MISS CHARLOTTE, Elm St., Coxsackie, N. Y.	1909
BOGERT, WILLIAM S., 1000 Garden St., Bellingham, Wash.	1904
BOLLES, MRS. FRANK, 6 Berkeley St., Cambridge, Mass.	1912
BOLT, BENJAMIN FRANKLIN, 1421 Prospect Ave., Kansas City, Mo.	1909
BOND, HARRY L., Lakefield, Minn.	1908
BONFILS, F. G., 1003 Corona St., Denver, Colo.	1912
BORLAND, WM. G., 14 Wall St., New York City.	1911
BORNEMAN, HENRY S., 1613 Dyre St., Frankford, Philadelphia, Pa.	1912
BOSSON, CAMPBELL, 722 Tremont Bldg., Boston, Mass.	1906
BOURNE, THOS. L., Hamburg, N. Y.	1914
BOWDISH, B. S., Demarest, N. J.	1891
BOWDISH, MRS. B. S., Demarest, N. J.	1902
BOWDITCH, HAROLD, 60 Harvard Ave., Brookline, Mass.	1900
BOWDITCH, JAMES H., 903 Tremont Bldg., Boston, Mass.	1913
BOYNTON, CHAS. T., 1005 South Sheridan Rd., Highland Park, Ill.	1912

BRACKEN, MRS. HENRY M., 1010 Fourth St., S. E., Minneapolis, Minn.	1897
BRADFORD, MOSES B. L., Concord Public Library, Concord, Mass.	1889
BRADLEE, THOMAS STEVENSON, Somerset Club, Boston, Mass.	1902
BRANDRETH, COURTENAY, Ossining, N. Y.	1905
BRANDRETH, FRANKLIN, Ossining, N. Y.	1889
BREWSTER, EDWARD EVERETT, 316 East C St., Iron Mountain, Mich.	1893
BREWSTER, MRS. WILLIAM, 145 Brattle St., Cambridge, Mass.	1912
BRIDGE, EDMUND, 52 Wyman St., West Medford, Mass.	1910
BRIDGE, MRS. EDMUND, 52 Wyman St., West Medford, Mass.	1902
BRIGGS, S. MENDALL, Manomet, Mass.	1913
BRIMLEY, H. H., Raleigh, N. C.	1904
BRISTOL, JOHN I. D., 1 Madison Ave., New York City	1907
BRITTEN, G. S., 302 University Bldg., Syracuse, N. Y.	1913
BROCK, DR. HENRY HERBERT, 687 Congress St, Portland, Me.	1894
BROCKWAY, ARTHUR W., Hadlyme, Conn.	1912
BROOKS, REV. EARLE AMOS, 419 N. River Ave., Weston, W. Va.	1892
BROOKS, GORHAM, 37½ Beacon St., Boston, Mass.	1912
BROOKS, LAWRENCE, Milton, Mass.	1912
BROOKS, MISS MARTHA W., Petersham, Mass.	1913
BROOKS, WINTHROP S., Milton, Mass.	1907
BROWN, MISS ANNIE H., 31 Maple St., Stoneham, Mass.	1909
BROWN, EDWARD J., U. S. Nat. Museum, Washington, D. C.	1891
BROWN, H. A., 40 Talbot St., Lowell, Mass.	1912
BROWN, MRS. HENRY T., Lancaster, Mass.	1912
BROWN, HUBERT H., Beamsville, Ontario	1889
BROWN, MRS. J., JR., 71 Bay State Road, Boston, Mass.	1913
BROWN, PHILIP G., 85 Vaughan St., Portland, Me.	1911
BROWN, STEWARDSON, 20 E. Penn St., Germantown, Philadelphia, Pa.	1895
BROWN, WM. JAMES, 250 Oliver Ave., Westmount, Quebec	1908
BROWNING, WM. HALL, 16 Cooper Square, New York City	1911
BRUEN, FRANK, 65 Prospect St., Bristol, Conn.	1908
BRYANT, HAROLD CHILD, Univ. of California, Berkeley, Cal.	1913
BURBANK, CHAS. O., 48 Glenwood Ave., Newton Centre, Mass.	1912
BURGESS, JOHN KINGSBURY, Chestnut St., Dedham, Mass.	1898
BURLEIGH, THOS. D., 825 N. Wigley Ave., Pittsburg, Pa.	1913
BURNETT, WILLIAM L., State Agric. College, Fort Collins, Colo.	1895
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BURTCH, VERDI, Branchport, N. Y.	1903
BUXBAUM, MRS. CLARA E., 4822 Grand Boulevard, Chicago, Ill.	1895
CABOT, LOUIS, Brookline, Mass.	1904
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CALVERT, J. FLETCHER, 596 Princess Ave., London, Ont.	1912
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CARTER, JOHN D., Lansdowne, Pa.	1907
CASE, CLIFFORD M., 7 Holcomb St., Hartford, Conn.	1892
CASH, HARRY A., 54 Spring St., Pawtucket, R. I.	1898
CHAMBERLAIN, CHAUNCY W., 36 Lincoln St., Boston, Mass.	1885
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CHAPMAN, Mrs. F. M., Englewood, N. J.	1908
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CHEESMAN, M. R., 55 W. 4th St., S., Salt Lake City, Utah.	1911
CHIPMAN, Miss GRACE E., Sandwich, Mass.	1912
CHRISTY, BAYARD H., 403 Frederick Ave., Sewickley, Pa.	1901
CLARK, CLARENCE H., Lubeck, Me.	1913
CLARK, H. WALTON, Fairport, Ia.	1913
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CLARKE, CHARLES E., 11 Chetwynd Road, Tufts College, Mass.	1907
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CLARKE, ROWENA A., Kirkwood, Mo.	1906
CLARKE, Dr. WM. C., Tenaflly, N. J.	1909
CLEAVES, HOWARD H., Public Museum, New Brighton, N. Y.	1907
CLEVELAND, Dr. CLEMENT, 925 Park Ave., New York City.	1903
CLEVELAND, Miss LILIAN, Woods Edge Road, West Medford, Mass.	1906
COALE, HENRY K., Highland Park, Ill.	1883
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COBB, Miss ANNIE W., 301 Massachusetts Ave., Arlington, Mass.	1909
COBB, STANLEY, 340 Adams St., Milton, Mass.	1909
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COOK, Miss LILIAN GILLETTE, Long Lea Farm, Amherst, Mass.	1899
COPE, FRANCIS R., Jr., Dimock, Pa.	1892
COPELAND, Dr. ERNEST, 141 Wisconsin St., Milwaukee, Wis.	1897
COPELAND, MANTON, 88 Federal St., Brunswick, Me.	1900
COULTEB, STANLEY, Lafayette, Ind.	1912
CRAIG, WALLACE, Orono, Me.	1912
CRAIGMILE, Miss ESTHER A., 24 S. Grant St., Hinsdale, Ill.	1910
CRAM, R. J., 26 Hancock Ave., W., Detroit, Mich.	1893
CRANDALL, C. W., 10 Third St., Woodside, N. Y.	1891
CRANE, Miss CLARA L., Dalton, Mass.	1904
CRANE, Mrs. ZENAS, Dalton, Mass.	1904

CREHORE, FREDERIC M., 87 Milk St., Boston, Mass.	1913
CRESSY, Mrs. N. S., Avon Road, Unionville, Conn.	1912
CRITTENDEN, VIOLA E., Shelburne Falls, Mass.	1913
CROCKER, Mrs. DAVID, Barnstable, Mass.	1912
CROCKER, Mrs. EMMONS, 48 Mechanics St., Fitchburg, Mass.	1912
CROSBY, MAUNSELL S., Rhinebeck, N. Y.	1904
CULVER DELOS E., Addingham, Pa.	1913
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DAVENPORT, Mrs. ELIZABETH B., Lindenhurst, Brattleboro, Vt.	1898
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DAY, Miss E. S., 339 Bainbridge St., Brooklyn, N. Y.	1914
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DILLE, FREDERICK M., 2927 W. 28th Ave., Denver, Colo.	1892
DIMOCK, GEO. E., Jr., 907 N. Broad St., Elizabeth, N. J.	1911
DIONNE, C. E., Laval University, Quebec, Canada	1893
DIXON, FREDERICK J., 111 Elm Ave., Hackensack, N. J.	1891
DODSON, JOSEPH H., Room 1201-19 S. La Salle St., Chicago, Ill.	1909
DORN, Prof. L., Concordia College, Fort Wayne, Ind.	1912
DOWNHOUR, Miss ELIZABETH, 2307 Talbott Ave., Indianapolis, Ind.	1913
DRAPER, J. SUMNER, 16 State St., Boston, Mass.	1908
DRUMMOND, Miss MARY, Spring Lane, Lake Forest, Ill.	1904
DULL, Mrs. A. P. L., 211 N. Front St., Harrisburg, Pa.	1900
DUNBAR, W. LINFRED, U. M. C. Co., Bridgeport, Conn.	1906
DURFEE, OWEN, Box 125, Fall River, Mass.	1887
DURYEA, Miss ANNIE B., 62 Washington St., Newark, N. J.	1911

DYKE, ARTHUR CURTIS, 205 Summer St., Bridgewater, Mass.	1902
EARLY, CHAS. H., 185 Fairmont Ave., Hyde Park, Mass.	1912
EASTMAN, FRANCIS B., Plattsburg Barracks, N. Y.	1909
EATON, MISS MARY S., 8 Monument St., Concord, Mass.	1909
EATON, SCOTT HARRISON, Malcolm Hotel, Lawrenceville, Ill.	1912
EDSON, JOHN M., Marietta Road, Bellingham, Wash.	1886
EDWARDS, PHOEBE P., Brookline, Mass.	1912
EDWARDS, VINAL N., Box 54, Woods Hole, Mass.	1912
EHINGER, DR. CLYDE E., 100 Rosedale Ave., West Chester, Pa.	1904
EICHE, AUGUST, 1133 O St., Lincoln, Neb.	1902
EIFRIG, REV. C. W. GUSTAVE, Concordia Teachers College, Oak Park, Ill.	1913
EIMBECK, DR. A. F., New Haven, Mo.	1906
EKBLAW, WALTER ELMER, care of G. Ekblaw, Rantoul, Ill.	1911
ELDRIDGE, ARTHUR S., South Lincoln, Mass.	1912
ELLIOT, MRS. J. W., 124 Beacon St., Boston, Mass.	1912
ELLS, GEORGE P., Norwalk, Conn.	1904
EMMET, CHRISTOPHER TEMPLE, Stony Brook, N. Y.	1909
EMMET, ROBERT T., New Rochelle, N. Y.	1904
EMMONS, RUPERT A., 17 T St., N. E., Washington, D. C.	1913
EMORY, MRS. MARY DILLE, 156 Foundry St., Morgantown, W. Va.	1899
ENDERS, JOHN O., 17 Highland St., Hartford, Conn.	1904
EVANS, WILLIAM B., Westtown, Pa.	1897
FARLEY, JOHN A., 52 Cedar St., Malden, Mass.	1904
FAY, S. PRESCOTT, 3 Brimmer St., Boston, Mass.	1907
FELGER, ALVA HOWARD, North Side High School, Denver, Colo.	1898
FELL, MISS EMMA TREGO, 1534 N. Broad St., Philadelphia, Pa.	1903
FELTON, W. R., Lone Tree, Mont.	1910
FERGUSON, MRS. MARY VAN E., 5 Panoramic Way, Berkeley, Cal.	1912
FERRY, MISS MARY B., 19 Morgan Ave., Norwalk, Conn.	1912
FIELD, EDWARD B., 30 Gillette St., Hartford, Conn.	1898
FIELD, DR. GEO. W., Sharon, Mass.	1910
FINDLAY, D. DOUGLAS, Carleton Place, Ontario, Canada.	1914
FISHER, MISS ELIZABETH WILSON, 2222 Spruce St., Philadelphia, Pa.	1896
FISHER, G. CLYDE, American Mus. Nat. Hist., New York City	1908
FLANAGAN, JOHN H., 89 Power St., Providence, R. I.	1898
FLETCHER, MRS. MARY E., Proctorsville, Vt.	1898
FLOYD, WILLIAM, 84 William St., New York City.	1913
FOLK, JOHN P., 104 Franklin St., Suffolk, Va.	1913
FOOTE, MISS F. HUBERTA, 90 Locust Hill Ave., Yonkers, N. Y.	1897
FORBES, ALEXANDER, Milton, Mass.	1912
FORDYCE, GEO. L., 40 Lincoln Ave., Youngstown, Ohio.	1901
FOWLER, FREDERICK HALL, 221 Kingsley Ave., Palo Alto, Cal.	1892
FOWLER, HENRY W., Acad. Nat. Sciences, Philadelphia, Pa.	1898
FOX, DR. WILLIAM H., 1826 Jefferson Place, Washington, D. C.	1883
FRANCIS, NATHANIEL A., 35 Davis Ave., Brookline, Mass.	1913

FRASER, DONALD, Johnstown, N. Y.	1902
FREEMAN, Miss HARRIET E., 37 Union Park, Boston, Mass.	1903
FRENCH, CHARLES H., Canton, Mass.	1904
FRENCH, Mrs. CHAS. H., Canton, Mass.	1908
FULLER, T. OTIS, Needham, Mass.	1904
FULLER, Mrs. T. Otis, Needham, Mass.	1909
FUNKHOUSER, W. D., 415 N. Tioga St., Ithaca, N. Y.	1913
GABRIELSON, IRA N., 206 N. 1st Ave., Marshalltown, Iowa.	1912
GARDINER, CHARLES BARNES, 5 Minard Place, Norwalk, Ohio.	1903
GEORGE, Mrs. W. W., 1312 Market St., Parkersburg, W. Va.	1912
GERTKEN, SEVERIN, Prof. St. Johns University, Collegeville, Minn.	1912
GIANINI, CHAS. A., Poland, N. Y.	1911
GIBSON, LANGDON, 5 Union St., Schenectady, N. Y.	1904
GILMAN, M. FRENCH, Fort Bidwell, Cal.	1907
GLADDING, Mrs. JOHN R., 30 Stimson Ave., Providence, R. I.	1912
GLEASON, ALFRED D., Gleasondale, Mass.	1912
GOLSAN, LEWIS S., Autaugaville, Ala.	1912
GOODALE, Dr. JOSEPH LINCOLN, 258 Beacon St., Boston, Mass.	1885
GOODRICH, JULIET T., 1210 Astor St., Chicago, Ill.	1904
GORDON, HARRY E., 313 Laburnum Ave., Rochester, N. Y.	1911
GOULD, Dr. ALFRED M., Malden, Mass.	1912
GOULD, JOSEPH E., 5 Clifton St., Norfolk, Va.	1889
GRAHAM, Wm. J., Aledo, Ill.	1909
GRANGER, Miss HELEN, 65 Langdon St., Cambridge, Mass.	1904
GRANGER, WALTER, Amer. Mus. Nat. Hist., New York City	1891
GRANT, Wm. W., 489 Castle St., Geneva, N. Y.	1910
GRAVES, Mrs. CHARLES B., 4 Mercer St., New London, Conn.	1905
GRAY, Miss ELIZABETH F., 870 High St., Dedham, Mass.	1913
GRAY, Miss ISA E., 5 Chestnut St., Boston, Mass.	1912
GREEN, Miss MARY AMORY, Croton-on-Hudson, N. Y.	1911
GREENOUGH, HENRY VOSE, 23 Monmouth Court, Brookline, Mass.	1909
GREGORY, STEPHEN S., Jr., 1349 Astor St., Chicago, Ill.	1906
GRISCOM, LUDLOW, 21 Washington Sq., N., New York City	1908
GRONBERGER, S. M., Smithsonian Inst., Washington, D. C.	1909
GROSS, ALFRED O., 17 McKeen St., Brunswick, Me.	1907
GROSVENER, GILBERT H., National Geog. Soc., Washington, D. C.	1913
GUILD, HENRY R., 102 Beacon St., Boston, Mass.	1912
GUTSELL, JAMES S., 301 College Ave., Ithaca, N. Y.	1911
HADLEY, ALDEN H., Monrovia, Indiana.	1906
HAGAR, J. A., 79 Washington Park, Newtonville, Mass.	1914
HALL, FRANK H., Agricultural Experiment Station, Geneva, N. Y.	1910
HALLETT, GEO. H., Jr., Haverford College, Haverford, Pa.	1911
HANKINSON, THOS. LEROY, Charleston, Ill.	1897
HARDON, Mrs. HENRY W., 315 West 71st St., New York City	1905
HARPER, FRANCIS, 555 First Ave., College Point, N. Y.	1907
HARRINGTON, Mrs. W. R., 11 Ave., and 47th St., New York City	1913

HARRIS, HARRY, Kansas City, Mo.	1911
HARVEY, MISS RUTH SAWYER, 1203 Woodland Ave., Cincinnati, Ohio.	1902
HASKELL, WM. S., Woolworth Building, New York City	1913
HATHAWAY, HARRY S., Box 1466, Providence, R. I.	1897
HAVEMEYER, H. O., Jr., Mahwah, N. J.	1893
HAZARD, Hon. ROWLAND G., Peace Dale, R. I.	1885
HELME, ARTHUR H., Miller Place, N. Y.	1888
HEMENWAY, Mrs. AUGUSTUS, Readville, Mass.	1912
HENDERSON, Judge JUNIUS, 627 Pine St., Boulder, Colo.	1903
HENDRICKSON, W. F., 276 Hillside Ave., Jamaica, N. Y.	1885
HENNESSEY, FRANK, Winona Lake College, Winona Lake, Ind.	1914
HERRICK, FRANCIS H., Adelbert College, Cleveland, Ohio.	1913
HERRICK, HAROLD, 25 Liberty St., New York City	1905
HERRICK, NEWBOLD L., Cedarhurst, N. Y.	1913
HERSEY, F. SEYMOUR, 6 Maple Ave., Taunton, Mass.	1911
HERSEY, L. J., Wray, Colo.	1909
HESS, ISAAC E., Philo, Ill.	1909
HIGBEE, HARRY G., 13 Austin St., Hyde Park, Mass.	1900
HIGGINS, HENRY CHAS., Uxbridge, Mass.	1912
HILL, JAMES HAYNES, Box 485, New London, Conn.	1897
HILL, Mrs. THOMAS R., 4629 Baltimore Ave., Philadelphia, Pa.	1903
HINCKLEY, GEO. LYMAN, Redwood Library, Newport, R. I.	1912
HINCKLEY, HENRY H., 50 West Hill Ave., Melrose Highlands, Mass.	1912
HINE, Prof. JAMES STEWART, Ohio State Univ., Columbus, Ohio.	1899
HINE, Mrs. JANE L., Auburn, Ind.	1890
HITCHCOCK, FRANK H., Metropolitan Club, New York City	1891
HIX, GEORGE E., 100 W. 91st St., New York City	1904
HODGE, Prof. CLIFTON FREMONT, State University, Eugene, Oregon.	1899
HOLDEN, Mrs. EDWIN B., 323 Riverside Drive, New York City	1903
HOLDEN, Mrs. EMELINE R., 13 E. 79th St., New York City	1902
HOLLAND, HAROLD MAY, Galesburg, Ill.	1910
HOLLAND, Dr. WILLIAM J., Carnegie Museum, Pittsburgh, Pa.	1899
HOLLISTER, WARREN D., McPhee Bldg., Denver, Colo.	1901
HOLMAN, RALPH H., 33 Chestnut St., Stoneham, Mass.	1907
HOLT, ERNEST G., Biological Survey, Washington, D. C.	1911
HOLT, Mrs. NANCY W. C., 13 Chauncey St., Cambridge, Mass.	1908
HONYWILL, ALBERT W., Jr., 522 Holmes St., Wilkesburg, Pa.	1907
HORSFALL, BRUCE, Princeton, N. J.	1905
HOTCHKISS, Miss JULIA R., 502 W. 113 St., New York City	1912
HOWE, Dr. REGINALD HEBER, Jr., Thoreau Museum, Concord, Mass.	1895
HOWELL, A. BRAZIER, Covina, Cal.	1909
HOWELL, BENJ. F., Jr., R. F. D. 1., Boonton, N. J.	1907
HOWES, PAUL GRISWOLD, Maplewood Biol. Laborat., Stamford, Conn.	1913
HOWLAND, R. H., 164 Wildwood Ave., Upper Montclair, N. J.	1912
HOYT, Miss ANNIE S., 160 Lexington Ave., New York City	1909

HOYT, WILLIAM H., Box 425, Stamford, Conn.....	1907
HUBBARD, DR. LUCIUS L., Houghton, Mich.....	1907
HUBBARD, MRS. SARA A., 177 Woodruff Ave., Brooklyn, N. Y.....	1891
HUDSON, MRS. K. W., The Bellevue, Intervale, N. H.....	1911
HULL, EDWIN D., 6024 Ellis Ave., Chicago, Ill.....	1913
HUNN, JOHN T. SHARPLESS, 1218 Prospect Ave., Plainfield, N. J.....	1895
HUTCHINSON, DR. W. F., Box 42, Portsmouth, Va.....	1910
INGALLS, CHARLES E., East Templeton, Mass.....	1885
INGERSOLL, ALBERT M., 908 F St., San Diego, Cal.....	1885
IRVING, JOHN, Glen Cove, N. Y.....	1894
ISHAM, C. B., 27 W. 67 St., New York City.....	1891
IVES, H. DAVID, Southampton, N. Y.....	1912
JACKSON, HARTLEY, H. T., Biological Survey, Washington, D. C.....	1910
JACKSON, THOMAS H., 304 N. Franklin St., West Chester, Pa.....	1888
JAMES, NORMAN, N. W. James Lumber Co., Baltimore, Md.....	1913
JARVES, Miss FLORA AMY, Box 151, Kingston Hill, R. I.....	1913
JENKINS, Miss IDA G., 30 Dearborne St., Roxbury, Mass.....	1912
JENKS, CHAS. W., Bedford, Mass.....	1912
JENNEY, CHARLES F., 100 Gordon Ave., Hyde Park, Mass.....	1905
JENNINGS, RICHARD D., 129 Harrison St., East Orange, N. J.....	1913
JENSEN, J. K., Westwood, Mass.....	1912
JEWEL, LINDSEY L., Wytheville, Va.....	1910
JEWETT, STANLEY G., 582 Bidwell Ave., Portland, Oregon.....	1906
JOHNS, ERWIN WM., 19 West Market St., Iowa City, Iowa.....	1910
JOHNSON, CHAS. E., 714 16 Ave., S. E., Minneapolis, Minn.....	1912
JOHNSON, FRANK EDGAR, 16 Amackassin Terrace, Yonkers, N. Y.....	1888
JOHNSON, MRS. GRACE PETTIS, City Library Asso., Springfield, Mass.....	1908
JOHNSON, JULIUS M., 77 Herkimer St., Brooklyn, N. Y.....	1913
JOHNSON, WALTER ADAMS, 120 W. 32d St., New York City.....	1889
JOHNSON, WILBUR WALLACE, 144 Harrison St., East Orange, N. J.....	1914
JOHNSON, WILLIAM S., Lyons, N. Y.....	1893
JONES, F. W., 563 Massachusetts Ave., Boston, Mass.....	1912
JONES, DR. LOMBARD C., Falmouth, Mass.....	1912
JORDAN, A. H. B., Lowell, Wash.....	1888
JUMP, MRS. EDWIN R., 59 Boyd St., Newton, Mass.....	1910
JUSTICE, HENRY, Devon, Pa.....	1913
KALMBACH, EDWIN R., Biological Survey, Washington, D. C.....	1910
KEYS, JAMES EDWARD, 328 St. George St., London, Ontario.....	1899
KEIM, THOMAS DANIEL, Fellowship Farm, Stelton, N. J.....	1902
KELOGG, RALPH T., Silver City, N. M.....	1913
KENT, DUANE E., 47 West St., Rutland, Vt.....	1913
KENT, EDWIN C., 90 West St., New York City.....	1907
KERMODE, FRANCIS, Provincial Museum, Victoria, B. C.....	1904
KEYES, Prof. CHAS. R., Mt. Vernon, Ia.....	1904
*KIDDER, NATHANIEL T., Milton, Mass.....	1906

KIHN, WILFRED L., 755 Eastern Parkway, Brooklyn, N. Y.	1913
KILGORE, WILLIAM, Jr., 4304 Colfax Ave., S., Minneapolis, Minn.	1906
KING, LE ROY, 20 E. 84th St., New York City.	1901
KIRKHAM, Mrs. JAMES W., 275 Maple St., Springfield, Mass.	1904
*KIRKHAM, STANTON D., 152 Howell St., Canandaigua, N. Y.	1910
KIRKWOOD, FRANK C., Monkton, Md.	1892
KITTREDGE, JOSEPH Jr., U. S. Forest Service, Missoula, Mont.	1910
KLOSEMAN, Miss JESSIE E., 44 Bullard St., Dedham, Mass.	1909
KNAEBEL, ERNEST, 3707 Morrison St., Chevy Chase, D. C.	1906
KNAPP, Mrs. HENRY A., 301 Quincy Ave., Scranton, Pa.	1907
KNOLHOFF, FERDINAND WILLIAM, 40 E. 42d St., New York City	1890
KRETZMAN, Prof. P. E., 1230 St. Anthony Ave., St. Paul, Minn.	1913
KUSER, ANTHONY R., Bernardsville, N. J.	1908
KUSER, Mrs. ANTHONY R., Bernardsville, N. J.	1910
KUSER, JOHN DRYDEN, Bernardsville, N. J.	1910
KUTCHIN, Dr. VICTOR, Green Lake, Wis.	1905
La DOW, STANLEY V., 610 W. 116th St., New York City.	1913
LACEY, HOWARD GEORGE, Kerrville, Texas.	1899
LAMB, CHAS. R., 159 Brattle St., Cambridge, Mass.	1912
LANCASHIRE, Mrs. JAMES HENRY, Manchester, Mass.	1909
LANG, HERBERT, Amer. Mus. Nat. Hist., New York City.	1907
LATIMER, Miss CAROLINE P., 19 Pierrepont St., Brooklyn, N. Y.	1898
LAURENT, PHILIP, 31 E. Mt. Airy Ave., Mt. Airy, Philadelphia, Pa.	1902
LAW, J. EUGENE, Hollywood, Cal.	1907
LAWRENCE, JOHN B., 126 E. 30th St., New York City.	1907
LEE, HENRY E., Rapid City, S. D.	1910
LEMAN, J. HOWARD, 48 Beacon St., Boston, Mass.	1912
LEMSEN, NICHOLAS F., 34 Nassau St., New York City.	1912
LENGERKE, JUSTUS VON, 200 5th Ave., New York City.	1907
LEWIS, Dr. FREDERIC T., 76 Oxford St., Cambridge, Mass.	1909
LEWIS, HARRISON F., R. R. 2 Yarmouth, Nova Scotia.	1912
LEWIS, Mrs. HERMAN, 120 Grove St., Haverhill, Mass.	1912
LEWIS, L. ALVA, 608 Panama Bldg., Portland, Ore.	1913
LIGON, STOKLEY, Chloride, New Mexico.	1912
LINCOLN, FREDERICK CHARLES, Colo. Mus. Nat. Hist., Denver, Colo.	1910
LINGS, GEO. H., 208 Piermont Ave., Nyack N. Y.	1913
LINTON, CLARENCE B., 125 West Ocean Ave., Long Beach, Cal.	1908
LINZEE, JOHN W., 96 Charles St., Boston, Mass.	1912
LITTLE, LUTHER 2d, 1625 W. Adams St., Los Angeles, Cal.	1913
LONGSTREET, RUBERT J., Stetson University, DeLand, Fla.	1913
LORD, Rev. WILLIAM R., Dover, Mass.	1901
LORING, MARION B., 914 High St., Dedham, Mass.	1913
LOW, ETHELBERT T., 30 Broad St., New York City.	1907
LUCE, Mrs. FRANCES P., 140 Washington St., Boston, Mass.	1912

*Life Associate.

LUM, EDWARD H., Chatham, N. J.....	1904
LUTHER, DR. CLARENCE H., 8 McIlroy Bldg., Fayetteville, Ark.....	1910
MACKIE, DR. WM. C., 54 Coolidge St., Brookline, Mass.....	1908
MACLAY, MARK W., Jr., 830 Park Ave., New York City.....	1905
MADDOCK, MISS EMELINE, Hamilton Court, Philadelphia, Pa.....	1897
MADISON, HAROLD L., Park Museum, Providence, R. I.....	1912
MAHER, J. E., 351 Communipaw Ave., Jersey City, N. J.....	1902
MAIN, FRANK H., Lanesboro, Mass.....	1913
MAITLAND, ROBERT L., 141 Broadway, New York City.....	1889
MANN, ELIAS P., Williamstown, Mass.....	1912
MAPLES, JAMES C., Port Chester, N. Y.....	1913
MARBLE, RICHARD M., Woodstock, Vt.....	1907
MARRS, MRS. KINGSMILL, 9 Commonwealth Ave., Boston, Mass.....	1903
MARSHALL, ELLA M. O., New Salem, Mass.....	1912
MARTIN, MISS MARIA ROSS, Box 365, New Brunswick, N. J.....	1902
MARX, EDWARD J. F., 207 Burke St., Easton, Pa.....	1907
MASON, VINTON W., 12 Davenport St., Cambridge, Mass.....	1913
MATERN, EDWIN S., 1042 Walnut St., Allentown, Pa.....	1912
MATTERN, WALTER I., 1042 Walnut St., Allentown, Pa.....	1912
MAY, MISS ADELINA, 226 Ocean St., Lynn, Mass.....	1912
MAYNARD, C. J., 447 Crafts St., West Newton, Mass.....	1912
McCLINTOCK, NORMAN, 504 Amberson Ave., Pittsburgh, Pa.....	1900
McCONNELL, HARRY B., Cadiz, O.....	1904
McCOOK, PHILIP JAMES, 571 Park Ave., New York City.....	1895
McHATTON, DR. HENRY, 335 College St., Macon, Ga.....	1898
McILHENNY, EDWARD AVERY, Avery Island, La.....	1894
McINTIRE, MRS. HERBERT BRUCE, 4 Garden St., Cambridge, Mass.....	1908
McINTYRE, MRS. J. W., 151 Franklin St., Newton, Mass.....	1913
McLAIN, ROBERT BAIRD, Market and 12th Sts., Wheeling, W. Va.....	1893
McLEAN, HON. GEO. P., Simsbury, Conn.....	1913
McMAHON, WALT F., 74 Eddy St., West Newton, Mass.....	1913
McMILLAN, MRS. GILBERT, Gorham, N. H.....	1902
MEAD, MRS. E. M., 301 W. 91 St., New York City.....	1904
MEANS, CHAS. J., 29 Marlborough St., Boston, Mass.....	1912
MENGEL, G. HENRY, 739 Madison Ave., Reading, Pa.....	1913
MERRIAM, CHARLES, Weston, Mass.....	1908
MERRIAM, HENRY F., 30 Clinton Ave., Maplewood, N. J.....	1905
MERRILL, ALBERT R., Hamilton, Mass.....	1912
MERRILL, D. E., State College, New Mexico.....	1913
MERRILL, HARRY, Bangor, Maine.....	1883
MERSHON, W. B., Saginaw, Mich.....	1905
METCALF, WILLARD L., 16 Gramercy Park, New York City.....	1908
METCALF, Z. P., A & M. College, West Raleigh, N. C.....	1913
MEYER, Lieut. G. RALPH, Ft. McKinley, Portland Harbor, Me.....	1913
MEYER, MISS HELOISE, Lenox, Mass.....	1913
MILLS, Prof. WILLIAM C., Ohio State Univ., Columbus, O.....	1900

MINER, LEO D., 1836 Vernon St., N. W. Washington, D. C.....	1913
MISCHKE, GEO. M., 1122 49th St., Brooklyn, N. Y.....	1913
MITCHELL, CATHERINE ADAMS, Riverside, Ill.....	1911
MITCHELL, H. H., 2337 Smith St., Regina, Sask., Canada.....	1913
MITCHELL, DR. WALTON I., 603 Beacon Bldg., Wichita, Kan.....	1893
MOORE, CHAS. S., San Diego, Cal.....	1913
MOORE, Miss ELIZABETH PUTNAM, 5300 Media St., Philadelphia, Pa.....	1905
MOORE, HENRY D., Haddonfield, N. J.....	1911
MOORE, WILLIAM G., 257 W. Main St., Haddonfield, N. J.....	1910
MORCOM, G. FREAN, Box 175, Huntington Beach, Cal.....	1886
MORE, R. L., Vernon, Texas.....	1911
MORGAN, ALBERT S., Winfield, W. Va.....	1913
MORLEY, G. GRISWOLD, 2535 Etna St., Berkeley, Cal.....	1911
MORSE, ELIZA A., 21 Elm St., Worcester, Mass.....	1913
MORSE, HARRY GILMAN, Huron, Ohio.....	1912
MOSHER, FRANKLIN H., 17 Highland Ave., Melrose Highlands, Mass.....	1905
MUNRO, J. A., Okanagan Landing, British Columbia, Canada.....	1913
MURIES, O. J., Sellwood Y. M. C. A., Portland, Ore.....	1913
MURPHEY, DR. EUGENE E., 444 Telfair St., Augusta, Ga.....	1903
MUSGRAVE, JOHN K., 3516 Shady Ave., Allegheny, Pa.....	1909
MYERS, Mrs. HARRIET W., 311 Ave. 66, Los Angeles, Cal.....	1906
MYERS, Miss LUCY F., Brookside, Poughkeepsie, N. Y.....	1898
NELSON, JAMES ALLEN, Bethesda, Md.....	1898
NEWELL, Mrs. H. S., 2431 E. 5th St., Duluth, Minn.....	1912
NEWMAN, Rev. STEPHEN M., Howard University, Washington, D. C.....	1898
NIMS, Mrs. LUCIUS, 5 Union St., Greenfield, Mass.....	1913
NOBLE, G. KINGSLEY, 13 Howland St., Cambridge, Mass.....	1913
NOLTE, Rev. FELIX, St. Benedict's College, Atchison, Kan.....	1903
NORRIS, J. PARKER, Jr., 2122 Pine St., Philadelphia, Pa.....	1904
NORRIS, ROY C., 725 N. 10th St., Richmond, Ind.....	1904
NOVY, FRANK ORIEL, 721 Forest Ave., Ann Arbor, Mich.....	1909
NOWELL, JOHN ROWLAND, Box 979, Schenectady, N. Y.....	1897
O'CONNELL, G. M., Cornell Heights, Ithaca, N. Y.....	1913
OGDEN, DR. HENRY VINING, 141 Wisconsin St., Milwaukee, Wis.....	1897
OHL, H. C., 1457 Jay St., Fresno, Cal.....	1913
OLDYS, HENRY, Silver Springs, Md.....	1896
*OLIVER, DR. HENRY KEMBLE, 2 Newbury St., Boston, Mass.....	1900
ORDWAY, Miss ELIZABETH I., 20 Myrtle St., Winchester, Mass.....	1913
OSBORN, ARTHUR A., 58 Washington St., Peabody, Mass.....	1912
OTTEMILLER, FREE, 30 N. Pine St., York, Pa.....	1914
OVERTON, DR. FRANK, Patchogue, N. Y.....	1909
*OWEN, Miss JULIETTE AMELIA, 306 N. 9th St., St. Joseph, Mo.....	1897
PAINE, AUGUSTUS G., Jr., 200 5th Ave., New York City.....	1886
PALADIN, ARTHUR, N. Y. State Museum, Albany, N. Y.....	1911

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PALMER, S. C., Swarthmore College, Swarthmore, Pa.	1912
PANGBURN, CLIFFORD H., Lawrence Park, Bronxville, N. Y.	1907
PARKER, Hon. HERBERT, South Lancaster, Mass.	1904
PARSONS, JOHN E., 30 E. 36th St., New York City.	1912
PAUL, LUCIUS H., 19 Aurora St., Rochester, N. Y.	1908
PEABODY, Rev. P. B., Blue Rapids, Kan.	1903
PEAVEY, ROBERT W., 791 Coney Island Ave., Brooklyn, N. Y.	1903
PECK, MORTON E., 1458 Court St., Salem, Ore.	1909
PENARD, THOS. E., 16 Norfolk Rd., Arlington, Mass.	1912
PENFIELD, Miss ANNIE L., 155 Charles St., Boston, Mass.	1912
PENNINGTON, FRED ALBERT, 5529 Kenwood Ave., Chicago, Ill.	1910
PEPPER, Dr. WM., 1811 Spruce St., Philadelphia, Pa.	1911
PERKINS, Dr. GEO. H., Burlington, Vt.	1912
PERRY, Dr. HENRY JOSEPH, 636 Beacon St., Boston, Mass.	1909
PETERS, ALBERT S., Lake Wilson, Minn.	1908
PETERS, JAMES LEE, Harvard, Mass.	1904
PHELPS, FRANK M., 212 E. 4th St., Elyria, Ohio.	1912
PHELPS, Mrs. J. W., Box 36, Northfield, Mass.	1899
PHILHOWER, CHAS. A., Chatham, N. J.	1913
PHILIPP, PHILIP B., 220 Broadway, New York City.	1907
PHILLIPS, ALEXANDER H., 54 Hodge Road, Princeton, N. J.	1891
PHILLIPS, CHAS., 2506 Plymouth Ave., Minneapolis, Minn.	1914
PHILLIPS, CHAS. LINCOLN, 5 West Weir St., Taunton, Mass.	1912
PIERPONT, ANNA H., 59 Chestnut Ave., Waterbury, Conn.	1913
PINCHOT, GIFFORD, 1617 Rhode Island Ave., Washington, D. C.	1910
PLATT, Mrs. DAN F., Englewood, N. J.	1913
POE, Miss MARGARETTA, 1204 N. Charles St., Baltimore, Md.	1899
POMEROY, HARRY KIRKLAND, R. F. D. 4, Kalamazoo, Mich.	1894
POND, Miss ELLEN J., 160 Lexington Ave., New York City.	1909
POPE, ALEXANDER, 1013 Beacon St., Brookline, Mass.	1908
POPE, E. F., Colmesneil, Texas.	1913
PORTER, Rev. E. C., 24 Randolph St., Arlington, Mass.	1912
PORTER, LOUIS H., Stamford, Conn.	1893
POST, WM. S., 347 5th Ave., New York City.	1911
POTTER, JULIAN K., Camden, N. J.	1912
PRAEGER, WILLIAM E., 421 Douglas Ave., Kalamazoo, Mich.	1892
PRICE, JOHN HENRY, Crown W Ranch, Knowlton, Mont.	1906
PRICE, LIGON, R. F. D. 1, Box 44, Dunmore, W. Va.	1913
PRIMM, ROY LEE, 1113 W. Dayton St., Madison, Wis.	1912
PROCTOR, Mrs. HENRY H., 282 Commonwealth Ave., Boston, Mass.	1912
PURDY, JAMES B., R. F. D. 4, Plymouth, Mich.	1893
PUTNAM, Prof. FRED. W., Peabody Museum, Cambridge, Mass.	1912
RAMSDEN, CHAS. G., Box 146, Guantanamo, Cuba.	1912
RATHBORNE, R. C., 18 Congress St., Newark, N. J.	1911
RAWSON, CALVIN LUTHER, R. F. D. 2, Putnam, Conn.	1885
RAYMOND, Mrs. C. E., 21 3d St., Hinesdale, Ill.	1910

REA, PAUL M., Charleston Museum, Charleston, S. C.	1912
REAGH, DR. ARTHUR LINCOLN, 39 Maple St., West Roxbury, Mass.	1896
RECTOR, WILSON BLAINE, Belington, W. Va.	1913
REDFIELD, MISS ELISA WHITNEY, 29 Everett St., Cambridge, Mass.	1897
REED, HUGH DANIEL, 108 Brandon Place, Ithaca, N. Y.	1900
REHN, JAMES A. G., 6033 B Catherine St., Philadelphia, Pa.	1901
RENSHAW, MISS MARY H., 2005 St. Charles Ave., New Orleans, La.	1913
REYNOLDS, THEO. E. W., R. F. D. 2, Box 92, Kent, Wash.	1912
RHOADS, CHARLES J., National Reserve Bank, Philadelphia, Pa.	1895
RICE, JAMES HENRY, JR., Summerville, S. C.	1910
RICE, WARD J., Roachdale, Ind.	1913
RICHARDS, MISS HARRIET E., 36 Longwood Ave., Brookline, Mass.	1900
RICHARDSON, WYMAN, 50 Claverly Hall, Cambridge, Mass.	1912
RIDEOUT, MISS A. LILLIAN, 15 Farragut Rd., Swampscott, Mass.	1912
RIDGWAY, JOHN L., Chevy Chase, Md.	1890
RICKETSON, WALTON, 10 Anthony St., New Bedford, Mass.	1913
RIKER, CLARENCE B., 43 Scotland Rd., South Orange, N. J.	1885
RING, CLARK L., Saginaw, Mich.	1912
RIPLEY, CHAS., 173 Harvard St., Dorchester Center, Boston, Mass.	1912
RIPLEY, MRS. J. W., 67 Greenleaf St., Malden, Mass.	1912
ROBBINS, MISS ALMEDA B., Y. M. Library Association, Ware, Mass.	1910
ROBBINS, C. A., Onset, Mass.	1914
ROBERTS, JAMES O., 821 Genesee St., Utica, N. Y.	1912
ROBERTS, WILLIAM ELY, 5513 Irving St., Philadelphia, Pa.	1902
ROBERTSON, HOWARD, 157 S. Wilton Drive, Los Angeles, Cal.	1911
ROBINSON, ANTHONY W., 401 Chestnut St., Philadelphia, Pa.	1903
ROCKWOOD, MRS. GEO. I., 340 May St., Worcester, Mass.	1912
ROE, CHAS. M., 3012 Bathgate St., Cincinnati, O.	1906
*ROGERS, CHARLES H., Amer. Mus. Nat. Hist., New York City.	1904
ROOSEVELT, FRANKLIN DELANO, Hyde Park, N. Y.	1896
ROPER, KENYON, 509 N. 4th St., Steubenville, Ohio.	1911
ROSS, GEORGE H., 23 West St., Rutland, Vt.	1904
ROSS, DR. LUCRETIOUS H., 507 Main St., Bennington, Vt.	1912
ROWLEY, JOHN, 42 Plaza Drive, Berkeley, Cal.	1889
RUGG, H. G., Hanover, N. H.	1913
SACKETT, CLARENCE, Rye, N. Y.	1910
SAGE, HENRY M., Menands Road, Albany, N. Y.	1885
SANBORN, COLIN C., 224 East Park Ave., Highland Park, Ill.	1911
SAUNDERS, ARETAS A., West Haven, Conn.	1907
SAVAGE, JAMES, 1097 Ellicott Sq., Buffalo, N. Y.	1895
SAVAGE, WALTER CHLES, Amity, Ark.	1898
SCHANTZ, ORPHEUS M., 5215 W. 24th St., Cicero, Ill.	1907
SCHENCK, FREDRIC, 52 Brattle St., Cambridge, Mass.	1912
SCHORGER, A. W., Forest Products Laboratory, Madison, Wis.	1913

*Life Associate.

SCOTT, WILLIAM G., Box 1954, Winnipeg, Man., Canada.....	1913
SHANNON, WM. PURDY, 1170 Broadway, New York City.....	1908
SHARPLES, ROBERT P., West Chester, Pa.....	1907
SHAW, CHAS. F., 676 Bedford St., North Abington, Mass.....	1912
SHAW, DR. J. HOLBROOK, 43 Court St., Plymouth, Mass.....	1912
SHAW, WILLIAM T., 600 Linden Ave., Pullman, Wash.....	1908
SHEARER, AMON R., Mont Belvieu, Tex.....	1905
SHELDON, CHARLES, 8 W. 9th St., New York City.....	1911
SHELTON, ALFRED, Univ. of Ore., Eugene, Ore.....	1911
SHIRAS, GEORGE, 3d, Stoneleigh Court, Washington, D. C.....	1907
SHOEMAKER, CLARENCE R., 3116 P St., Washington, D. C.....	1910
SHOEMAKER, HENRY W., 26 W. 53d St., New York City.....	1912
SHROSBREE, GEORGE, Public Museum, Milwaukee, Wis.....	1899
SILLIMAN, HARPER, 126 E. 22d St., New York City.....	1902
SIMMONS, GEO. FINLAY, 622 First National Bank, Houston, Texas...	1910
SLADE, MRS. DANIEL D., Chestnut Hill, Mass.....	1912
SMITH, AUSTIN PAUL, 742 Pennsylvania Ave., San Antonio, Texas...	1911
SMITH, BYRON L., 2140 Prairie Ave., Chicago, Ill.....	1906
SMITH, Miss ETHEL M., Rome, Ohio.....	1910
SMITH, Rev. FRANCIS CURTIS, 812 Columbia St., Utica, N. Y.....	1903
SMITH, Prof. FRANK, 913 West California Ave., Urbana, Ill.....	1909
SMITH, HORACE G., State Museum, State House, Denver, Colo.....	1888
SMITH, DR. HUGH M., 1209 M St. N. W., Washington, D. C.....	1886
SMITH, LOUIS IRVIN, Jr., 3908 Chestnut St., Philadelphia, Pa.....	1901
SMITH, WILBUR F., South Norwalk, Conn.....	1909
SMYTH, Prof. ELLISON A., Jr., Polytechnic Inst., Blacksburg, Va...	1892
SNYDER, WILL EDWIN, 309 De Clark St., Beaver Dam, Wis.....	1895
SOUTHER, ARTHUR L., 38 Pleasant St., Stoneham, Mass.....	1913
SPEARS, Miss ETHEL D., 115 East 69th St., New York City.....	1913
SPEENBURGH, D. C., 200 W. 95th St., New York City.....	1913
SPELMAN, HENRY M., 48 Brewster St., Cambridge, Mass.....	1911
SPOONER, Miss M. T., 381 Commonwealth Ave., Boston, Mass.....	1913
STANSELL, S. S. S., Manly, Alberta, Canada.....	1913
STANTON, Prof. J. Y., 410 Main St., Lewiston, Me.....	1883
STANWOOD, Miss CORDELIA JOHNSON, Ellsworth, Me.....	1909
STEARNS, GEO. CUSHMAN, 494 Washington St., Dedham, Mass.....	1913
STEPHENS, T. C., Morningside College, Sioux City, Iowa.....	1909
STEVENS, FRANK E., 25 Hudson St., Somerville, Mass.....	1912
STEVENS, DR. J. F., Box 546, Lincoln, Neb.....	1908
STILES, EDGAR C., 345 Main St., West Haven, Conn.....	1907
ST. JOHN, EDWARD PORTER, 57 Farmington Ave., Hartford, Conn...	1911
STOCKBRIDGE, CHAS. A., Fort Wayne, Ind.....	1911
STODDARD, HERBERT LEE, Field Museum Nat. Hist., Chicago, Ill...	1912
STONE, CLARENCE F., Branchport, N. Y.....	1903
STONE, H. F., Lawtence, N. Y.....	1913
STONE, WM. D., Fayetteville, Ark.....	1911

STOVER, ALLAN J., Kings Rd., R. F. D. 3, Corvallis, Ore.	1912
STRATER, FRANCIS A., 50 Sumner Rd., Brookline, Mass.	1912
STRATTON-PORTER, MRS. GENE, Box 855, Rome City, Ind.	1906
STREET, J. FLETCHER, Beverly, N. J.	1908
STRODE, DR. W. S., Lewiston, Ill.	1911
STUART, GEO. H., 3rd, care of Girard Trust Co., Philadelphia, Pa.	1913
STURGIS, S. WARREN, Groton, Mass.	1910
STURTEVANT, EDWARD, St. George's School, Newport, R. I.	1896
STYER, MRS. KATHARINE R., Concordville, Pa.	1903
SUGDEN, ARTHUR W., 52 Highland St., Hartford, Conn.	1913
SUMMERS, JOHN N., 17 E. Highland Ave., Melrose Highlands, Mass.	1912
SURFACE, HARVEY ADAM, State Zoölogist, Harrisburg, Pa.	1897
SWAIN, JOHN MERTON, Box 633, Farmington, Me.	1899
SWENK, MYRON H., 3028 Starr Street, Lincoln, Neb.	1904
TATE, C. W., 19 Norman St., East Orange, N. J.	1914
TAYLOR, ALEXANDER R., 1410 Washington St., Columbia, S. C.	1907
TAYLOR, B. F., 1619 Green St., Columbia, S. C.	1911
TAYLOR, LIONEL E., Kelouna, British Columbia	1913
TERRILL, LEWIS McI., 53 Stanley Ave., St. Lambert, Quebec.	1907
THOMAS, MISS EMILY HINDS, 2000 Spruce St., Philadelphia, Pa.	1901
THOMPSON, CHAS. S., 1712 S. Grand Ave., San Pedro, Cal.	1909
THORNE, SAMUEL, 19 Cedar St., New York City.	1908
THURSTON, HENRY, Box 181, Floral Park, N. Y.	1912
TILLEY, GEO. D., Darien, Conn.	1910
TINKER, ALMERIN D., 631 S. 12th St., Ann Arbor, Mich.	1907
TOPPAN, GEORGE L., care of Col. C. Pfaff, Framingham, Mass.	1886
TOURTELLOTTE, A. J., 114 East Main St., Westboro, Mass.	1913
TOWER, MRS. KATE DENIG, 9 Newbury St., Boston, Mass.	1908
TOWNSEND, WILMOT, 334 80th St., Brooklyn, N. Y.	1894
TREGANZA, A. O., 614 E. 6th St., Salt Lake City, Utah.	1906
TRIPPE, THOMAS M., Howardsville, Colo.	1909
TROTTER, WILLIAM HENRY, 36 N. Front St., Philadelphia, Pa.	1899
TRUMBULL, J. H., Plainville, Conn.	1907
TUDBURY, WARREN C., 441 Consolidated Realty Bldg., Los Angeles, Cal.	1903
TUFTS, LE ROY MELVILLE, Thrushwood, Farmington, Me.	1903
TUFTS, MISS MARY I., 1 Atlantic St., Lynn, Mass.	1910
TUTTLE, DR. ALBERT H., 1069 Boylston St., Boston, Mass.	1908
TUTTLE, HENRY EMERSON, 253 Yale Station, New Haven, Conn.	1909
TWEEDY, EDGAR, 404 Main St., Danbury, Conn.	1902
TYLER, JOHN G., 1114 Belmont Ave., Fresno, Cal.	1912
TYLER, DR. WINSOR M., 522 Massachusetts Ave., Lexington, Mass.	1912
UNDERWOOD, WILLIAM LYMAN, Mass Inst. Technology, Boston, Mass.	1900
UPHAM, A. W., 77 St. Botolph St., Boston, Mass.	1914
VALENTINE, MISS ANNA J., Bellefonte, Pa.	1905
VAN CORTLANDT, MISS ANNE S., Croton-on-Hudson, N. Y.	1885

VAN NAME, WILLARD GIBBS, N. Y. State Museum, Albany, N. Y.	1900
VAN SANT, MISS ELIZABETH, 2960 Dewey Ave., Omaha, Neb.	1896
VANTASSELL, F. L., 116 High St., Passaic, N. J.	1907
VETTER, DR. CHARLES, 2 West 88th St., New York City.	1898
VIETOR, DR. EDWARD W., 166 St. James Place, Brooklyn, N. Y.	1911
VIETOR, MRS. EDWARD W., 166 St. James Place, Brooklyn, N. Y.	1914
VISHER, STEPHEN S., 5725 Drexel Ave., Chicago, Ill.	1904
VROOMAN, ISAAC H., Jr., 294 Hamilton St., Albany, N. Y.	1908
WADLEIGH, WM. G., 219 State St., Boston, Mass.	1913
WADSWORTH, CLARENCE S., 37 Washington St., Middletown, Conn.	1906
WALCOTT, FREDERIC COLLINS, 14 Wall St., New York City	1913
WAITE, MRS. J. GILMAN, 19 Pearl St., Medford, Mass.	1912
WALES, EDWARD H., Hyde Park, N. Y.	1896
WALKER, ALEXANDER, Hemlock, Ore.	1913
WALKER, ERNEST P., Fisheries Service, Wrangell, Alaska.	1911
WALKER, GEO. R., R. F. D. 3, Murray, Utah.	1909
WALKER, DR. R. L., 355 Main Ave., Carnegie, Pa.	1888
WALLACE, CHAS. R., 69 Columbus Ave., Delaware, Ohio.	1913
WALLACE, JAMES S., 533 Front St., E., Toronto, Ontario.	1907
WALTER, DR. HERBERT E., 53 Arlington Ave., Providence, R. I.	1901
WALTERS, FRANK, 40 West Ave., Great Barrington, Mass.	1902
WARD, FRANK HAWLEY, 18 Grove Place, Rochester, N. Y.	1908
WARD, HENRY L., 882 Hackett Ave., Milwaukee, Wis.	1906
WARD, MRS. MARTHA E., 25 Arlington St., Lynn, Mass.	1909
WARNER, EDWARD P., Concord, Mass.	1910
WARNER, GOODWIN, Concord Junction, Mass.	1908
WARNER, WILLIS H., R. F. D. 2, Canfield, Ohio.	1913
WATSON, MRS. ALEX M., 124 Hatton St., Portsmouth, Va.	1910
WEBER, J. A., Palisades Park, N. J.	1907
WEIR, J. ALDEN, 471 Park Ave., New York City.	1899
WELLMAN, GORDON B., 54 Beltran St., Malden, Mass.	1908
WENTWORTH, IRVING H., 245 Belden Ave., San Antonio, Texas.	1900
WESTON, FRANCIS M., Jr., Bureau of Lighthouses, Washington, D. C.	1913
WETMORE, MRS. EDMUND, 125 E. 57th St., New York City.	1902
WEYGANDT, DR. CORNELIUS, Wissahickon Ave., Mt. Airy, Philadel- phia, Pa.	1907
WHARTON, WILLIAM P., Groton, Mass.	1907
WHEELER, EDMUND JACOB, 177 Pequot Ave., New London, Conn.	1898
WHEELER, HARVEY, Elm St., Concord, Mass.	1912
WHEELOCK, MRS. IRENE G., 1040 Hinman Ave., Evanston, Ill.	1902
WHITCOMB, MYRON L., 40 Westland Terrace, Haverhill, Mass.	1912
WHITE, FRANCIS BEACH, St. Paul's School, Concord, N. H.	1891
WHITE, GEORGE R., Dead Letter Office, Ottawa, Ontario.	1903
WHITE, DR. JAMES C., 259 Marlborough St., Boston, Mass.	1913
WHITE, W. A., 158 Columbia Heights, Brooklyn, N. Y.	1902
WHITE, W. C., Chester, S. C.	1911

WICKERSHAM, CORNELIUS W., Cedarhurst, N. Y.	1902
WILBUR, ADDISON P., 60 Gibson St., Canandaigua, N. Y.	1895
WILCOX, T. FERDINAND, 162 W. 54th St., New York City.	1895
WILLARD, BERTEL G., 8 Everett St., Cambridge, Mass.	1906
WILLARD, FRANK C., Tombstone, Arizona.	1909
WILLARD, Miss HELEN, 25 Regent Circle, Brookline, Mass.	1913
WILLCOX, Prof. M. A., 63 Oakwood Road, Newtonville, Mass.	1913
WILLIAMS, ROBERT S., New York Botanical Gardens, Bronx Park, New York City.	1888
WILLIAMS, ROBERT W., Jr., Tallahassee, Fla.	1900
WILLIAMSON, E. B., Bluffton, Ind.	1900
WILLISTON, Mrs. SAMUEL, 577 Belmont St., Belmont, Mass.	1911
WINDLE, FRANCIS, 253 Dean St., West Chester, Pa.	1909
WING, DEWITT C., 5401 Dorchester Ave., Chicago, Ill.	1913
WINSLOW, ARTHUR M., 3 Lyford St., Worcester, Mass.	1912
WOOD, Mrs. GEO., 1313 Spruce St., Philadelphia, Pa.	1910
WOOD, J. CLAIRE, 179 17th St., Detroit, Mich.	1902
WOOD, NELSON R., Smithsonian Institution, Washington, D. C.	1895
WOODRUFF, FRANK M., 225 Wisconsin St., Chicago, Ill.	1904
WOODRUFF, LEWIS B., 24 Broad St., New York City.	1886
WORCESTER, Mrs. ALFRED, Bacon St., Waltham, Mass.	1908
WRIGHT, ALBERT H., 707 E. State St., Ithaca, N. Y.	1906
WRIGHT, Miss HARRIET H., 1637 Gratiot Ave., Saginaw, W. S., Mich.	1907
WRIGHT, HORACE WINSLOW, 107 Pinckney St., Boston, Mass.	1902
WRIGHT, SAMUEL, Conshohocken, Pa.	1895
WYMAN, LUTHER E., 4911 Bridlong Ave., Los Angeles, Cal.	1907
YOUNG, JOHN P., 1510 5th Ave., Youngstown, Ohio.	1911
YOUNG, WALLACE PARK, 73 Soramen Ave., Toronto, Canada.	1913
ZAPPEY, WALTER R., 25 Hammond St., Cambridge, Mass.	1905
ZIMMER, J. T., 42 Holdrege St., Lincoln, Neb.	1908

DECEASED MEMBERS.*

FELLOWS.

	<i>Date of Death</i>
ALDRICH, CHARLES.....	March 8, 1908
BAIRD, SPENCER FULLERTON.....	Aug. 19, 1887
BENDIRE, CHARLES EMIL.....	Feb. 4, 1897
COUES, ELLIOTT.....	Dec. 25, 1899
GOSS, NATHANIEL STICKNEY.....	March 10, 1891
HOLDER, JOSEPH BASSETT.....	Feb. 28, 1888
JEFFRIES, JOHN AMORY.....	March 26, 1892
McILWRAITH, THOMAS.....	Jan. 31, 1903
MERRILL, JAMES CUSHING.....	Oct. 27, 1902
PURDIE, HENRY AUGUSTUS.....	March 29, 1911
SENNETT, GEORGE BURRITT.....	March 18, 1900
TRUMBULL, GURDON.....	Dec. 28, 1903
WHEATON, JOHN MAYNARD.....	Jan. 28, 1887

RETIRED FELLOWS.

GILL, THEODORE NICHOLAS.....	Sept. 25, 1914
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HONORARY FELLOWS.

BLANFORD, WILLIAM THOMAS.....	June 23, 1905
BARBOZA DU BOCAGE, JOSÉ VICENTE.....	July —, 1908
BURMEISTER, KARL HERMANN KONRAD.....	May 1, 1891
CABANIS, JEAN LOUIS.....	Feb. 20, 1906
GÄTKE, HEINRICH.....	Jan. 1, 1897
GIGLIOLI, ENRICO HILLYER.....	Dec. 16, 1909
GUNDLACH, JOHANN CHRISTOPH.....	March 14, 1896
GURNEY, JOHN HENRY.....	April 20, 1890
HARTLAUB, [KARL JOHANN] GUSTAV.....	Nov. 20, 1900
HUME, ALLAN OCTAVIAN.....	July 31, 1912
HUXLEY, THOMAS HENRY.....	June 29, 1895
KRAUS, FERDINAND.....	Sept. 15, 1890
LAWRENCE, GEORGE NEWBOLD.....	Jan. 17, 1895
MEYER, ADOLF BERNHARD.....	Feb. 5, 1911
MILNE-EDWARDS, ALPHONSE.....	April 21, 1900
NEWTON, ALFRED.....	June 7, 1907

* List revised by Dr. T. S. Palmer from data collected by the Index Committee.

PARKER, WILLIAM KITCHEN.....	July 3, 1890
PELZELN, AUGUST VON.....	Sept. 2, 1891
SALVIN, OSBERT.....	June 1, 1898
SAUNDERS, HOWARD.....	Oct. 20, 1907
SCHLEGEL, HERMANN.....	Jan. 17, 1884
SCLATER, PHILIP LUTLEY.....	June 27, 1913
SEEBOHM, HENRY.....	Nov. 26, 1895
SHARPE, RICHARD BOWDLER.....	Dec. 25, 1909
TACZANOWSKI, LADISLAS [CASIMIROVICH].....	Jan. 17, 1890
WALLACE, ALFRED RUSSEL.....	Nov. 7, 1913

CORRESPONDING FELLOWS.

ALTUM, [C. A. =] BERNARD.....	Feb. 1, 1900
ANDERSON, JOHN.....	Aug. 15, 1900
BALDAMUS, AUGUSTE KARL EDUARD.....	Oct. 30, 1893
BLAKISTON, THOMAS WRIGHT.....	Oct. 15, 1891
BLASIUS, [PAUL HEINRICH] RUDOLPH.....	Sept. 21, 1907
BLASIUS, WILHELM AUGUST HEINRICH.....	May 31, 1912
BOGDANOW, MODEST NIKOLAEVICH.....	March 16, 1888
BRYANT, WALTER [PIERC]E.....	May 21, 1905
BULLER, WALTER LAWRY.....	July 19, 1906
COLLETT, ROBERT.....	Jan. 27, 1913
COOPER, JAMES GRAHAM.....	July 19, 1902
CORDEAUX, JOHN.....	Aug. 1, 1899
DAVID, ARMAND.....	Nov. 10, 1900
DUGÈS, ALFRED.....	Jan. 7, 1910
FATIO, VICTOR.....	March 19, 1906
HAAST, JULIUS VON.....	Aug. 16, 1887
HARGITT, EDWARD.....	March 19, 1895
HAYEK, GUSTAV EDLER VON.....	Jan. 9, 1911
HERMAN, OTTO.....	Dec. 27, 1914
HOLUB, EMIL.....	Feb. 21, 1902
HOMEYER, EUGEN FERDINAND VON.....	May 31, 1889
KNUDSEN, VALDEMAR.....	Jan. 8, 1898
LAYARD, EDGAR LEOPOLD.....	Jan. 1, 1900
LEVERKÜHN, PAUL.....	Dec. 5, 1905
LILFORD, LORD (THOMAS LYTTLETON POWYS).....	June 17, 1896
MARSCHALL, AUGUST FRIEDRICH.....	Oct. 11, 1887
MALMGREN, ANDERS JOHAN.....	April 12, 1897
MIDDENDORFF, ALEXANDER THEODOROVICH.....	Jan. 28, 1894
MOSISOVICS VON MOJSVAR, FELIX GEORG HERMANN AUGUST.....	Aug. 27, 1897
OATES, EUGENE WILLIAM.....	Nov. 16, 1911
OUSTALET, [JEAN FRÉDÉRIC] ÉMILE.....	Oct. 23, 1905

PHILIPPI, RUDOLF AMANDUS.....	July 23, 1904
PRJEVALSKY, NICOLAS MICHAELOVICH.....	Nov. 1, 1888
PRENTISS, DANIEL WEBSTER.....	Nov. 19, 1899
PRYER, HARRY JAMES STOVIN.....	Feb. 17, 1888
RADDE, GUSTAV FERDINAND RICHARD VON.....	March 15, 1903
SCHRENCK, LEOPOLD VON.....	Jan. 20, 1894
SÉLYS-LONGCHAMPS, MICHEL EDMOND DE.....	Dec. 11, 1900
SEVERTZOW, NICOLAS ALEKSYEVICH.....	Feb. 8, 1885
SHELLEY, GEORGE ERNEST.....	Nov. 29, 1910
STEVENSON, HENRY.....	Aug. 18, 1888
TRISTRAM, HENRY BAKER.....	March 8, 1906
WHARTON, HENRY THORNTON.....	Sept. —, 1895
WOODHOUSE, SAMUEL WASHINGTON.....	Oct. 23, 1904
HERMAN, OTTO.....	Dec. 27, 1914

MEMBERS.

BROWN, HERBERT.....	May 12, 1913
FANNIN, JOHN.....	June 20, 1904
HARDY, MANLY.....	Dec. 9, 1910
JUDD, SYLVESTER DWIGHT.....	Oct. 22, 1905
KNIGHT, ORA WILLIS.....	Nov. 11, 1913
PENNOCK, CHARLES JOHN (disappeared).....	May 15, 1913
RALPH, WILLIAM LEGRANGE.....	July 8, 1907
TORREY, BRADFORD.....	Oct. 7, 1912
WHITMAN, CHARLES OTIS.....	Dec. 6, 1910

ASSOCIATES.

ADAMS, CHARLES FRANCIS.....	May 20, 1893
ALLEN, CHARLES SLOVER.....	Oct. 15, 1893
ANTES, FRANK TALLANT.....	Feb. 6, 1907
ATKINS, HARMON ALBRO.....	May 19, 1885
AVERY, WILLIAM CUSHMAN.....	March 11, 1894
BAILEY, CHARLES E.....	—, 1905
BAIRD, LUCY HUNTER.....	June 19, 1913
BARLOW, CHESTER.....	Nov. 6, 1902
BAUR, GEORG [HERMANN CARL LUDWIG].....	June 25, 1898
BECKHAM, CHARLES WICKLIFFE.....	June 8, 1888
BILL, CHARLES.....	April 14, 1897
BIRTWELL, FRANCIS JOSEPH.....	June 28, 1901
BOARDMAN, GEORGE AUGUSTUS.....	Jan. 11, 1901
BOLLES, FRANK.....	Jan. 10, 1894

BRACKETT, FOSTER HODGES.....	Jan. 5, 1900
BRANTLEY, WILLIAM FOREACRE.....	Sept. 9, 1914
BREESE, WILLIAM LAWRENCE.....	Dec. 7, 1888
BRENINGER, GEORGE FRANK.....	Dec. 3, 1905
BRENNAN, CHARLES F.....	Mar. 21, 1907
BROKAW, LOUIS WESTEN.....	Sept. 3, 1897
BROWN, JOHN CLIFFORD.....	Jan. 16, 1901
BROWNE, FRANCIS CHARLES.....	Jan. 9, 1900
BROWNSON, WILLIAM HENRY.....	Sept. 6, 1909
BURKE, WILLIAM BARDWELL.....	April 15, 1914
BURNETT, LEONARD ELMER.....	March 16, 1904
BUTLER, [THOMAS] JEFFERSON.....	Oct. 23, 1913
CAIRNS, JOHN SIMPSON.....	June 10, 1895
CALL, AUBREY BRENDON.....	Nov. 20, 1901
CAMPBELL, ROBERT ARGYLL.....	April —, 1897
CANFIELD, JOSEPH BUCKINGHAM.....	Feb. 18, 1904
CARLETON, CYRUS.....	Nov. 15, 1907
CARTER, EDWIN.....	Feb. 3, 1900
CARTER, ISABEL MONTEITH PADDOCK (MRS. CARTER).....	Sept. 15, 1907
CHADBOURNE, ETHEL RICHARDSON (MRS. ARTHUR PATTERSON CHADBOURNE).....	Oct. 4, 1908
CHARLES, FRED LEMAR.....	May 6, 1911
CLARK, JOHN NATHANIEL.....	Jan. 13, 1903
COE, WILLIAM WELLINGTON.....	April 26, 1885
COLBURN, WILLIAM WALLACE.....	Oct. 17, 1899
COLLETT, [COLLETTE] ALONZO MCGEE.....	Aug. 22, 1902
CONANT, MARTHA WILSON (MRS. THOMAS OAKES CONANT).....	Dec. 28, 1907
CORNING, ERASTUS, JR.....	April 8, 1893
DAFFIN, WILLIAM H.....	April 21, 1902
DAKIN, JOHN ALLEN.....	Feb. 21, 1900
DAVIS, SUSAN LOUISE (MRS. WALTER ROCKWOOD DAVIS).....	Feb. 13, 1913
DAVIS, WALTER ROCKWOOD.....	April 3, 1907
DEXTER, [SIMON] NEWTON.....	July 27, 1901
DODGE, JULIAN MONTGOMERY.....	Nov. 23, 1909
DYCHE, LEWIS LINDSAY.....	Jan. 20, 1915
ELLIOTT, SAMUEL LOWELL.....	Feb. 11, 1889
FAIRBANKS, FRANKLIN.....	April 24, 1895
FARWELL, MRS. ELLEN SHELDON DRUMMOND.....	Aug. 6, 1912
FERRY, JOHN FARWELL.....	Feb. 11, 1910
FISHER, WILLIAM HUBBELL.....	Oct. 6, 1909
FOWLER, JOSHUA LOUNSBURY.....	July 11, 1899
FULLER, CHARLES ANTHONY.....	Mar. 16, 1906
GESNER, ABRAHAM HERBERT.....	April 30, 1895
GOSS, BENJAMIN FRANKLIN.....	July 6, 1893
HALES, HENRY TEASDEL.....	Nov. 6, 1913
HATCH, JESSE MAURICE.....	May 1, 1898

HILL, WILLIAM HENRY.....	Oct. 14, 1913
HODLEY, FREDERICK HODGES.....	Feb. 26, 1895
HOLMES, LARUE KLINGLE.....	May 10, 1906
HOOPES, JOSIAH.....	Jan. 16, 1904
HOWE, FLORENCE AURELLA.....	July 9, 1913
HOWE, LOUISE.....	Sept. 13, 1912
HOWLAND, JOHN SNOWDEN.....	Sept. 19, 1885
INGERSOLL, JOSEPH CARLETON.....	Oct. 1, 1897
JENKS, JOHN WHIPPLE POTTER.....	Sept. 26, 1894
JESURUN, MORTIMER (disappeared).....	Feb. 19, 1905
JOUY, PIERRE LOUIS.....	March 22, 1894
KELKER, WILLIAM ANTHONY.....	Feb. 15, 1908
KNIGHT, WILBER CLINTON.....	July 28, 1903
KNOX, JOHN COWING.....	June 10, 1904
KOCH, AUGUST.....	Feb. 15, 1907
KUMLIEN, LUDWIG.....	Dec. 4, 1902
KUMLIEN, THURE LUDWIG THEODOR.....	Aug. 5, 1888
LAWRENCE, ROBERT HOE.....	April 27, 1897
LEE, LESLIE ALEXANDER.....	May 20, 1908
LEVEY, WILLIAM CHARLESWORTH.....	July 5, 1914
LINDEN, CHARLES.....	Feb. 3, 1888
LLOYD, ANDREW JAMES.....	June 14, 1906
MABBETT, GIDEON.....	Aug. 15, 1890
MAITLAND, ALEXANDER.....	Oct. 25, 1907
MARBLE, CHARLES CHURCHILL.....	Sept. 10, 1900
MARCY, OLIVER.....	March 19, 1899
MARIS, WILLARD LORRAINE.....	Dec. 11, 1895
MARSDEN, HENRY WARDEN.....	Feb. 26, 1914
MC EWEN, DANIEL CHURCH.....	Nov. 1, 1909
McKINLAY, JAMES.....	Nov. 30, 1899
MEAD, GEORGE SMITH.....	June 18, 1901
MINOT, HENRY DAVIS.....	Nov. 13, 1890
MORRELL, CLARENCE HENRY.....	July 15, 1902
NICHOLS, HOWARD GARDNER.....	June 23, 1896
NIMS, LEE.....	March 12, 1903
NORTHROP, JOHN ISAIAH.....	June 26, 1891
PARK, AUSTIN FORD.....	Sept. 22, 1893
PAULMIER, FREDERICK CLARK.....	March 4, 1906
POMEROY, GRACE V.....	May 14, 1906
RAGSDALE, GEORGE HENRY.....	March 25, 1895
RAWLE, FRANCIS WILLIAM.....	June 12, 1911
READY, GEORGE HENRY.....	March 20, 1903
REED, CHESTER ALBERT.....	Dec. 16, 1912
RICHARDSON, JENNESS.....	June 24, 1893
ROBINS, JULIA STOCKTON (MRS. EDWARD ROBINS).....	July 2, 1906
SAND, ISABELLA LOW.....	April 20, 1906

SELOUS, PERCY SHERBORN.....	April 7, 1900
SLATER, JAMES HOWE.....	Feb. 22, 1895
SLEVIN, THOMAS EDWARDS.....	Dec. 23, 1902
SMALL, EDGAR ALBERT.....	April 23, 1884
SMALL, HAROLD WESLEY.....	Mar. 12, 1912
SMITH, CLARENCE ALBERT.....	May 6, 1896
SMITH, RUTH COOK (MRS. H. A. HAMMOND SMITH).....	Jan. 2, 1912
SNOW, FRANCIS HUNTINGTON.....	Sept. 20, 1908
SOUTHWICK, JAMES MORTIMER.....	June 3, 1904
SPAULDING, FREDERICK BENJAMIN.....	Oct. 22, 1913
STONE, WILLARD HARRISON.....	March 15, 1895
SWEIGER, HELEN BRONSON (MRS. JACOB L. SWEIGER).....	March 24, 1907
TAYLOR, ALEX. O'DRISCOLL.....	April 10, 1910
THOMPSON, MILLETT TAYLOR.....	Aug. 7, 1907
THORNE, PLATT MARVIN.....	March 16, 1897
THURBER, EUGENE CARLETON.....	Sept. 6, 1896
UPHAM, MARY CORNELIA (MRS. WILLIAM HENRY UPHAM).....	Nov. 29, 1912
VENNOR, HENRY GEORGE.....	June 8, 1884
WATERS, EDWARD STANLEY.....	Dec. 27, 1902
WELLES, CHARLES SALTER.....	Feb. 24, 1914
WILLARD, SAMUEL WELLS.....	May 24, 1887
WILSON, SIDNEY STEWART.....	Nov. 22, 1911
WISTER, WILLIAM ROTCH.....	Aug. 21, 1911
WOOD, WILLIAM.....	Aug. 9, 1885
WOODRUFF, EDWARD SEYMOUR.....	Jan. 15, 1909
WORTHEN, CHARLES KIMBALL.....	May 27, 1909
YOUNG, CURTIS CLAY.....	July 30, 1902

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CONTINUATION OF THE
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Vol. XXXII }

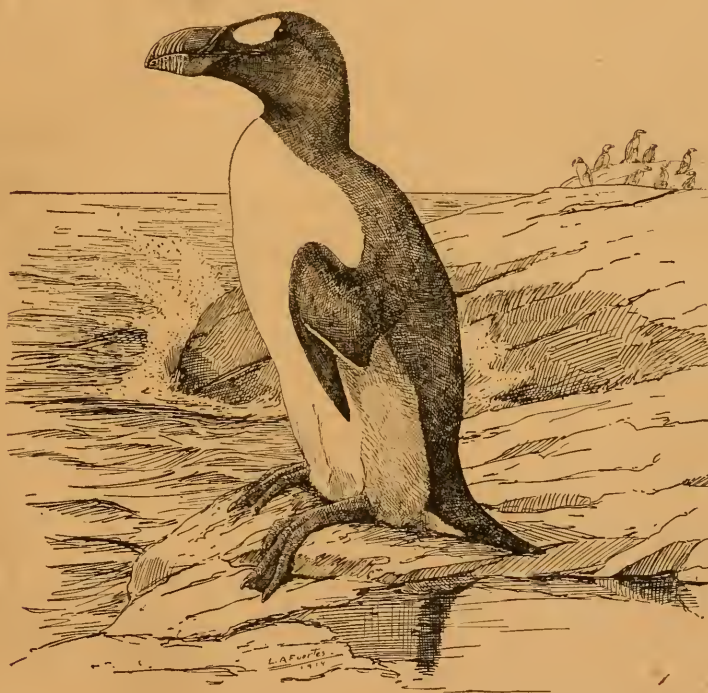
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CONTENTS

	PAGE
ON THE TRAIL OF THE IVORY-BILL. By <i>Frederic H. Kennard</i> . (Plates I-III)	1
LIST OF THE BIRDS OF LOUISIANA. Part VI. By <i>H. H. Kopman</i>	15
ANATOMICAL AND OTHER NOTES ON THE PASSENGER PIGEON (<i>Ectopistes migratorius</i>) LATELY LIVING IN THE CINCINNATI ZOOLOGICAL GARDENS. By <i>Dr. R. W. Shufeldt</i> . (Plates IV-VI)	29
TEN HOURS AT FERNANDO NORONHA. By <i>Robert Cushman Murphy</i>	41
NOTES ON AMERICAN AND OLD WORLD ENGLISH SPARROWS. By <i>John C. Phillips</i>	51
A NEW SUBSPECIES OF SCREECH OWL FROM CALIFORNIA. By <i>J. Grinnell</i>	59
EARLY RECORDS OF THE WILD TURKEY. III. By <i>Albert Hazen Wright</i>	61
THE PRESENT STATUS OF THE TRUMPETER SWAN (<i>Olor buccinator</i>). By <i>Henry K. Coale</i> . (Plates VII-X)	82
NOTES ON A CAPTIVE VIRGINIA RAIL. By <i>Alvin R. Cahn</i>	91

GENERAL NOTES.— Concealing Posture of Grebes, 95; The Double-crested Cormorant in the Chicago Area, 95; Note on the Feeding of the Mallard, 96; Piping Plover at Cape May, N. J., 97; The Yellow-crowned Night Heron in Colorado. A Correction, 97; The American Bittern Nesting on Long Island, N. Y., 97; Cory's Least Bittern in Illinois, 98; Willow Ptarmigan in Minnesota, 99; Audubon's Caracara in New Mexico, 100; Actions of the Red-tailed Hawk, 100; Richardson's Owl in Illinois, 101; An albinistic Bobolink, 101; Leconte's Sparrow in Wisconsin, 101; The Evening Grosbeak at Portland, Maine, 102; Two Species of Cliff Swallow Nesting in Kerr County, Texas, 102; The Cape May Warbler in Eastern Massachusetts, 104; The Records of the Tennessee and Cape May Warblers in Southwestern Maine, 104; Cape May and Tennessee Warblers in Philadelphia, 106; San Lucas Verdin in Arizona, 106; Bluegray Gnatcatcher nesting in Wisconsin, 106; Robin's Nests, 106; Two New Records for British Columbia, 107; Some Unusual Breeding Records from South Carolina, 108; Notes on Some Birds of the Maryland Alleghanies; An Anomaly in the Check-List, 108; The Status of the Song Sparrow and the Chipping Sparrow as Early Birds, 110.

RECENT LITERATURE.— Cooke's 'Distribution and Migration of North American Rails,' 113; Wetmore on the Growth of the Tail Feathers of the Giant Hornbill, 113; Chapman on New Colombian Birds, 114; Shufeldt on the Young of *Phalacrocorax atriceps georgianus*, 114; 'Alaskan Bird-Life,' 114; Mrs. Bailey's 'Handbook of Birds of the Western United States' Fourth Edition, 115; McIlhenny's 'The Wild Turkey and Its Hunting,' 115; Mathews' 'Birds of Australia,' 116; Kuroda's Recent Ornithological Publications, 116; The Annual Report of the National Association of Audubon Societies, 117; Recent Literature on Bird Protection, 117; Studies in Egg Production in the Domestic Fowl, 118; Birds as Carriers of the Chestnut-Blight Fungus, 119; Reichenow's 'Die Vögel,' 119; Second Report on the Food of Birds in Scotland, 121; Felden on Birds of Trinidad and Tobago, 121; The Ornithological Journals, 123; Ornithological Articles in Other Journals, 128; Publications Received, 131.

CORRESPONDENCE.— Obituary Notices, 133; Time of Incubation, 134; Changes in By-Laws of the A. O. U., 134.

NOTES AND NEWS.— Obituary; Theodore N. Gill, 139; The San Francisco Meeting of the A. O. U., 140; Importation of Rhea plumage, 142; Full Names of Authors in 'The Auk,' 143; Book Notice, 144; Exhibition of Water colors of Birds, 144.

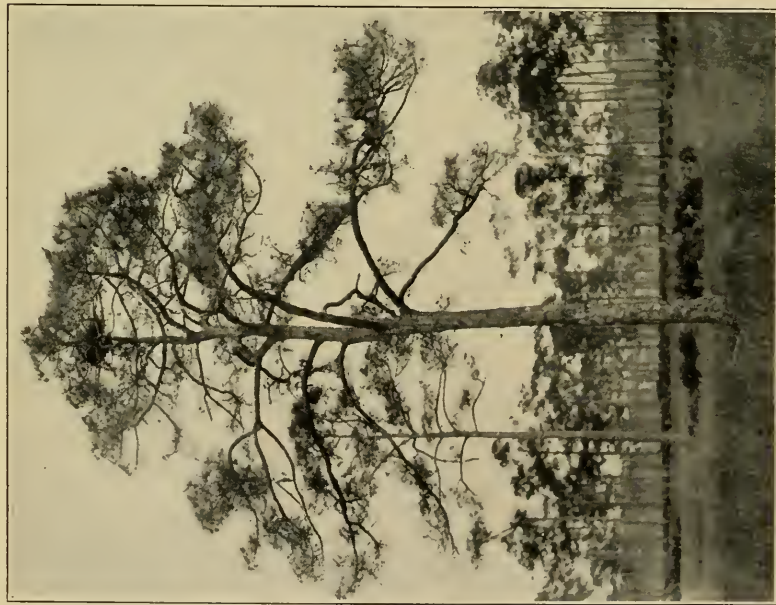
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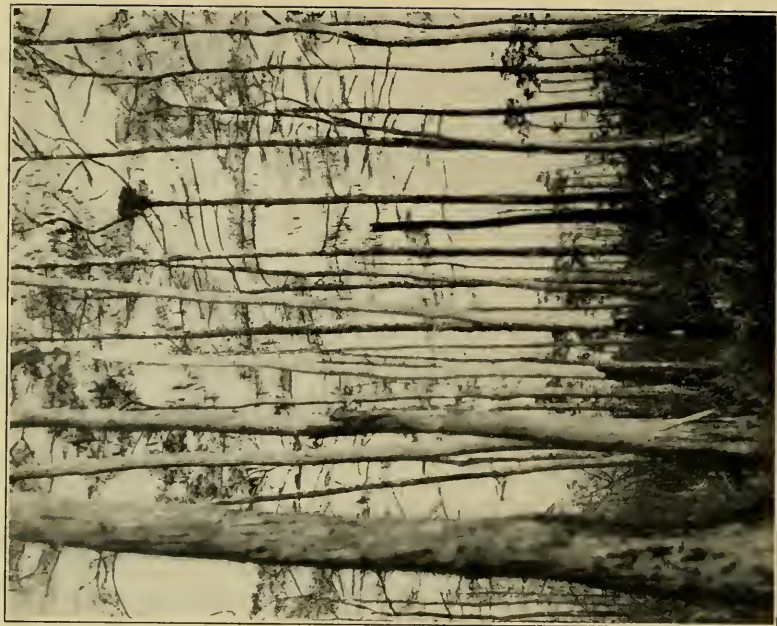
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1. NEST OF AUDUBON'S CARACARA.



2. NEST OF FLORIDA RED-SHOULDERED HAWK.

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No. 1.

ON THE TRAIL OF THE IVORY-BILL.

BY FREDERIC H. KENNARD.

Plates I-III.

AFTER years of looking forward to a hunting trip in the Florida Big Cypress Swamp, my hopes seemed about to be realized when on the 14th of February, 1914, the teamster, Peter Hogan, started from Fort Myers with our outfit, in a wagon very much like an old-fashioned prairie schooner, hauled by two good looking yoke of oxen; while my guide, Tom Hand, and I were to follow the next day in an automobile; it being our intention to catch up before Peter reached the Big Cypress, and leaving the machine at its edge, go on with him.

The wagon was a stout, broad tired affair, with top like a prairie schooner, and easily held our outfit. We used oxen because, though slow, they could with their spreading toes, pull a wagon through places where horses and mules would be sure to bog down.

Tom and I started the next day soon after daylight, for Immokalee, about thirty-two miles southeast of Fort Myers, running through rather uninteresting open pine woods for almost the entire distance. We bogged down just south of Immokalee, had to cut several trees to use as levers, and finally after building a miniature corduroy road, managed to pry the machine out of the mud and caught up with Peter about eight miles further south, where we camped for the night.

When leaving Fort Myers in the morning, we saw a few Florida Grackles fussing about the orange trees in front of the hotel. A

Mockingbird was warbling from a neighboring telegraph pole, Florida Bluejays were feeding among the palms, and a Loggerhead Shrike was singing somewhere in the grounds. Purple Martins were flying about the water tank at the rear of the hotel, and the omnipresent English Sparrow was yapping among the out-buildings. In the bay back of the house was a bunch of about thirty very tame Lesser Scaup Ducks, close in by the sea wall, while just outside, a couple of big Brown Pelicans were wheeling about in the air, or flopping down into the water; and several gulls and some large terns were flying about.

On our way through the pine woods we saw Turkey Buzzards, of course, and a few Florida Crows, Florida Jays, and Florida Bluejays, Flickers, Pileated, Red-cockaded and Red-bellied Woodpeckers. There were numerous warblers flitting about the tree tops, but in our hurry we only identified the Pine and Myrtle. There were a few sparrows also in the underbrush, which we had no time to identify. We saw Phœbes, Bluebirds, numerous Shrikes, Florida Red-wings, Mourning Doves, and several Kingfishers flying about the sloughs or lakes that we passed in the open places. We saw several large herons, either Ward's or Great Blue, a small flock of Little Blue Herons, about half of which were white, one Louisiana Heron, and in the distance, one large white heron, probably an Egret. There were numbers of Florida Meadowlarks, and after we had passed Immokalee we began to get into the country of the Sandhill Cranes.

About sixteen miles out from Fort Myers we discovered the nest of an Audubon Caracara, placed about thirty-five feet up in the top of a pine, just beside the trail. The nest was a rather bulky affair built of sticks, coarse beneath and finer above, with a depression in the top about four inches deep, lined with weeds, and containing one fresh egg. The birds did not seem to be particularly wild, and at first watched us curiously from a neighboring tree, and later flew off to the edge of an adjoining slough.

Immokalee is a typical little Florida hamlet and consists of a church, several houses, one of which contained a postoffice, a so-called store, and several small orange groves. Its oldest inhabitant, Mr. W. H. Brown, an Englishman who has lived there for forty years trading with the Seminoles, boasted that the town was the highest in Lee County just twenty-one feet above the sea!

The next morning, February 16th, we went on through the pine woods, about seven miles, to the "Rock Spring Crossing" at the edge of the Big Cypress, where we left our automobile in the woods, beneath an extemporized canvas tent. We bogged down twice, en route, and had to wait, both times, for the oxen to catch up and pull the machine out of the mud, a soft marley clay.

The country had been very uninteresting, and comparatively birdless, only a few sparrows and a buzzard or two having been seen, and the tracks of a few turkeys. After caching the auto, and eating a hasty lunch, we took to the swamp, the main "strand" of the Big Cypress, and for four miles plodded, and waded, and cleared the trail of prostrate trees and overhanging boughs that threatened the schooner's superstructure.

On the margin of the swamp and its bordering jungle, we saw a Catbird, a Brown Thrasher, and a few Florida Yellow-throats, but after we got into the swamp itself we saw not a bird until we reached a small cabbage hammock about half a mile from the other side, which was fairly alive with them. Chickadees (I do not know whether they were Carolina or the Florida sub-species), Tufted Titmice, many unidentified warblers, Pileated and Red-bellied Woodpeckers were flying about, while in the waters of the swamp adjoining there waded numbers of Louisiana Herons, Green Herons, Egrets, Wood Ibis, Black-crowned Night Herons, and large herons, either Ward's or Great Blues.

On coming out of the swamp the trail led across a fine large hammock of open pine woods, interspersed with cabbage palms, live-oaks, and an undergrowth of saw-palmettos, dotted here and there with numerous depressions filed with cypress and jungle. Peter and I went ahead looking for a "burn" on which to camp, near water and pasturage, while Tom took my rifle, and soon brought in two turkeys which he had "roosted" in a cypress, near the edge of the swamp.

In choosing a camp site in this country one should usually choose a "burn," or place that has recently been burned over, as otherwise one may return to camp, only to find that it has vanished in smoke.

The natives everywhere in this region; cowboys, alligator hunters, and Indians alike, seem to travel with boxes of matches in their pockets, which they distribute impartially as they ride through

the country, generally in order to make better pasturage for their cattle; but in this particular region where there are no cattle, in order to burn out the thickets and jungle, which would otherwise become impenetrable, and to supply food and convenient hunting grounds for deer and turkey which come out on the "burns" to feed on the fresh young growth.

We stayed here until the 19th, wading the swamps, beating the brush, or exploring the neighboring savannahs; collecting a few birds here and there, and filling our larder with turkeys and venison, both fresh and smoked, but always keeping in mind the main object of the expedition, the Ivory-billed Woodpecker. Pileated Woodpeckers there were in plenty, and I would not even try to guess the number of miles we foolishly traveled after large woodpeckers and strange noises that we thought might perchance emanate from an Ivory-bill. They were always Pileateds.

In the swamps there were herons galore; Ward's, Louisianas, Little Blues, Greens, and Black-crowned Night Herons, Wood Ibis or Flint-heads as they are locally called, bunches of White Ibis, numbers of American Bittern, and an occasional Egret. In the main swamp also were numerous fresh tracks of otter, bear, several large alligators, to say nothing of flocks of little fellows. Along the edges the joyous Carolina Wren was almost always in evidence, while on the hammocks numbers of Florida Quail and Mourning Doves flew up almost from under our feet. Florida Barred Owls were everywhere, and as usual particularly loquacious, and Tom could talk their language better than anyone I ever heard. Turkey Buzzards were always soaring somewhere in sight, particularly when we had meat hung up; and a pair of Florida Sparrow Hawks had a nest in an old pine stub close beside the camp. There were warblers in the tree tops, particularly in the cabbage palms, where they, as well as almost every other bird in the vicinity, seemed to find food among the ripe fruit that hung there. Even the Pileated Woodpeckers fed freely on the berries.

There were turkeys here, singly, in pairs and in flocks; sometimes two or three of them would stampede right through camp while we were sitting there, perhaps skinning one of their relatives; while in the mornings and evenings we could always hear the old gobblers a-gobbling from their chosen perches.

I do not think that throughout the entire trip there was ever a morning in which we could not hear at least two or three gobblers, apparently vying with each other, and everybody else for that matter, as to which could make the most noise. If we had heard a gobbler in the distance and wanted to locate him, all we had to do was to let out a few unearthly hoots, like a very large Barred Owl, and he would invariably reply; and once I remember when Tom, at dusk, had shot a small turkey from the top of a cypress tree, the old gobbler that was sitting unobserved on a nearby pine, let out a series of record breaking gobbles in an apparent effort to outdo the shotgun.

Right here perhaps a brief description of our methods of hunting turkeys may be of interest to those unfamiliar with this much written up subject. Briefly, we either "called," "roosted" or "still hunted" them.

For "calling" or "yelping" we got up in the morning before daylight, and after making our way to a comparatively open space near which we knew some gobbler roosted, we would hide in the brush or behind a tree, and then imitating the call of a hen, coax him down from his perch and up within gun shot. Usually the smaller hollow wing-bone of a turkey hen is used as a "yelper" for this purpose; but Tom could conjure the most coaxing calls out of a piece of grass, a leaf or any thing. At this season of the year very little coaxing is really necessary, and the old gobblers would come in on the run at the slightest provocation.

The hens usually roost in a tall cypress near the edge of the swamp, while the old gobblers, at this season seem exclusive, and prefer to roost alone; usually in some tall pine on the nearby hammock. Then when morning comes, after a few preliminary gobbles when the hens have flown down and begun to feed, the old gobbler comes down and is supposed to pay his respects to each of his consorts, or for that matter any other consort that happens to be near.

When the birds are to be "roosted," if it is a gobbler you are after, it is comparatively easy to locate him by his gobbling. If there is any uncertainty as to his exact direction, gobble, or hoot like an owl, and unless he sees you he will invariably reply. Then work your way carefully in his general direction until you have him

located accurately, and then when it is sufficiently dark, creep up with infinite pains to some spot where you can shoot him in the head. It is hardly believable to one who has not tried to locate him how inconspicuous a very large old gobbler may be while sitting in perfectly plain sight, on the limb of a big old pine. My objection to this method of hunting is that when a large bird like a gobbler, weighing fifteen to eighteen pounds, falls seventy-five feet or so from the top of a tall tree he is likely to damage his plumage by striking the limbs and be ruined as a specimen.

"Still hunting" hardly needs a description further than to say that one must know something of the habits of the birds and their daily haunts, and remember that a turkey's eyes are extremely sharp, and that it can run like a deer. There was one enormous old gobbler that I particularly wanted to bring home to an unbelieving friend of mine, and I laid for him on several occasions. I knew almost exactly where to find him at a certain hour in the afternoon, and would approach this particular hammock as stealthily as possible, only to be rewarded each time by seeing him scooting across the prairie to a neighboring swamp. Once, and only once, I chased him. He never seemed really to hurry and disdained taking to his wings. We named this particular place "the quarter mile run"; and yet I have on several occasions walked almost onto an old gobbler "a-droning" in the middle of the trail.

The turkeys of this region are reputedly the smallest of the Florida subspecies; the hens that we shot weighing from five and three quarters to eight and a half pounds, but old hens, I am told, frequently weigh as much as ten pounds or more and I know of one big one that weighed eleven pounds. The young gobblers that we shot weighed from eight and a half to ten pounds, and I am informed, frequently weigh as much as twelve, or even in extreme cases, fourteen pounds. The old gobblers that we collected on this trip, and we did not kill any very large ones, weighed from fifteen to eighteen pounds, but I know of Big Cypress gobblers that have been weighed by friends of mine whose evidence is unquestionable, that weighed twenty-two, twenty-three, and in one extreme case, twenty-five pounds.

On the afternoon of February 19 we broke camp for a hammock



FLORIDA WILD TURKEYS IN DEEP LAKE GROVE.

1. Gobbler.
2. Hens.

about four miles away, where there was an isolated grove of orange and grapefruit trees belonging to Mr. Frank Van Agnew of Kissimmee, Florida, who had very kindly offered me all the hospitality possible. This grove really was the objective point of our expedition, for it was here in 1908, that a friend of mine had seen Ivory-bills, and had presented me with the skin of a beautiful male as a proof that these rare birds were still to be found in southern Florida. On the trail, which led through a fairly dry and more or less open country, we saw several deer and numerous turkeys, several bunches of Quail, and one Great Crested Flycatcher, besides the usual number of warblers, woodpeckers, etc.

Upon arriving at Van Agnew's, we found, on the edge of the open pine woods, a very comfortable three room bungalow with an open hallway and piazza, built of cypress and set upon posts about six feet above the ground, which at certain seasons of the year is under water. A short distance away, across an open space and a piece of pretty wet cypress swamp, was the hammock, with about ten acres above flood level planted with a very healthy looking grove of trees. Somebody had been there ahead of us and abstracted the oranges. The grapefruit were however still there, the trees loaded with them; and they tasted very good to us after the villainous water that we had been forced to drink for the last few days. Distances are great in Florida and the natives do not think much of them. It has been customary to drag this fruit to market sixty miles by ox team.

I had come on ahead of the rest of the party, and while waiting for them, put in my time exploring the grove. On my entrance a whole flock of turkeys rose just in front of me, lit in some live oaks at the edge of the swamp, and I was lucky enough to knock over two of them with my rifle.

The ground, except for little circles, which had been cultivated immediately about the trees, was waist high with a luxuriant growth of weeds, which were reported to be full of rattlers. The surrounding swamp I knew to be full of moccasins, and the prospect was creepy. There were a few cabbage palms and live oaks scattered through the grove, and about the edge of the clearing was an almost impenetrable jungle of live oaks, underbrush, vines, etc., which gradually merged into the more open cypress swamp

beyond. Even here the going was not any too easy; the cypress trees were very tall and I had an attack of cold feet every time I thought of the job I had before me, if by any chance I should happen to be lucky enough to discover that needle in a haystack, an Ivory-bill's nest, in the top of one of those trees.

We camped here until March 1st, sleeping by preference on the piazza, and out of reach of the elements and things that crawl. Game was plenty, fine water in a cistern by the house, and the ever present grapefruit, with which to assuage our thirst.

The only drawback was the sickness of one of Peter's oxen, which came very near dying, poisoned apparently by something it had eaten; and the loss of which might, we were afraid, seriously handicap our expedition. It seems there is something that grows hereabouts, which if eaten by the cattle is apt to cause them to sicken and die, and which invariably seems to kill the calves. The cattle men have, on this account, not yet invaded this country.

Pigs, too, find it unhealthy, as the bear and panther are apt to make away with them; and a "cracker" has little use for a region that is neither healthy for cattle nor pigs.

The country is too difficult of access for the average sportsman, so that with the exception of a few Seminoles and an occasional alligator hunter or a few "crackers," who are "hiding out," the region is practically uninhabited, and one of the finest natural game preserves I have ever visited.

Deer, turkey and quail abound. Signs of bear were all about us, and some of them big ones too; their tracks where they lumbered through the swamps and the marks where they had sharpened their claws on the cabbage palms, not infrequently helping themselves to the very edible buds thereof. Peter, late one afternoon, found a nest where an old she bear had very recently had her cubs in some brakes on a cabbage hammock in the swamp, about half a mile from camp.

On the 20th we hunted unsuccessfully all day for signs of Ivory-bills, but it was not until the afternoon of the 21st, while Peter and I were off hunting in another part of the swamp, that Tom, who was on the watch in the grove, was lucky enough to discover a female Ivory-bill, which he followed for four or five hours. There was considerable excitement in camp that night, when we all turned up for supper.

The next day, immediately after breakfast, the bird again appeared in the grove and from 8.20 till 8.40 A. M. clung to the side of a cabbage palm about fifteen feet up, and only about fifty feet from where Tom and I were hiding. She simply clung there uttering her call note, often accompanied by an upward and forward movement of her head, and sometimes by a sudden slight movement of her wings.

The note was entirely different from anything I had ever heard, and reminded me of one of those children's toys that one squeezes, or better still a child's tin trumpet, for the note had rather a metallic ring. It was uttered at intervals, averaging about one second apart, though sometimes longer; once, twice, thrice or more in succession. Later in the day when the bird was hitching up the side of a tree, I counted one hundred and seventy-four calls in four minutes.

Audubon says that the note resembles "the false high note of a clarinet," while Wilson describes it thus: "His common note, repeated every three or four seconds, very much resembles the tone of a trumpet or the high note of a clarinet, and can plainly be distinguished at a distance of half a mile, seeming to be immediately at hand; though perhaps more than a hundred yards off. This it utters while mounting along the trunk or digging into it." A good description of the note, and its ventriloquial peculiarities.

At 8.40 A. M. the bird flew north, down into the swamp. Tom followed her through the jungle, while I kept watch in the grove, either for her return or the possible advent of her mate. She fed in the swamp quietly until 9.20, when she again started calling, and kept it up until 9.50 A. M., when she flew off north, further into the swamp, where we lost her. At 11.05 A. M. the bird again appeared at the edge of the jungle, and kept up her calling until 2 P. M., when we went back to camp for lunch. At 3. P. M. we returned, this time accompanied by Peter, and though the three of us spent the rest of the day beating about the swamp, we were unable to find any trace of the bird.

From now on there was always one of us on the watch in the grove for the Ivory-bill; while the other two spent their time cruising the adjoining country. On February 23, at 5.50 A. M. Tom heard a bird call three times from the cypress swamp south-

east of the grove, and a few notes at a time for the next thirty minutes. He did not get sight of the bird, and from then until the morning of March 1st, neither of us saw or heard her again. The male, if there was one, was never seen, though they should have been breeding at this time. We waded through miles of swamp, crawled through miles of jungle, dodging snakes, and devoured by red bugs, our necks stiff from searching the tree tops for possible nests. Pileateds were in abundance, and we found several of their nests, but no Ivory-bills.

The grove itself and its immediate surroundings, were fairly alive with bird life; Mockingbirds, Redbirds, Catbirds, Florida Yellowthroats, Great Crested Flycatchers, and noisiest of them all some Vireos, none of which I collected, but which I suppose were the Key West Vireos. Turkey Buzzards were always soaring somewhere overhead. Florida Red-shouldered Hawks were forever screaming, and even in broad daylight, the hooting of Florida Barred Owls could often be heard. Occasionally a beautiful Swallow-tailed Kite could be seen overhead in swift and graceful flight; and that most characteristic of Florida woodpeckers, the Red-bellied, was always somewhere in hearing. Florida Grackles were wading about the mud in the swamp between the hammock and bungalow, and the croak of White Ibis could be heard deeper in the swamp. Brown-headed Nuthatches and chickadees were in the pine woods about the bungalow, while Tufted Titmice could often be heard in a willow thicket down by the edge of the swamp, and there were colonies of Boat-tailed Grackles in some of the many sloughs.

On February 23 we saw our first Robins, a whole flock of them; and I shot a male Red-headed Woodpecker, which seems to be a rather uncommon bird in this vicinity. Of quail there were many bunches.

On the morning of March 1, after we had become thoroughly disgusted and the sick ox seemed well enough to be led, we broke camp for a pine island five or six miles further south. Just before leaving Tom and I went over to the grove for a last look for the Ivory-bill and incidentally for a few grapefruit. We were picking the fruit, and had our bag almost full when we heard several very loud woodpecker calls, closely resembling the "pump handle" note of the Flicker in the breeding season, and that lone widow



1. PETER HOGAN AND THE 'SCHOONER.'

2. DEEP LAKE, FLORIDA.

"pecker bird" as Tom called her, flew out from the swamp and onto the side of a cabbage palm, only about sixty feet away from me. She joined her mate, if mate he be, in my collection. On dissection her ovaries showed no sign of the breeding season.

We traveled about five miles across a very uninteresting country of scattered "pine islands," "cypress heads," "strands," and broad savannahs, until we came to a rocky "pine island," where we found a poor camping site on a "burn," near a depression in which we scraped a hole for some vile water. We camped here because it was centrally located in a country over which we wished to hunt.

The next day Peter and I, leaving Tom at camp, tramped to Deep Lake about six miles, through more "pine islands" and "cypress strands," across prairies which were still pretty wet and on which we saw a few Killdeer. At Deep Lake there is a hammock with a fine grove of several hundred acres owned by a company, to the superintendent of which Mr. Walter G. Langford of Fort Myers had very kindly given me letters, and in whose care also I had had my mail sent.

Here, while walking through the grove to the superintendent's bungalow, we saw several flocks of turkeys scurrying away across the aisles among the grapefruit trees, and counted over forty hens and one gobbler. These birds, which are here protected, become very tame and can be seen at almost any time from the piazza of the house running about and feeding among the trees of the grove, and the superintendent showed me one old cypress stub just back of the cook's camp where a little earlier in the season about seventy-five turkeys roosted nightly.

Deep Lake is a beautiful little sheet of water entirely surrounded by huge cypress draped with hanging moss. Several alligators were sunning themselves upon the surface. Snake-birds were flying rapidly overhead or perching with the Turkey Buzzards who sat indolently on some of the overhanging boughs, while numbers of Black Buzzards were soaring high above. Florida Gallinules were running or swimming about the edge of the lake, several Swallow-tailed Kites were flying about the nearby grove, Pileated and Red-bellied Woodpeckers seemed everywhere, and Florida Crows and Fish Crows were calling from a neighboring stub.

March 4th all hands were up early, preparing to start north for

Van Agnew's, when to our disgust we discovered that the oxen were missing. This was not an at all uncommon event, and while the men were off hunting them up, Charlie, the Deep Lake colored hunter-cook, wandered into camp with a letter for me, and a yarn to the effect that the teamster at Deep Lake had yesterday seen three Ivory-bills, just south of the grove. While I put no faith in the story, for no one hereabouts seems to know that there are two large species of woodpecker, I thought it best to change my plans, and as soon as the oxen were driven in, traveled south to Deep Lake, where we camped on a hammock just north of the grove. Here we stayed for a week, hunting the region as thoroughly as possible for signs of Ivory-bills, but without success.

On the 7th, I went to Everglade, some fifteen miles south, over a new railroad they were constructing from Everglade to Deep Lake in order to be able to market the thousands of cases of fruit which had heretofore been allowed to rot on the ground. The railroad had already been constructed to within half a mile of the grove and Mr. John M. Roche, the principal owner, very kindly took me over the line on his "private car," a small flat car with a settee tied onto it. The rails were laid on ties of almost any kind of wood, laid flat upon the surface of the prairie, with long trestles over the numerous bog holes, and bridges over the creeks. As we traveled south from Deep Lake the cypress swamps rapidly dwindled both in number and in the size of trees, and gave place gradually to the mangroves, both black and red. The swamp immediately about Deep Lake seeming to mark the southerly boundary of the large cypress.

The southern terminus of the railroad was on the north shore of Allen's Creek, about three quarters of a mile above Everglade, where besides a few scattered houses, there is a postoffice, store and a little hotel, all run by Mr. G. W. Storter.

On March 8th, as we had found no signs of Ivory-bills and as the sick ox seemed considerably better, we yoked up the cattle and as the water had dried up considerably, were able to make the entire twelve miles to Van Agnew's in one day. Nothing of particular interest happened on the road except that I slew a large moccasin, the second largest I have ever seen. He was five feet six inches long, about three and one half inches in diameter, and contained a

recently swallowed snake three feet long and about two inches in diameter, and another partially digested, eighteen inches long, and about one and a quarter inches in diameter.

We stayed at Van Agnew's until the 10th, replenishing our water and grapefruit supplies, hunting turkeys etc., and, of course, always on the outlook for a glimpse of an Ivory-bill.

On March 10th we moved north to our first camping ground in the Big Cypress where we stayed for two days, hunting turkey hens of which we had hitherto secured but few good specimens. We had killed only gobblers at first thinking that we could get the hens at any time, but as the hens were now taking to the woods for their nesting season good specimens had not been so easy to secure.

The next day, while Tom was again hunting hens, Peter and I explored the nearby strand of the big swamp in a last hunt for the elusive Ivory-bill but without success. Red-bellied Woodpeckers were breeding and in the woods only a little way from camp a Pileated Woodpecker was sitting on a nest, about seventy-five feet up in the top of a tall cypress. The nest was evidently very shallow, for the bird, a male, invariably sat with his head out of the window apparently examining the surroundings. One Florida Red-shouldered Hawk's nest that we investigated, contained a day old chick and one pipped egg.

On Friday the 13th of March, we broke camp, and after crossing the main strand of the swamp, in which the waters had now subsided considerably, said goodby to the Big Cypress and its many attractions.

In my early youth I had had a geography in which was a picture, supposedly of the Big Cypress Swamp, with an Indian magnificently gotten up in war paint, feathers, etc., just stepping into a birch bark canoe from a wooded bank. That picture, which at the time made a great impression on me, might have been fairly accurate except for the fact that the Seminoles neither wear war paint nor feathers, do not build birch bark canoes, and there are no wooded banks in the Big Cypress. The few Indians that we saw were much better dressed than I. Their canoes are long, very graceful dugouts, made from cypress logs.

The region known as the Big Cypress covers a large area, extending in a generally northeasterly direction from near the gulf coast to a point a few miles southeast of Immokalee, and is very different

from those saw-grass areas, known as Everglades, which cover the greater part of southern Florida, and with which it is often confused by northerners. The Big Cypress consists of a series of swamps, the "main strand" with outreaching arms or "strands", and "cypress heads," interspersed with broad savannahs and prairies, with occasional sawgrass sloughs. All of these are under water for several months in the year; and are dotted here and there with small areas, elevated a few feet above the reach of the ordinary floods, known as hammocks, which are covered with a growth of pine, cabbage palm, live oaks, saw palmetto, etc., and to which, in time of flood, the game of the region resorts.

Our trip, so far as Ivory-bills were concerned, had been pretty discouraging. We had secured one specimen, to be sure, but had found no nest, and had learned but little of the bird.

I do not know any better description of the bird's habits than that given by Robert Ridgway in 'The Osprey' for November, 1898, in which he says, "As a result of my three trips to southern Florida, I feel sure that the Ivory-billed Woodpecker is not only a rare, but very local bird in that part of the State, and that it only occurs in large cypress swamps or their immediate vicinity, its true home being within the cypress, and its feeding grounds the cabbage palmetto and live oak hammocks just outside."

"Although a far more powerful bird, the Ivory-billed looks no larger at a distance than the Pileated Woodpecker, but its color, its actions (particularly its manner of flight), and its notes are so totally different that once seen it need never be mistaken for that species, or vice versa. The Pileated Woodpecker is a noisy, active bird, always in evidence from its loud yelping or cackling notes or its restless movements. The Ivory-bill, on the other hand, is comparatively quiet and secluded, and its notes would not attract attention except from one keenly alert for new sounds, being notable for their nasal tone and perfect monotony rather than any other quality." Mr. Ridgway goes on to say that the notes "resemble nothing else so much as the toot of a child's penny trumpet, as described by Wilson, or a false high note on a clarinet as Audubon describes it, repeated three or more times (like pait, pait, pait), with absolute monotony; but instead of being audible for a distance of half a mile as Audubon states, I am sure that those heard by me would have been inaudible beyond half that distance."

LIST OF THE BIRDS OF LOUISIANA. PART VI.

BY H. H. KOPMAN.

THE following list is a continuation of a list of the birds of Louisiana published in 'The Auk' by the present writer and Messrs. Andrew Allison and Geo. E. Beyer in 1906-08.¹ The work of publishing this list was suspended with the appearance of the fifth instalment, which embraced the Pici. Owing to changes in the plans of the several authors of the original list, further co-operation became impractical. The present writer has for some time intended to complete the list, however, and has been prevented by other work from doing so earlier. He is glad to present now what he believes are the most important data on the species listed. The bulk of this material is obtained from his own notes and those of Mr. Andrew Allison, to whom, as well as to Prof. Beyer, credit is given in important specific instances demanding it. The migration records from Ariel, Miss., and Lobdell, La., and most of those from Bay St. Louis and Ellisville, Miss., were established by Mr. Allison, who is now living in China.

186. CHUCK-WILL'S-WIDOW (*Antrostomus carolinensis*). Common summer visitor in the higher parts of the State, especially where there are pines. Very rare in the fertile alluvial section of the southeast, and apparently occurring only as a migrant. Personally I have recorded it there only two or three times in over twenty years of observing. In the sections where it is common it arrives about April 10, usually appearing simultaneously with the Nighthawk. Earliest arrival: Covington, La., Apr. 7, 1901. Calls very little after the middle of July, and is little in evidence after Sept. 1. The latest date for departure is a Mississippi record made by Mr. Andrew Allison: Bay St. Louis, Sept. 25, 1899.

187. WHIP-POOR-WILL (*Antrostomus vociferus vociferus*). A transient only. Rare in the fertile alluvial sections. Fairly common in the higher parts of the State. Usually commonest the latter part of September and early part of October. Data on its movements are limited, and comprised chiefly Mississippi records. Seen by Mr. Andrew Allison at Bay St. Louis, Miss., on Sept. 13, 1899, Oct. 21, 1902, and Apr. 1, 1902. Probably remains in the fall until the early part of November, or may winter rarely.

188. NIGHTHAWK (*Chordeiles virginianus virginianus*). Common transient visitor in most parts of the State. Its occurrence as a breeder in the

¹ 1906, pp. 1-15, 275-282. 1907, pp. 314-321. 1908, pp. 173-180, 439-448.

extreme southeastern portion is, however, limited and local. At New Orleans it is not often seen after the spring migration, and is not conspicuous again until at least the middle of August. During the summer of 1909, however, being often in the commercial section of the city in the evenings, I noticed Nighthawks on numerous occasions, sailing above the taller buildings, the flat roofs of which are usually covered with broken shell, and the probability of the bird using such places to nest occurred to me. The majority of such structures, ten and twelve story office buildings, have been erected in New Orleans within the last decade, and they would furnish more nearly the proper nesting sites for the Nighthawk than any other character of surface in the region about New Orleans.

The Nighthawk arrives in southern Louisiana with remarkable regularity. Out of twenty or more dates of arrival, fully two thirds are April 10-12. The remainder are a day or so earlier or later. In the fall, there is a decided increase of transients after the middle of August. The most remarkable flight I have ever seen was observed near Convent, in St. James parish, about fifty miles above New Orleans on the Mississippi river, on Sept. 11, 1894. The flight was heaviest for the half hour preceding sun-down. The birds kept close to the river and were flying downstream, which at that point was about southeast. The Nighthawk becomes rather inconspicuous after the 20th of September. The last are usually seen in the last week of October, and the latest date of which I have a record is Nov. 3, 1895, at Chef Menteur, La.¹

189. FLORIDA NIGHTHAWK (*Chordeiles virginianus chapmani*). This interesting subspecies has been observed on the shell reefs in the Gulf in the neighborhood of the mouths of the Mississippi which furnish suitable nesting sites. It is also very common in the prairie sections of central southern and southwestern Louisiana. Great numbers may sometimes be seen sailing low or at moderate elevations throughout the day in perfectly clear weather. The same is true of its habits about the Gulf islands.

190. CHIMNEY SWIFT (*Chatura pelagica*). A common summer visitor. On the whole, however, I do not believe it is as abundant as formerly, at least in the immediate vicinity of New Orleans, which is doubtless due largely to changes in the method of construction of flues. The average date of arrival is about March 18 at New Orleans, though several seasons I have failed to see any until about March 25, and once or twice I have noted none up to April 1. The swift usually becomes common the last week in March. Several seasons its appearance became general March 26. The earliest movements of which I have a record occurred in 1897, the first appearing March 13, and the species becoming abundant March 19. The season was well advanced, but in 1911 which was one of the earliest springs I have ever known, practically nothing was seen of the swift until

¹ [According to Mr. H. C. Oberholser's 'Monograph of the Genus *Chordeiles*' the Florida Nighthawk is the breeding bird everywhere in the lower Mississippi Valley north to southwestern Kentucky and extreme southern Illinois. It would seem therefore that all notes on summer resident birds in Louisiana must refer to this form and not to *C. v. virginianus*. ED.]

late in the season. As a matter of fact, an early spring in southern Louisiana, from the standpoint of temperature and progress of vegetation, seldom has a pronounced effect on the course of the migrations.

The Chimney Swift is usually more in evidence after the latter part of June than in the late spring and early summer. Numbers are often seen sailing at a moderate height at this time, as though the more pressing duties of the nesting season had been concluded. The first week in July, 1897, I noticed that during the daytime young swifts began to leave a chimney in which they had been reared. About August 15, the year preceding, I observed the same thing at the same location, and have concluded that a second brood is generally reared as soon as the first comes out. In the case of the young birds observed in August, of course, the first brood must have appeared somewhat earlier than in 1897, but I was not on the ground when the first brood might have been expected. In 1897, on the other hand, I did not observe that a second brood was reared where the first was noted. I think the observations of the two seasons, however, indicate very plainly that with the species as a whole, two broods are commonly reared.

The Chimney Swift is very common in southern Louisiana during the latter part of summer and in the early fall. It is usually common also in the early part of October, and in warm weather after the middle of the month, important flights are often seen. The normal date of departure is Oct. 25-28. The latest date of departure recorded is Nov. 4, 1896.

191. RUBY-THROATED HUMMINGBIRD (*Archilochus colubris*). Commonest as a transient, but in the State as a whole it is a fairly common breeder. I have heard of one or two instances of its being seen in winter. In the southern section of the State it is decidedly uncommon as a breeder. Personally I have seen but two nests, one in a live oak in St. James parish, and the other in an elm in St. Mary parish. The latter was found early in July and contained one fresh egg.

While the Hummingbird usually arrives at the latitude of New Orleans within a day or two of March 20, the movements occasionally show considerable aberration. For instance, in 1897, the first was seen March 7, and on the same date in 1902 at New Iberia, La.; while in the latter year, the first was reported by Mr. Andrew Allison from Bay St. Louis, Miss., on Feb. 20. On the other hand, it is not observed some seasons until after the first of April. It usually becomes common, however, the last week in March. There are several decided transient movements later in the spring, and almost invariably a decided influx for a few days between the 5th and 15th of May. These latter movements are always observed when the weather has become suddenly cooler.

Hummingbirds usually show an increase the latter part of August or early part of September. The last is usually seen about the same time as the Nighthawk and Chimney Swift, that is, the last week of October, or first few days of November.

The Hummingbird is often very conspicuous in September on the Gulf

Coast of Mississippi about the growths of "wild sage" (*Calamintha coccinea*) in the pineries.

192. SCISSOR-TAILED FLYCATCHER (*Muscivora forficata*). The occurrence of this species in Louisiana, with the possible exception of the extreme western portion of the State, is decidedly infrequent, not to say casual. I have never had the good fortune to observe it, and I know of no one who has observed it more than a few times. I have seen a specimen killed near New Orleans in the fall, and I think its occurrence is most apt to be noted at that season. It is doubtless present sometimes as a breeder in the western part of the State.

193. KINGBIRD (*Tyrannus tyrannus*). Common everywhere as a transient in Louisiana, especially in the fall, and common as a breeder in most parts of the State. Coastwise, it is commoner as a breeder in the prairie section of the central southern and southwestern portions of the State than in the wet, wooded alluvial region of the southeast. It is rare as a breeder at New Orleans; in fact, I have few records of its occurrence in the region immediately about the city in the breeding season. At various points within thirty miles to the east, south and west, however, I have found it fairly common in the breeding season on several occasions. It is regularly common as a breeder in extreme southern Louisiana, however, west of the Atchafalaya river.

The Kingbird usually arrives at New Orleans the last week in March, the earliest date of arrival being March 23, 1895 and 1904. While a few doubtless always arrive at this time, its appearance does not become general until April 4 or 5, which is the date when the first are usually seen on the Mississippi coast.

The Kingbird is extremely abundant as a transient in southern Louisiana from about August 25 to Sept. 25. It is seldom seen after Oct. 1. I noted a straggler at Biloxi, Miss., however, on Oct. 23, 1905.

In the piney sections of southeastern Louisiana and southern Mississippi, the Kingbird feeds extensively in the fall on the ripened seeds of the two common native magnolias (*M. fatida* and *M. virginiana*). Wherever it finds the former of these two species transplanted in the wet wooded alluvial section of southeast Louisiana, it occurs in the greatest numbers. This is particularly true in the suburban sections of New Orleans, where *M. fatida* is a favorite shade tree, though not a native of the surrounding woods, or swamps, as commonly supposed.

194. ARKANSAS KINGBIRD (*Tyrannus verticalis*). A specimen of this species taken at Mandeville, La., in September, 1914, is in the Louisiana State Museum. The specimen was taken by the taxidermist of that institution, Mr. George Schneider.

195. CRESTED FLYCATCHER (*Myiarchus crinitus*). There is absolutely nothing exceptional with reference to the occurrence of the Crested Flycatcher in Louisiana so far as I have been able to learn. It is not quite so common in the swampy section of the southeast as in other wooded portions of the State, but wherever there is any considerable growth of

trees, it may be counted upon as a regular breeder. The movements in spring are almost identical with those of the Kingbird. The earliest date of arrival I have recorded is March 25, 1900, at Covington, La. The first has frequently been seen on March 30.

This species becomes very inconspicuous after the middle of August. It departs apparently at the same time as the Kingbird, about the last week in September. The latest recorded date of departure is Oct. 15, 1897, when it was observed by Messrs. Andrew and W. B. Allison at Ariel, Amite county, Miss.

196. PHOEBE (*Sayornis phæbe*). A common winter visitor throughout the State. Arrives at the Gulf Coast, Oct. 5 or 6, the movement seldom varying a day from these dates. In 1897, however, I noted one at New Orleans Sept. 25. Departs from the same latitude about April 5 or 6, being as regular at this season as in the fall.

197. OLIVE-SIDED FLYCATCHER (*Nuttallornis borealis*). Extremely rare. I have only three records of its occurrence in Louisiana. Mr. H. L. Ballowe took a specimen at Diamond, Plaquemines parish, Aug. 31, 1894. I noted one at Covington, La., Aug. 16, 1903. Mr. Andrew Allison noted one at New Orleans May 6, 1901. In addition, Mr. Allison has noted the species twice at Bay St. Louis, Miss.: On Mar. 31 and Aug. 29, 1902. It will thus be seen that there is a striking agreement in the records for the fall movement, and that like some other species breeding well to the northward, to which attention will be called when they are reached, it moves south very early.

198. WOOD PEWEE (*Myiochanes virens*). A common breeder throughout the state. Most abundant, however, as a fall transient, occurring in greatest numbers during the first half of October. A heavy wave during this period always includes large numbers of Wood Pewees.

The normal date of arrival at Gulf coast latitude is about April 5, its appearance is usually general about April 10. Occasionally the first is noted before April 1. In 1904, I saw one at New Orleans on March 30; in 1897, Mr. W. B. Allison saw one at New Orleans on March 27 and in 1906 at Bay St. Louis, Miss., on March 25; in 1901 Mr. Andrews Allison saw one at Bay St. Louis on March 31. On the other hand, I failed to see any at New Iberia, La., in 1902 until April 25, and for two successive seasons none was noted until that date at Ellisville, Miss.

Transient Pewees in fall are brought to Gulf coast latitude by a decided wave that usually reaches there the last week in August. The species is common throughout September, and especially so whenever there is a wave during that month. It is sometimes remarkably abundant during the first important wave in October, usually occurring from the 5th to the 10th. The general transient movement is over by Oct. 20. The latest date for departure at New Orleans is Nov. 2.

[YELLOW-BELLIED FLYCATCHER (*Empidonax flaviventris*). While this species undoubtedly occurs as a rare transient in Louisiana, I have never seen it in the State, and do not know of any well authenticated record of its presence.]

199. ACADIAN FLYCATCHER (*Empidonax virescens*). A common summer visitor in swampy woods of every character. It is evenly distributed throughout the wet wooded lands of the fertile alluvial region, and occurs wherever there are river swamps and creek bottoms in other sections. It arrives at New Orleans about April 1. The earliest arrival of which I have a record is March 30, 1904. It becomes common about April 8. It is seen occasionally through most of October. The latest date of departure is Oct. 27, 1900, at Convington.

200. TRAILL'S FLYCATCHER (*Empidonax trailli trailli*).

201. ALDER FLYCATCHER (*Empidonax trailli alnorum*). The similarity of this and the preceding form and the apparently indiscriminate way in which they associate in the lower Mississippi valley make it difficult to distinguish between them in their occurrence and movements. Specimens taken on the Mississippi coast, however, appear to be chiefly if not entirely of the latter of the two forms. Whichever one occurs in the fertile alluvial region of southeast Louisiana, and I am inclined to think it is true *trailli*, is rather rare. It has been noted at New Orleans May 2, and while I believe it has been observed on one or two other occasions, I fail to find any records of these observations. The Alder Flycatcher is rather a common fall transient on the Mississippi coast, where it arrives about Sept. 1. Earliest date of arrival: Aug. 27, 1896, Beauvoir, Miss. Latest date of departure: Oct. 18, 1901, Bay St. Louis, Miss. No records for spring migration.

202. LEAST FLYCATCHER (*Empidonax minimus*). Not particularly common at any points in southern Louisiana and southern Mississippi where I have made observations, and decidedly rare in the fertile alluvial region of southeastern Louisiana. Arrives at Gulf coast latitude the early part of September. Earliest: Sept. 1, 1900, Bay St. Louis, Miss. The only dates on which I have recorded it in spring in Louisiana are April 6, 1895, at New Orleans, and March 30 and May 9, 1902, at New Iberia, La.

203. PRAIRIE HORNED LARK (*Otocoris alpestris praticola*). This is doubtless the form to which reference is had in a list of the birds of Louisiana by Prof. Geo. E. Beyer, who records the fact of a specimen having been taken and a number having been seen by Gustave Kohn along the shore of Lake Pontchartrain near Mandeville on Jan. 6, 1879. I do not know of any other record of the occurrence of this bird in Louisiana.

204. FLORIDA BLUE JAY (*Cyanocitta cristata florincola*). Whether the typical Blue Jay occurs in Louisiana I do not know, but this is undoubtedly the only form present in the southern section of the State. It is not so common in the fertile alluvial region of the southeast as elsewhere, its distribution being somewhat irregular in that section. A rather peculiar feature of its occurrence in this region is the fluctuation of its numbers in the suburban districts of New Orleans. For several years together, it may be rather common there, and then disappears almost entirely for an equally extended period. Thus, while a resident in this region it is evidently rather nomadic. In the prairie section of central southern Louisi-

ana the Blue Jay is common wherever there are groves or patches of woods. In the town of New Iberia, I found it exceedingly numerous in the winter of 1901-02.

205. AMERICAN CROW (*Corvus brachyrhynchos brachyrhynchos*). A resident throughout the State but not quite as common coastwise as the Fish Crow, being confined in that portion of the State, as a rule, to well wooded or cultivated lands. Somewhat commoner coastwise in winter than at other seasons.

206. FISH CROW (*Corvus ossifragus*). Abundant coastwise, apparently not occurring very far inland. It is most abundant in wet, open grounds. Nesting appears to be somewhat later than that of the preceding species, beginning the latter part of March.

207. BOBOLINK (*Dolichonyx oryzivorus*). Appears with considerable regularity in the coast section in fall, especially in the rice fields. Rather rare during most of the spring, but sometimes occurring plentifully for a few days late in the season.

The earliest record for fall arrival is Aug. 22, 1894, at Diamond, Plaquemines parish. It becomes common about Sept. 20. I have no data on the departure of fall transients.

The earliest date of spring arrival is April 4, 1894, at Avery Island, and the latest date of departure is May 2, 1903, at Lobdell, West Baton Rouge parish. Small flocks of transients in song are not unusual about May 1. about cultivated lands in the southeastern part of the State.

208. COWBIRD (*Molothrus ater ater*). Represented in the State by two distinct forms, typical *M. ater*, which in the southern section, at least, is only a winter bird, and a decidedly smaller bird, which I have found in summer in the southern portion of the State, especially to the north and west of New Orleans. This breeding bird is fairly common. The typical *M. ater* occurs rather irregularly in winter, sometimes in good sized flocks, from about the middle of November to the latter part of March. The form breeding in southern Louisiana is an inch or more smaller than typical *M. ater*.

209. YELLOW-HEADED BLACKBIRD (*Xanthocephalus xanthocephalus*). Except in the western portion of the State, where it is said to occur in winter, this species can hardly be considered as more than an accidental visitor.

210. RED-WINGED BLACKBIRD (*Agelaius phoeniceus phoeniceus*).

211. FLORIDA RED-WING (*Agelaius phoeniceus floridanus*). The comparative status of the typical form and the Florida Red-wing as breeders I am unable to define. I know nothing peculiar with reference to the occurrence of this species as a whole in Louisiana. It occurs by myriads in the marshes in summer, and is found in winter in greatest numbers in the swamps and woods, where it occurs in large flocks, often mixed with those of Cowbirds, Grackles and Rusty Blackbirds. Nesting is usually well under way by the latter part of April.

[MEADOWLARK (*Sturnella magna magna*). May occur as a winter visitor in the more northern parts of the State].

212. SOUTHERN MEADOWLARK (*Sturnella magna argutula*). Common resident of the State, but rather irregularly distributed in the fertile region of the southeast. More or less common in that section in the neighborhood of cultivation, especially on the sugar plantations. Even among resident birds there are decided differences in size and coloring. In the Bayou Teche section I have taken some very small, dark-colored birds in summer. These are noticeably different from other specimens taken in winter in the southern part of the State, though I believe that the latter were of the same subspecies and represented a breeding form in some portion of the State if not in the localities where taken.

213. ORCHARD ORIOLE (*Icterus spurius*). The most conspicuous summer visitor in the fertile alluvial section of southeastern Louisiana. Occurs in the greatest profusion in practically all situations except the unbroken swamps, but is most abundant in the vicinity of habitation and cultivation. Is abundant along ditches, bayous, canals, etc., in the open marsh, and on grassy, bushy islands along the coast. Occurs also in greater or less abundance in all other portions of the State in the vicinity of cultivation, but seldom in the forests and swamps.

Its abundance as a breeder in the southeastern portion of the State, however, can scarcely be comprehended by those whose acquaintance with it is confined to its appearance in more northern localities. In one live oak in a plantation yard where there were many more trees of this kind I once counted nearly twenty nests of this species.

The average date of arrival of the male at New Orleans is March 25. The first female arrives usually about April 5, and the male becomes common at the same time. The females become common in a few days. The first male may be either a second-year or a mature bird, but in either case is almost invariably singing.

Nesting is usually started shortly after April 20. The construction of the nest is rather deliberate. While nesting is usually well started by the first part of May, there are decided discrepancies in the time. The three following cases noted in a single season will illustrate these discrepancies: Nest No. 1—May 9, nest discovered and apparently complete; May 13, contained 3 eggs; May 14, complement of 4 eggs complete; May 27, contained young, apparently two days old. Nest No. 2.—Discovered May 22, contained no eggs. Nest No. 3—Discovered May 22, contained young about 5 days old.

There is almost if not quite as much variation in the time of rearing the second brood. On July 8 I have found a nest with a complement of fresh eggs and the next day two nests with young.

Orchard Orioles begin to flock in southern Louisiana and Mississippi in the latter half of July. The song is seldom heard after Aug. 1. In 1912, however, I heard one sing on Sept. 12.

This species becomes inconspicuous at Gulf coast latitude after the middle of August, though little companies of them may be in evidence for a few days at a time at intervals until Sept. 10 or 15. Such transients usually

form part of slight waves including other species. The latest date of departure is Sept. 26, 1914, near Poydras, St. Bernard parish. The average date of departure is about Sept. 15.

During 1912, 1913 and 1914 I made some notes on the time of the first singing of this species in the morning: 1912—April 25, first song at 4.40, morning clear; April 26, first song at 4.50, morning cloudy; June 14, first song at 4.20, morning clear; July 14, first song at 4.40, morning partly cloudy. 1913—April 27, first song at 4.50, morning clear; May 8, first song at 4.30, morning clear. 1914—June 6, first song at 4.10, morning clear.

214. BALTIMORE ORIOLE (*Icterus galbula*). A rather common summer visitor in the northern half of the State; breeds sparingly as far south as the latitude of Baton Rouge and Opelousas. Throughout the remaining portion of the State, it is known only as a rather rare and irregular spring transient, being practically unknown in fall. A pronounced bird wave about April 20 will usually be found to include this species. The following records of the appearance of this species in Louisiana and Mississippi in spring were made by the writer and Mr. Andrew Allison: 1899, April 1, Bay St. Louis, Miss.; April 13, 1902, New Iberia, La.; April 14, 1902, Bay St. Louis, Miss.; April 10, 1906, Ellisville, Miss.; April 17, 1907, Ellisville, Miss.; April 6, 1908, Jackson, Miss.; April 9, 1911, New Orleans, La. I have also four or five records of its occurrence between April 20 and April 25 at New Orleans and other south Louisiana points. The only record I have for fall transients near the Gulf coast is the occurrence of several at Biloxi, Miss., on Sept. 4, 5, 1905.

215. RUSTY BLACKBIRD (*Euphagus carolinus*). A common winter visitor, sometimes occurring in very large flocks, in fact I have seen flocks on the wing in the sugar country of southeast Louisiana in winter that stretched out for more than a mile. Frequents both the thick swamps and more or less open cultivated country, especially in spring. It becomes abundant in fall in southern Louisiana with the first heavy frosts the latter part of November or early part of December. The earliest record for arrival is Covington, La., Nov. 17, 1899. The earliest Mississippi records are, Ariel, Amite Co., Nov. 9, 1897, and Ellisville, Jones Co., Nov. 9, 1906.

The Rusty Blackbird remains common late in the spring, and at New Orleans I have seen fair-sized flocks about the borders of pastures until April or even May 1. The latest date for departure at New Orleans is May 10, 1899.

216. BREWER'S BLACKBIRD (*Euphagus cyanocephalus*). A rather rare winter visitor. I killed one from a flock of Rusty Blackbirds near Convent, St. James parish, on Dec. 23, 1893.

217. FLORIDA GRACKLE (*Quiscalus quiscula aglæus*). This is the only form of the common Crow Blackbird that occurs in the swampy coastal section of the State, so far as I have been able to learn. It is abundant and occurs in practically all situations except the open marsh. It is often found in great flocks in the wet woods in winter and early spring. It nests

chiefly in the neighborhood of habitation, especially in groves of live oaks, and water oaks. Nesting begins early in April. The birds recorded by Dr. F. W. Langdon as *Q. purpureus* in the Journal of the Cincinnati Society of Natural History, Vol. IV, 1881, which were breeding at Baton Rouge were apparently referable to this form.

218. BRONZED GRACKLE (*Quiscalus quiscula aeneus*). Never occurs, as far as I have been able to determine, in the section where the Florida Grackle is found. It is a fairly common breeder in the interior and northern portions of the State. I found it breeding commonly in Madison parish in 1896. Its numbers doubtless increase in winter.

219. BOAT-TAILED GRACKLE (*Megaquiscalus major major*). A strictly coastal species in Louisiana as far as I have observed. I doubt whether it ever occurs more than fifty miles inland. In summer it is confined to the marshes and very wet swamp lands. In the fall considerable numbers move on to the drained and cultivated lands. As with the Florida Grackle, nesting begins in the early part of April. In Audubon Park, New Orleans, a curious relationship between the movements of these two species is noted at this time. The numbers of the Florida Grackles increase in the park, numerous individuals arriving from the swamps to nest in the oaks of the park, while the Boat-tailed Grackles, which are present in large numbers on the meadowy stretches of the park throughout the winter, move off to their nesting sites in the marshes south of the city.

220. PURPLE FINCH (*Carpodacus purpureus purpureus*). Fairly common winter visitor except in the southern portion of the State, where it has been found only in severe winters. Numbers were seen at several points in the suburbs of New Orleans and in the woods near the city after Jan. 1, 1895. The last were seen March 23. In 1897, the first arrived at Ariel Amite County, Miss.; on Nov. 13. In 1901, the first arrived at Bay St. Louis, Miss., on Dec. 4, and the species became common Dec. 16.

221. AMERICAN GOLDFINCH (*Astragalinus tristis tristis*). Common winter visitor in all sections of the State. Doubtless breeds sparingly in the northern counties, as it certainly does in corresponding latitude in Mississippi. Its movements southward in fall, however, are rather late. Some records of fall arrival follow: Ellisville, Miss., Nov. 6, 1906; Ariel, Miss., Nov. 10, 1897; Covington, La., Nov. 12, 1899; New Orleans, Nov. 19, 1898. In September, 1907, I noted Goldfinches about Jackson, Miss., and in August I had seen them very little further north.

The latest date for spring departure at New Orleans is April 11, 1894 and 1896. At Bay St. Louis, Miss., the latest date of departure is April 23, 1902.

222. PINE SISKIN (*Spinus pinus*). A rather irregular and usually rather uncommon winter visitor, seldom reaching the fertile alluvial region of southeastern Louisiana. The earliest date of arrival of which I have any record is Nov. 29, 1908, at Woodville, Miss., and the latest date of departure is April 19, 1902, at Bay St. Louis, Miss.

223. VESPER SPARROW (*Poæcetes gramineus gramineus*). A common

but seldom abundant winter visitor. Least common in the fertile alluvial region in the southeastern part of the State. In 1899, the first was seen at Covington, La., on Nov. 2, and that is about the average time of arrival at that latitude. The last was reported in 1902 at Lobdell, West Baton Rouge parish on March 20, 1903.

224. SAVANNAH SPARROW (*Passerculus sandwichensis savanna*). Common winter visitor, particularly abundant in cultivated lands in the southeastern part of the State. Arrives at New Orleans usually during the first week in October, and becomes common by Oct. 15 or 20. A few may arrive sometimes shortly before Oct. 1, but I have no satisfactorily verified records showing such to be the case. Remains common until the latter part of April. Records for last seen are: May 9, 1897, New Orleans; May 12, 1903, Lobdell.

225. GRASSHOPPER SPARROW (*Ammodramus savannarum australis*). Probably occurs throughout the State as a summer visitor in the vicinity of cultivation. All records I have regarding it, however, were made in the fertile alluvial region of the southeast. It was formerly common in summer in the meadowy portion of Audubon Park, New Orleans, but I have not seen it there for ten or twelve years. Twenty years ago I found it most abundant on a sugar plantation in St. James parish. Though said to winter in Louisiana, I have never seen it except in summer. Records of arrival are: April 3, 1898, New Orleans; April 4, 1897, New Orleans (became common); April 4, 1903, Lobdell; April 8, 1895, New Orleans.

226. HENSLOW'S SPARROW (*Passerherbulus henslowi henslowi*). Have noted this species on two occasions at Covington, and think close search would prove it to be fairly common and regular in grassy pine woods in winter. The dates of observation at Covington are Nov. 2, 1899, and Jan. 23, 1905. Mr. Andrew Allison noted it at Ariel, Miss., Oct. 9, 1897, and at New Orleans, Nov. 30, 1899.

227. LECONTE'S SPARROW (*Passerherbulus lecontei*). I have never seen this species, but Mr. Andrew Allison noted one at Lobdell on April 23, 1903. He also saw about eight at Ariel, Miss., on Nov. 15, and made subsequent observations of it there.

228. NELSON'S SPARROW (*Passerherbulus nelsoni nelsoni*). I found this species in great abundance on Marsh Island on May 16, 1907, and on May 19 observed it and took a specimen at Sabine Pass. These may all have been migrants, as I have not observed it later in the year at other points on the coast, but on that supposition, the lateness of the date is rather remarkable.

229. LOUISIANA SEASIDE SPARROW (*Ammodramus maritimus fisheri*). An extremely abundant breeder in all tidewater marshes. I have seen scores at a time in the rushes and marsh grasses, perched just below the level of the grass tops, delivering in more or less regular concert their strange monotonous songs. The usual song sounds like "te-dunk-chee-e-e-e." Sometimes the trill alone is given. A nest found on Battledore Island,

July 23, 1908, contained four young a few days old. It was built of grass and the opening, on the side, was rather large. It was four feet from the ground in *Avicennia nitida*, a bush that is common along the coast.

230. LARK SPARROW (*Chondestes grammacus grammacus*). Occurs casually and at various seasons in the eastern part of the State. It is doubtless a resident wherever found, and I think it is likely it will be found fairly common in the western part as well. Have noted it also on the coast of Mississippi. In Louisiana I have seen it in Madison, Caldwell, St. James, Plaquemines and St. Mary parishes.

231. WHITE-CROWNED SPARROW (*Zonotrichia leucophrys leucophrys*). A decidedly rare bird in most if not all parts of the State. Have noted it in the late autumn and late spring but never in midwinter. Noted several adult males in song at New Orleans on May 1 and 2, 1897, an immature bird at Covington, Nov. 25, 1899, and an immature bird at Biloxi, Miss., Nov. 10, 1905.

232. WHITE-THROATED SPARROW (*Zonotrichia albicollis*). A very abundant winter visitor, especially in the wooded alluvial portion of the southeast. The earliest fully verified record of arrival is Oct. 13, 1900, at Covington, and it was seen on the same date in 1897 at Ariel, Amite county, Miss. It becomes fairly common about the end of October, and very common in November with the first cold weather. It remains common until the early part of April, and the last is usually seen a few days after April 20. The latest date of departure is April 27, 1903, at New Orleans.

233. CHIPPING SPARROW (*Spizella passerina passerina*). This species is entirely absent from the fertile alluvial region of the southeastern part of the State, in the prairie section, and doubtless in all low wooded lands along the Mississippi river similar to those in the southeast. In the pineries and wooded uplands it is a common resident, increasing very much in numbers in winter, of course, especially in the pineries of the southern part of the State. It became common at Covington, Nov. 11, 1899, at Ariel, Miss., Oct. 25, 1897, at Bay St. Louis, Miss., Oct. 31, 1901, and at Biloxi, Miss., Nov. 15, 1905. The bulk of winter visitors left Ellisville, Jones county, Miss., April 15, 1907.

234. FIELD SPARROW (*Spizella pusilla pusilla*). Never very common in the lowland sections of the State; breeds as far south as West Baton Rouge parish, however. Does not breed on the coast of Mississippi. The first was seen at Biloxi, Miss., Oct. 6, 1905, and there was a marked influx of winter visitors at Gulfport, Miss., Oct. 22, 1910.

235. SLATE-COLORED JUNCO (*Junco hyemalis hyemalis*). Decidedly rare in the extreme southern part of the State. Fairly common in winter at Covington. In 1897, the first was seen at Ariel, Miss., on Nov. 12. In 1907, the last was seen at Ellisville, Miss., on March 31.

236. BACHMAN'S SPARROW (*Peuceea aestivalis bachmani*). A fairly common resident in the pineries and in mixed upland growths of hardwood and pine, especially in small oak and pine thickets. Sings chiefly in the late winter, spring and early summer, being heard often in concert with the Pine Warbler.

237. SONG SPARROW (*Melospiza melodia melodia*). A rare bird in the lowland section of the State. In fact, the only record of which I have any knowledge is that of a specimen taken near New Orleans in the early part of March by Mr. Andrew Allison. In the winter of 1905-06, I noticed the first at Biloxi, Miss., Oct. 24, and the last on March 12.

[LINCOLN'S SPARROW (*Melospiza lincolni lincolni*). This species, so far as I know, has never been observed in Louisiana. It has been taken in spring in north Mississippi, however, by Mr. Andrew Allison.]

238. SWAMP SPARROW (*Melospiza georgiana*). In suitable locations, this is probably the most abundant winter visitor to the southern section of the State except the Myrtle Warbler. It is remarkably abundant in fresh water marshes, the edges of swamps and all undrained, overgrown places. The earliest record of arrival at New Orleans is Oct. 3, 1894, and it was common there Oct. 9, 1903. The first is usually seen in southern Louisiana and southern Mississippi about Oct. 8. Like the White-throated Sparrow it remains common until the early part of April. The last is seen a little later, usually about May 1. The latest date of departure is May 3, 1898, at New Orleans.

239. FOX SPARROW (*Passerella iliaca iliaca*). Rare in the southern part of the State. Several were seen and a specimen taken by Mr. Andrew Allison in a briery pasture on the edge of a wood on well drained land near New Orleans on Feb. 22, 1897. This is the only record of its occurrence in the southern part of the State of which I know. It has been reported as rather common in north Louisiana in winter.

240. TOWHEE (*Pipilo erythrophthalmus erythrophthalmus*). Resident; fairly common in most sections of the State; in the fertile alluvial section of the southeast it is found chiefly about the plantations or in woods better drained than the average timbered lands. In the prairie section it is a common and rather conspicuous inhabitant of mixed growths of briers, canes, etc. Individuals show remarkable attachment to the comparatively few spots in the fertile alluvial region where they occur. An unusually well drained piece of woodland near New Orleans that I have visited repeatedly in the past twenty years is practically the only spot in an area of 15 or 18 square miles where I have always been practically certain of seeing this bird.

241. CARDINAL (*Cardinalis cardinalis cardinalis*). Rivalled only by the Mockingbird and Carolina Wren among the smaller birds of the State in absolutely uniform abundance in every section.

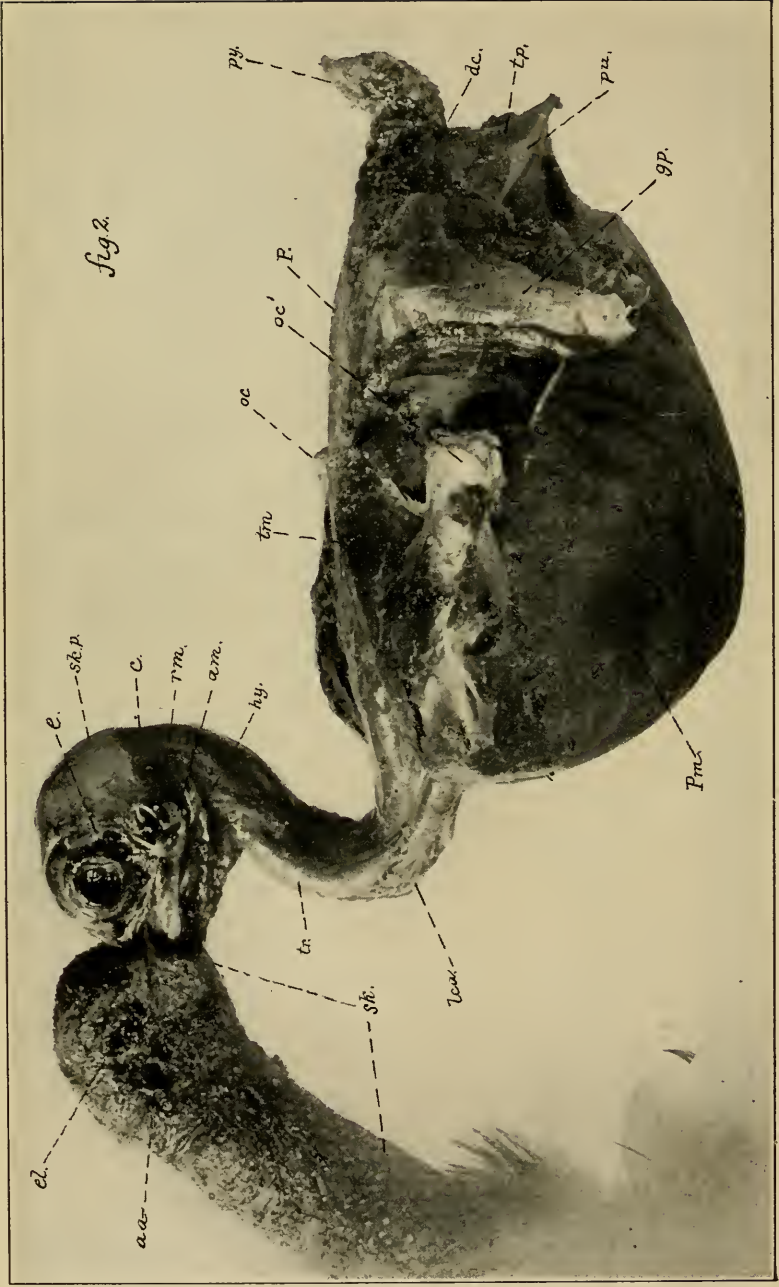
242. ROSE-BREADED GROSBEAK (*Zamelodia ludoviciana*). Occasionally common in migration, either spring or fall, for a day or two at a time. In southern Louisiana, it is most apt to be noted the latter part of April and early part of October. The latest date of its occurrence at New Orleans in spring is May 6, 1897. Have never noted it in early spring, and in fact have no record of its occurrence before April 21. The earliest date of its occurrence in fall at New Orleans is Oct. 6, 1894. One was seen at Ellisville, Miss., Oct. 19, 1897.

243. BLUE GROSBEAK (*Guiraca caerulea caerulea*). Only transient in the southern part of the State, and never common in the fertile alluvial region and probably not common at any time in the prairie section. Just how far south it breeds in Louisiana I do not know, but it has been found breeding in central Mississippi. Has been found commonest in Louisiana about cultivated lands in the piney regions of the southern portion of the State. The earliest record of arrival at New Orleans is April 8, 1898. The latest date of occurrence in spring is May 7, 1897. The earliest date of arrival in fall at New Orleans is Aug. 28, 1899, and this has been found to be about the average date of its arrival on the coast of Mississippi, where it is fairly common in fall. In 1905, the last was seen at Biloxi, Miss., Oct. 22.

244. INDIGO BUNTING (*Passerina cyanea cyanea*). Summer visitor, but not very common breeder in the southern part of the State; more common, however, in the fertile alluvial section than in the piney regions, being found sparingly on the sugar plantations and about other cultivation. Extremely abundant as a transient in the fertile alluvial section in both spring and fall, and in the piney sections in fall. The earliest date of arrival at New Orleans is March 26, 1899, and the first usually comes about March 30. It becomes common about the end of the first week in April, and usually reaches the height of its abundance from April 15 to 20. In the fall, the first transient is usually seen at New Orleans about Sept. 22. It is usually most abundant the second week in October, but is variably plentiful from about Oct. 5 to Oct. 18 or 20. The last is usually seen at New Orleans a few days after Oct. 20. At Biloxi, Miss., I saw one Nov. 1, 1905. The following notes of its occurrence at Covington, La., were made in 1899: "Greatest number came Oct. 6. Few of these were left Oct. 12. A second "wave" came Oct. 21. Last, Oct. 27."

245. PAINTED BUNTING (*Passerina ciris*). Summer visitor, commonest in the central southern and southwestern part of the State. In the prairie lands of St. Mary, Iberia, St. Martin and Lafayette parishes, it reaches its greatest abundance. It is decidedly common, however, throughout the cultivated lands of the fertile alluvial region of the southeast. The earliest record of arrival is March 23, 1894, Convent, La. It is seldom seen after the latter part of September. One was noted, at New Orleans, however, Oct. 26, 1895. Males in perfect plumage may be seen up to the time of the general departure of the species, and the late bird noted above was a male in full plumage.

246. DICKCISSEL (*Spiza americana*). When I began systematic observation of the birds of the State in 1893, this was a common spring transient at New Orleans, being noted in that year, and in the two years following. Subsequent to 1895, however, none was seen at New Orleans until 1899 and then not again until 1912. In all the seasons in which it was seen at New Orleans, it was present in Audubon Park as a late April transient. In some of these seasons, it was seen also elsewhere. Found this species breeding on the edge of a pasture in St. Mary parish in 1895, and the same



ANATOMY OF THE PASSENGER PIGEON.

year I saw a female, apparently near a nest, in Audubon Park the latter part of May. I have found it in summer also in Cameron parish, near the mouth of the Calcasieu river. The earliest date of arrival at New Orleans is April 18, 1895. I have no records of the fall movements.

(*To be concluded.*)

ANATOMICAL AND OTHER NOTES ON THE PASSENGER
PIGEON (*ECTOPISTES MIGRATORIUS*) LATELY LIVING
IN THE CINCINNATI ZOÖLOGICAL GARDENS.

BY DR. R. W. SHUFELDT.

Plates IV-VI.

ON February twenty-first, 1914, Mr. S. A. Stephan, General Manager of The Cincinnati Zoölogical Company, of Cincinnati, Ohio, wrote me that "Our Passenger Pigeon has been promised to the Smithsonian Institution when it dies. This bird is a female and now about 29 years old, and the last one of a flock of eight that we got in 1878." I have since learned that it was hatched in the Garden.

The specimen of which Mr. Stephan speaks was, beyond all reasonable doubt, the last living representative of its race in the world,—the last, the very last, of the millions upon millions of those birds which were known to pass over certain sections of the United States during their migrations to and from their feeding and breeding grounds. Many of us, whose birthdays date back to the middle of the last century and before, and who resided in the districts where these vast unnumbered hosts of migrating "blue pigeons" darkened the heavens for days at a time, distinctly remember the cruel, unnecessary slaughtering of those birds, untold thousands of which were never used for any purpose whatever; millions of others of which were slain for their feathers alone, while it is now impossible to form any correct estimation of the number

supplied to the markets of the time, or of those allowed to remain where they fell to the guns and other weapons of destruction of the army of slaughterers responsible for their extinction. All this is now past history, and will not be further touched upon in this article more than to say, that *Ectopistes migratorius* is now extinct; and what is here set forth is but a brief account of my personal observations upon the last known example of the species.

From Mr. Stephan, who wrote me on the 7th of September, 1914, I learn that "our female passenger pigeon died September 1st [1914] at 1 P. M. of old age, being about 29 years old." It was almost immediately packed in ice and shipped to the National Museum at Washington, D. C., where it was received in fine condition on the fourth of that month. On the morning of its arrival, Dr. Charles W. Richmond, Assistant Curator of the Division of Birds of the Museum, requested me, by telephone, to take part in making the record of the specimen.

When first seen and examined by me, the bird was in the possession of Mr. William Palmer of the National Museum, who had been delegated to skin it for Mr. Nelson R. Wood, of the Taxidermical Department, who, I was informed, was to have the honor of mounting it for permanent preservation in the Ornithological Exhibition Rooms of the museum.

I found the bird to be an adult female in the moult, with a few pin feathers in sight, and some of the middle tail feathers, including the long, central ones, missing. The feathers of the abdomen, and especially about the vent, were soiled to some extent, otherwise the plumage of the bird was smooth and good. It had the appearance of a specimen in health, with healthy eyes, eye-lids, nostrils, and mouthparts. The feet were of a deep, flesh-colored pink, clean and healthy, while the claws presented no evidences indicative of unusual age, though not a few of wear. Its weight was not taken.

At my suggestion, the bird was taken by Mr. Palmer to the photographic rooms of the museum, where, at about 11 A. M., it was thrice posed by me for photography. Three (8 × 10) successful negatives were at once made by the assistant photographer of the institution, giving the specimen on anterior, posterior and lateral views, with about one-fourth reduction.

Shortly afterwards (1.15 p. m.), Mr. Palmer and I arrived with the specimen at my home (3356-18th Street, Washington, D. C.), and in one of my work rooms (on the third floor, back room) facilities were immediately given him to skin the specimen. Previous to his commencing this operation, I made duplicate (5 × 8) negatives of the head of the bird with my vertical camera, and successfully developed them in the dark-room, next to where Mr. Palmer had started in to make the skin.

Apart from the legs and wings, when Mr. Palmer had carried the skinning to the base of the mandibles, I made another exposure with the same camera, the subject being the body of the specimen, natural size, on left lateral view. A reproduction of this unusual photograph is shown in Plate I of this contribution, and is valuable on a number of accounts as exhibiting the size of the body; of the eye; position of the trachea; the great size of the *pectoralis major* muscle, etc. After this, the eyes and brain were consigned to alcohol; and while I was developing the aforesaid plate in the dark-room, Mr. Palmer completed the skinning of the specimen, having set the body aside for me for anatomical description.

Immediately after this we partook of a "late lunch" in the dining-room below, and, at a little before 4 p. m., Mr. Palmer repaired to his home with the skin in his possession, while I went up to my laboratory on the third floor to make a preliminary survey of the body, prior to making any additional photographs that might be necessary for illustration.

There was no fat present anywhere externally, where it occurs in birds to a greater or less extent, between the dermal tissues and the superficial muscles and other structures. I found, on the right side of the abdomen, a slit-like opening, one-half a centimeter in length, which led freely into the abdominal cavity, and from which blood was oozing. This opening I enlarged in order to withdraw the viscera for the purpose of making a photograph of them, previous to proceeding with the dissection of the organs within. This has been my practice for a great many years.

Much to my surprise, I found a quantity of blood (not clotted) in the abdominal cavity, and the right lobe of the liver and the intestine almost entirely broken up, as though it had been done with some instrument. As to the intestine, it was missing alto-

gether, while the right lobe of the liver was in scattered fragments. The firmer organs were apparently intact, but did not occupy their normal positions. This left but one course for me to adopt. I therefore evacuated the blood, washed out the abdominal cavity carefully, and consigned the entire body to a jar containing fresh, denatured alcohol, which I had purchased for the purpose.

My hope was to have made a dissection, to be photographed similar to my colored plate of a female tame pigeon, which forms the frontispiece to the Key to North American Birds by Dr. Elliott Coues (Revised Edition, 1884), or to my dissection of the young of *Phalacrocorax atriceps georgianus* (Pl. 18, Fig. 6), where, in either case, all the viscera are displayed and duly lettered.¹

The colored pigeon plate I refer to should prove helpful to one not especially familiar with the organs and other structures in the *Columbidæ* while reading the anatomical part of the present paper. There is an interesting contribution to the anatomy of *Ectopistes migratorius* in Audubon's "Birds of America," for which we have to thank the learned Scotch naturalist, William MacGillivray.²

This description is devoted almost entirely to the organs and structures included in the digestive system and to the anatomy of certain parts of the air passages. Up to the present time there has been nothing — so far as I am aware — contributed to the myology of the Passenger Pigeon, or to certain other parts of its morphology, while recently I have given a brief, illustrated account of its skeleton.³

THE BRAIN: AS stated above, Mr. Palmer removed the brain as best he could, after skinning the head of the bird, and it was at once consigned to alcohol.

¹ SHUFELDT, R. W. "Anatomical Notes on the young of *Phalacrocorax atriceps georgianus*." Science Bulletin, Vol. 2, No. 4. The Museum of the Brooklyn Institute of Arts and Sciences, "A Report of the South Georgia Expedition." Edited by Robert Cushman Murphy. (Nov. 5, 1914), pp. 95-101. Pls. 17, 18.

² AUDUBON, JOHN JAMES. "The Birds of America from Drawings made in the United States and their Territories." Vol. V, New York, 1839, pp. 34, 35. Page 35 is devoted to a drawing by MacGillivray giving — anterior view and somewhat enlarged — the digestive tract of an adult male specimen (preserved in spirits) of *Ectopistes migratorius*.

³ SHUFELDT, R. W. "Osteology of the Passenger Pigeon (*Ectopistes migratorius*)." THE AUK, Vol. XXXI, No. 3, July, 1914, pp. 358-362, Plate XXXIV. I have also published other papers on the osteology of this bird in the Proc. Zoöl. Soc. of London, Journal of Morphology, American Naturalist, etc.; these are duly cited in 'The Auk' article.

I find the *cerebellum* to be 8 millimeters long and 6 mm. wide at its middle part. It projects posteriorly considerably beyond the cerebral hemispheres, and exhibits, on its strongly convex posterior aspect, six transverse sulci, in which minute vessels ramify. The optic lobes—one upon either side—are large and of an ellipsoid form; they cover, in either case, the point of radiation of the sulci laterally, which point (the *flocculus*) is frequently well exposed in tame or domesticated pigeons.

Having the usual form as seen in the *Columbidae* generally, the cerebral hemispheres are in contact with each other mesially and with the optic lobes below. The cerebral vessels ramify superficially upon the surface of each, while between them, posteriorly, the small *pineal gland* is in view. Upon direct superior view, the cerebral hemispheres nearly shut out the optic lobes from sight.

Anteriorly, the *olfactory lobes* are well developed and project beyond the hemispheres,—the first pair of cerebral nerves were divided close to them. Likewise, the second pair of optic nerves were divided close to the rather large *optic tracts* at the base of the brain-mass.

Measuring across the widest part of the cerebral hemispheres, I find it to be a distance of 18 mm., while the length of the cerebral sulcus is 9 mm.

THE EYE: In my above cited paper on the osteology of the pigeon, I have already noted the characters of the *sclerotic plates* (p. 360), and I may add here that the average antero-posterior diameter of the eye is found to be 14 mm., its transverse diameter being about 9 mm. There appears to have been nothing peculiar in the external musculature of this organ, beyond what we find in the typical eye of ordinary existing birds,—the pigeons in particular. Posteriorly, the *optic nerve* is not surrounded by an “osseous plate,” as it is in the Raven.¹

Internally, the *pecten* presents nothing unusual, and the *lens* has a diameter of about 4.5 mm.

My next procedure in this dissection required me to separate the immense *pectoralis major* muscle from its origin upon the sternum on the *right side*, and to deal with the *pectoralis secundus* and

¹ SHUFELDT, R. W. “Myology of the Raven,” p. 60, fig. 23.

pectoralis tertius muscles in a similar manner. Following this operation, I disarticulated the four right costal ribs at the costal border of the sternum, and also the right coracoid at its sternal extremity. This allowed, in part, a turning of the sternum to one side, and permitted a better view of the interior of the thoracic and abdominal cavities.

There was no evidence whatever of the presence of the *intestine* in any part of its continuity save a piece about 8 mm. in length, where it emerged from the gizzard and the ragged margin surrounding the abdominal boundary of the vent. All the portion referred to was not in the abdominal cavity.

The entire *right lobe* of the rather large *liver* was in a disintegrated condition, showing its internal structure, and exposing the organs usually concealed by it to view.

The *heart* was in its normal position, while the gizzard was rotated to the left side. I discovered no *blood clots* or *parasites* of any kind in the abdominal cavity.

Without making very complete dissections, it was nevertheless evident that the three pectoral muscles and the superficial muscles of the back made origins and insertions similar to those in existing *Columbidæ* generally.

Os furculum was next disarticulated at its right coracoidal articulation, and the usual muscles and ligaments in the vicinity divided at different points. This admitted of a far more extended view of the organs and structures within the thoracic and abdominal cavities. This view I at once made a five by eight negative of, the reproduction of a photograph of which is here seen in Plate V.

Extremely simple in its network of nerves, the *brachial plexus* is primarily formed by the union of the last two cervical nerves and the first two dorsal ones. They soon unite as a single fasciculus, from which, as usual, the branches are derived to supply the wing.

Passing for the moment to the pelvic basin, I found the *kidneys* occupying their usual sites, and neither one appeared to present any atrophy or other evidences of disease; they are of equal size and each tri-lobed.

On the other hand, a certain degree of atrophy characterizes the left *ovary* and its *duct*,—a condition we might naturally expect in a bird of this age, and one which had lived so long in confinement.

Beyond this atrophy, the organ is normal and presents nothing worthy of special note. The *right ovary* is quite rudimentary, so rudimentary, indeed, and associated as it is with the mutilation of the various organs of the abdominal cavity, referred to in a previous paragraph, that, in the absence of a microscopical examination, this ovary and oviduct might be mistaken for something else, though not likely, as I am familiar with its appearance in a great many species of birds, including the Pigeons.

As I am unable to give any account of the *intestine* owing to the aforesaid absence, I will quote MacGillivray on the subject, his specimen having been an adult male in spirits. Omitting the reference letters to his figure, he says: "The intestine is 4 feet long, 4 twelfths in width, at the narrowest part only 2 twelfths. The duodenum curves in the usual manner, at the distance of three inches. The intestine forms six folds. The cæca are extremely diminutive, being only $1\frac{1}{2}$ twelfths in breadth; they are 2 inches distant from the extremity; the cloaca [is] oblong."

Neither the large *lungs* nor any of the *air-sacs* I examined presented anything peculiar, nor do they depart in any way from those structures as they occur in ordinary large wild pigeons generally. The lungs were very dark, and appear to have been congested at the time of death.

Posterior to these, the *spleen*, the *ovaries*, the *adrenals*, and the *pancreas* were all either broken up, as described above, or entirely removed, which was the case with the *pancreas*, as it, in pigeons, occurs in a loop or fold of the duodenal division of the intestine.

For the purpose of further anatomical description, I determined at this point to remove from the trunk various organs and structures that could not well be described *in situ*. These included the *respiratory apparatus*, the *heart* and *great vessels*, the *digestive tract*, remains of the *liver*, etc.

RESPIRATORY AND VOCAL ORGANS: As the 1839 octavo edition of Audubon's *Birds* (Geo. R. Lockwood ed.) is accessible but to the few, I am taking the liberty of quoting here the essential paragraphs of MacGillivray (as cited above) on some of the remaining organs, in that the student may note the agreement or disagreement, as the case may be, with my own observations as set forth below. Be it remembered, however, that MacGillivray's spirit specimen was a male bird, and the one here being described is a female.

Among other observations left us in the account, he said: "The mouth is very narrow, being only $4\frac{1}{2}$ twelfths in breadth, but capable of being dilated to the width of 1 inch by means of a joint on each side of the lower mandible." The "joint" he refers to is the quadrato-mandibular articulation, and, so far as I am aware, the arrangement is the same in all pigeons. He continues by saying that "There are two thin longitudinal ridges on the palate, of which the sides slope upwards. The posterior aperture of the nares is $\frac{1}{2}$ inch long, margined with pupillæ. The tongue is $7\frac{1}{2}$ twelfths long, rather broad and sagittate at the base, with numerous small papillæ, but at the middle contracted to $1\frac{1}{2}$ twelfths, afterward horny, very narrow, induplicate, and ending in a rather sharp point."¹

MacGillivray gave the shape of the *tongue* about as I find it in this specimen. It is distinctly longitudinally grooved upon its dorsal surface in the middle line, while it is convex from side to side ventrally. Posteriorly it is deeply and *roundly* concaved, the free margin of which is embellished with a fringe of minute and delicate papillæ, which are white and about 32 in number. A row similar to these are found upon the posterior free margins of the upper larynx. The *rima glottidis* is of an elongate, cordate form, with the median apex behind. Its margins are thickened and raised. On its side, the horny part of the tongue measures 14 mm. and its middle longitudinal line 11 mm. Rima glottidis has a median longitudinal length of 5 mm. The laryngeal and hyoidean muscles present nothing peculiar or noteworthy. Behind, the larynx has a transverse diameter of six mm., and each lateral part is rounded posteriorly, being fringed as above described.

William MacGillivray, when he described the anatomy of *Ectopistes migratorius* for Audubon, was entirely correct when he recorded that "The trachea passes along the left side, as usual in birds having a large crop; its length is $2\frac{3}{4}$ inches; its breadth varying from $2\frac{3}{4}$ twelfths to $1\frac{1}{2}$ twelfths; its rings 105, feeble; the last ring large, formed laterally of two rings, with an intervening membrane. Bronchi of about 15 half rings and narrow. The lateral

¹ In my former article in 'The Auk' cited above, I have already given a brief account of the bones of the *hyoid arches*, so it will be unnecessary to say anything further about them here. R. W. S.

muscles strong, as are the sterno-tracheal, which come off at a distance of $\frac{1}{2}$ inch. There is a single pair of inferior laryngeal muscles going to the upper edge of the last tracheal ring." (*loc. cit.*, p. 34.) To this I may add that a *pessulus* does not form a part of the lower larynx in this pigeon; apparently there is not even a rudiment of one.

The superior division of the *oesophagus*, twenty-five millimeters in length, is a strong, muscular tube of uniform caliber, and capable of considerable extension. Externally, its fibers run longitudinally. At the distance above mentioned from the buccal extremity, it suddenly dilates into an enormous *crop*, which, when filled, has an ellipsoidal form, with the major axis transversely disposed. This axis measures about 54 millimeters, while the minor axis or longitudinal one is about one-fourth less.

In a male bird, MacGillivray found the crop much larger, or 63 by 77 millimeters. Below, the crop in the present specimen has nearly a uniform caliber for a distance of 27 millimeters. It is strong and muscular, with muscular plicæ longitudinally raised upon its extreme surface. Still further along, it gradually dilates, to become the *proventriculus*, which, terminally very considerably enlarged, enters the *gizzard* or *stomach*. This latter is placed obliquely in the abdominal cavity as shown in Plate V.

MacGillivray found the gizzard in the male bird much larger than it is in the female here being described. He states that it was two inches and two-twelfths in breadth, and one inch and one-fourth in length. The gizzard at hand is but little more than half this size. It has the usual structure found in the *Columbæ*, and I found its internal cavity to contain a dozen or more quartz pebbles of the size of coarse bird-shot. The *musculus intermedias* of this gizzard is strong and well developed; its form, from two views, is shown in the plates, as well as its internal structure on section.

In a former paragraph I have already described the condition in which I found the *right lobe of the liver*, when I opened the abdominal cavity, and this leaves but the smaller *left lobe* for consideration. It has a transverse diameter of 21 millimeters, and an average longitudinal one of some 12 mm., not taking into consideration the three distal processes it presents: a small median one, and one upon either side of double its size. This distal margin is sharp,

which, to a less degree, is the case with the rounded or convex anterior contoural boundary. On the dorsal aspect there is a deep concavity, which allows the liver to fit itself upon the supero-anterior surface of the gizzard.

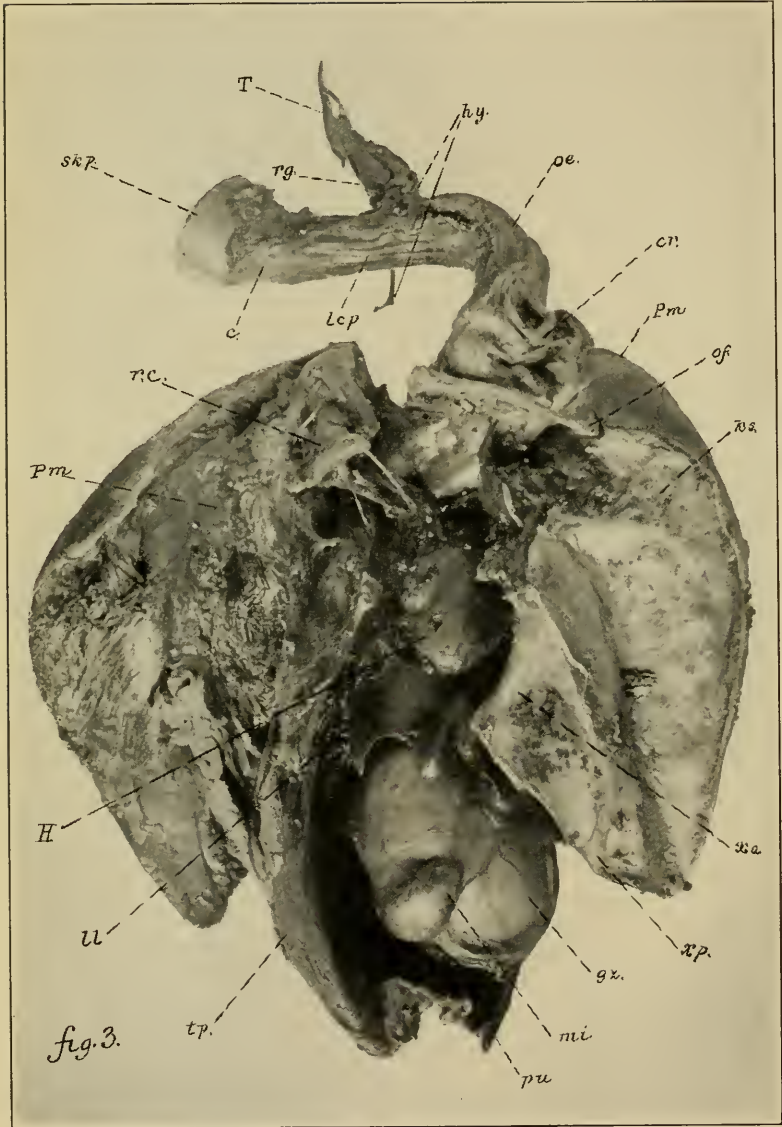
The *right* and *left bile ducts* were not in evidence, and the various divisions of the peritoneum could not be worked out entirely.

Coming to the *heart*, I find it to have an extreme length of 23 millimeters, and a transverse diameter, above the ventricles, of 14 millimeters. I examined with great care all the vessels entering and leaving its several cavities and their main branches; they are identically the same as they occur in *Columba livia*, as described by the late T. Jeffrey Parker in his admirable text-book entitled "A Course of Instruction in Zoötomý (Vertebrata)," on page 241, Fig. 56. There is every reason to believe that the internal anatomy of the *auricles* and *ventricles* of this heart of the Passenger Pigeon agree, in all structural particulars, with the corresponding ones in any large wild pigeon, as for example *C. fasciata*. I therefore did not further dissect the heart, preferring to preserve it in its entirety, — perhaps somewhat influenced by sentimental reasons, as the heart of the last "Blue Pigeon" that the world will ever see alive.

With the final throb of that heart, still another bird became extinct for all time,— the last representative of countless millions and unnumbered generations of its kind practically exterminated through man's agency.

Were I to go as far as I could into this subject of the anatomy of the Passenger Pigeon, my collected observations would afford matter for several good-sized volumes. Even the mutilated material before me might furnish several chapters on the myology of this species; on the circulatory system; the nervous system; histology of the structures, and a great deal more besides.

In any group of vertebrates, birds included, it is always an advantage to have published the *entire morphology* of some particular species of a group, as for example a typical pigeon of the genus *Columba*. Then, with respect to the morphology of species belonging to genera evidently closely related to *Columba*, it will but be necessary to make record of enough, with respect to their minute and gross anatomy, to establish the fact that our investigations have led us to a point where we can predict, with absolute cer-



ANATOMY OF THE PASSENGER PIGEON.

tainty, what the balance of the morphology will be in any particular case. It is always well, however, to make a careful comparison of the skeleton in the case of all the genera of a family, and it requires a comparative vertebrate morphologist, with a very vast and varied fund of knowledge of his subject, to decide, in any instance, just what amount of data to obtain, in the case of any particular species to be anatomically investigated, when the entire morphology of a typical representative of a closely related genus is known.

If what I have thus far attempted to present of the osteology of *Ectopistes migratorius*, and of the rest of the anatomy of that species,— and knowing what he already knows of the morphology of *Columba livia* and other pigeons,— will enable the ornithotomist to surmise, perhaps with more than comparative certainty, what the undescribed parts of the anatomy of *Ectopistes migratorius* would reveal upon investigation, I feel that my researches have accomplished all that I could hope for in this regard, with respect to our now extinct Passenger Pigeon, and that my labor has been well repaid.

EXPLANATION OF PLATES.

(All the figures in the Plates are by the author, and made, either by drawing or photographic reproduction, direct from the subjects they depict.)

Reference Lettering.

- aa. internal dermal margin of the auricular aperture.
- am. angle of mandible.
- c. complexus muscle (Figs. 2, 3.)
- cr. crop. (Figs. 3, 4 and 4.)
- ct. intestine cut away close to the external surface of the gizzard.
- dc. depressor caudæ muscle. (Fig. 2.)
- e. eye. (Fig. 2.)
- el. internal view of eyelids. (Fig. 2.)
- gp. gluteus primus muscle. (Fig. 2.)
- gz. gizzard. (Figs. 3, 4 and 5.)
- H. heart. (Figs. 3, 4 and 4.)
- hy. hyoid with muscles attached. (Figs. 2, 3, 4 and 5.)
- ks. keel of sternum. (Fig. 3.)

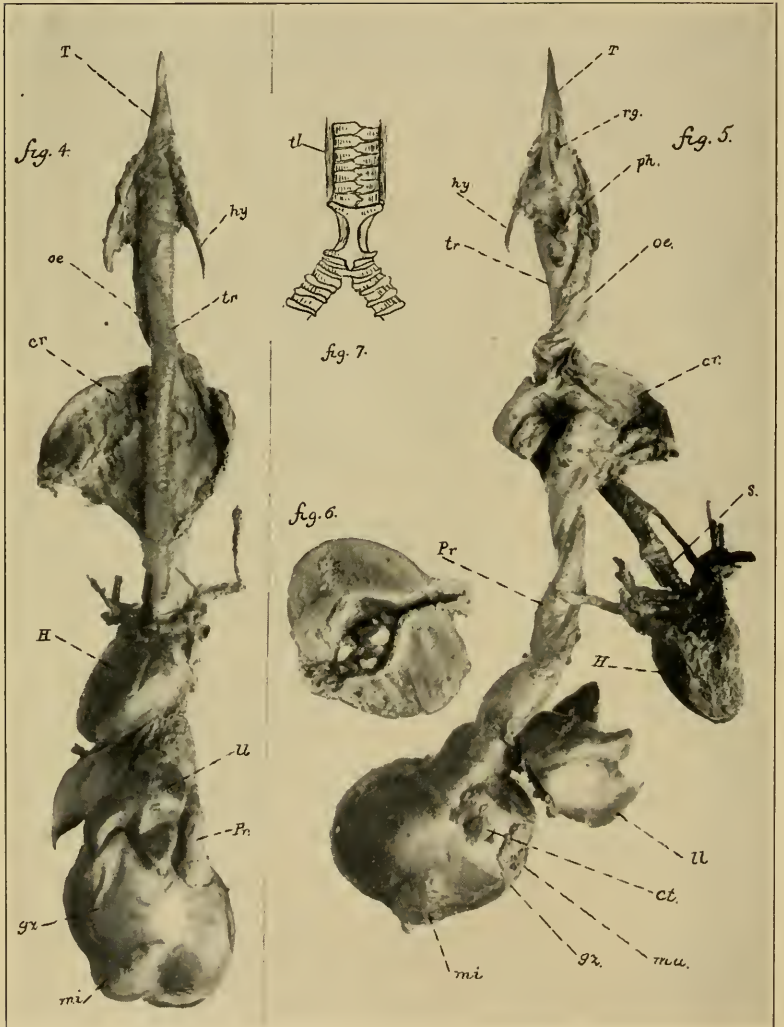
- lcp.* longus colli posticus muscle. (Fig. 3.)
ll. left lobe of liver. (Figs. 3, 4 and 5.)
mi. musculus intermedius of the gizzard. (Figs. 3, 4 and 5.)
oc. oblique condyle of right humerus. (Fig. 2.)
oc.' oblique condyle of left humerus. (Fig. 2.)
oe. œsophagus. (Figs. 3, 4 and 5.)
of. os furculum. (Fig. 3.)
P. pelvis.
ph. pharynx or entrance to œsophagus. (Fig. 5.)
Pm. pectoralis major muscle. (Figs. 2 and 3.)
Pr. proventriculus. (Figs. 4 and 5.)
pu. pubic bone of pelvis. (Figs. 2 and 3.)
py. pygostyle. (Fig. 2.)
r.c. right coracoid. (Fig. 3.)
rg. rima glottidis. (Figs. 3 and 5.)
rm. rectus capitis posticus major muscle. (Fig. 2.)
s. lower larynx and bronchial tubes. (Fig. 5.)
sk. skin of head and neck of the left side. (Fig. 2.)
sk.p. parietal region of cranium. (Figs. 2 and 3.)
T. tongue. (Figs. 3, 4 and 5.)
tl. tracheo-lateralis muscle. (Fig. 7.)
tm. teres et infraspinatus muscles. (Fig. 2.)
tp. transversus peronei muscle. (Fig. 2.)
tr. trachea. (Figs. 2, 4 and 5.)
xa. anterior xiphoidal process of sternum of right side. (Fig. 3.)
xp. posterior xiphoidal process of sternum of right side. (Fig. 3.)

PLATE IV.

FIG. 2. Skinned head, neck and trunk of *Ectopistes migratorius*; nat. size. The reversed skin attached to the base of the mandibles. *Humeri* and *femora* still attached and partly covered with their muscles. Forearm; hand; the pelvic limbs below the knee, and the uropygial glands have all been removed.

PLATE V.

FIG. 3. Neck and trunk of *Ectopistes migratorius* (same specimen). Skull and associated parts anterior to aural apertures have been cut away. Hyoidean apparatus, trachea and œsophagus drawn down considerably below normal position. Crop empty and wrinkled up. Os furculum dislocated at right shoulder, and right coracoid thrown out of its sternal articulation. Right pectoral muscles and other structures dissected away from sternum and drawn far to one side. Right side of sternum in full view. Thoracic and abdominal cavities opened up ventrally, and heart, left lobe of liver, gizzard, etc. exposed to view.



ANATOMY OF THE PASSENGER PIGEON.

PLATE VI.

FIG. 4. Tongue, hyoid, trachea, heart, liver and digestive organs removed from their cavities and photographed on anterior or ventral view. The crop (*cr.*) has been turned around to occupy the posterior aspect of the windpipe or trachea, in order that the latter may be seen for its entire length. The cardiac extremities of the great vessels at the base of the heart can easily be recognized. The left lobe of the liver (*ll.*) and the gizzard are in the normal relations to each other.

FIG. 5. Same structures and organs as seen in Fig. 4. The tongue and pharynx are seen upon dorsal view; the crop and œsophagus are twisted about the trachea in order to show the reverse side of the first-mentioned organ. The lower part of the trachea (lower larynx) and bronchial tubes are seen. Heart and great vessels are shown upon posterior aspect. The left lobe of the liver is thrown forwards in order to give a complete view of the gizzard, which latter has been bisected and turned so as to show its dorsal surface.

FIG. 6. Interior aspect of the anterior moiety of the gizzard exhibiting the muscular portion, with the central cavity filled with small pebbles.

FIG. 7. Anterior view of the lower part of the *trachea*; the *lower larynx*, and the bronchial tubes. About twice natural size, and drawn by the author direct from the specimen.

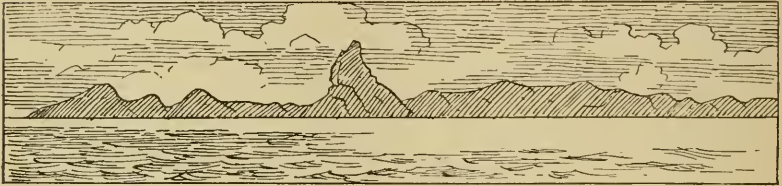
TEN HOURS AT FERNANDO NORONHA.

A DAY'S COLLECTING ON THE SOUTH GEORGIA EXPEDITION OF THE BROOKLYN MUSEUM AND THE AMERICAN MUSEUM OF NATURAL HISTORY.

BY ROBERT CUSHMAN MURPHY.

ON October 15, 1912, the good whaling brig *Daisy* of New Bedford was running merrily across the trade wind just south of the equator. All day long, boobies and other passing sea birds told us that we were nearing land, and at nine in the evening we made out the twinkling, revolving light of an island lying under the bright quarter moon. We hauled aback our square sails and lay to for the night.

The bold, overhanging "Pyramid" of Fernando Noronha, a black, phonolite mountain which is the most conspicuous landmark in all the South Atlantic, loomed out about nine miles distant



in the following dawn. As we bore down toward the land in the hazy light, the long strip of rough hills, which had first seemed continuous, gradually broke up into the several islets of which the group is composed. The sun, leaping above the equatorial horizon, revealed a green lowland, well clothed with shrubs and small trees, and a higher zone of bare, weathered peaks. The four tall, skeleton "wireless" towers were probably the only features which had been added to the landscape since Charles Darwin in the *Beagle* visited this Brazilian penal settlement fourscore years ago.

Fernando Noronha lies in latitude $3^{\circ} 50' S.$, longitude $32^{\circ} 25' W.$, two hundred miles off the South American mainland from which it is divided by a channel 13,000 feet in depth. The rugged group is only about seven miles long, by one and a half in width. The component islets, portions of the crater rim of an ancient volcano, are of basaltic rocks, without sedimentary deposits, but with injected dykes of phonolite or "clinkstone," the whole now almost worn away by the action of the denuding tropical rainfall and the battering seas, although the famous, columnar Pyramid still rises to a height of 1,089 feet. Most of the smaller islets are bare of vegetation except for a few grasses and sedges, some thickets of a low shrub (*Phyllanthus*), and several leguminous vines. Parts of the main island are covered by a variety of stunted trees and shrubs, including an endemic fig (*Ficus noronhæ*) and a leguminous tree (*Erythrina*). There is a large percentage of widely distributed tropical weeds, and a remarkable number of plants having edible berries or seeds. Within the memory of man the leeward side of the land was heavily forested, but the larger trees have long since

been felled in order that the exiled convicts, practically the only human beings to share the sea-beaten spot with countless nesting ocean birds, might not build rafts and escape to the shores of Brazil.

When the *Daisy* had drawn within a couple of miles of the coast, whaleboats were lowered, and I went ashore along with a fishing party. On the way to the land we were surrounded by an enormous flock of Noddy Terns which stretched away to the far horizon until the birds appeared like tiny, swarming insects. Passing several conical inaccessible islets, on which Man-o'-war-birds were breeding, we entered a cove of grottoed rock ending in a crescent of sand. Behind the beach the fissured, yellow wall of a cliff, conforming with the semicircular outline of the cove, rose sheer to a height of four or five hundred feet, and clustering in thousands along its upper surface were graceful Noddies on their scaffold nests. Side by side on a twisted bough at the foot of the cliff sat two snow-white "Love Terns" (*Gygis*), antitheses of the black Noddies.

The cool water of the cove lured us to a swim, and, as several of us plunged in, the blurred image of a green turtle glided away before us, and a shoal of porpoises see-sawed leisurely across the inlet. One of the sailors fired his gun from the whale-boat at something or other (which he did not hit), and the roar reverberated from face to face of the curving wall, while a horde of screaming birds poured down off the rocks, adding to the bewildering echoes.

Other inhabitants than the birds were also disturbed by the report of the gun. When we turned toward the beach a tall, black, muscular fisherman, with a tattered seine over one shoulder, and wearing not a stitch of clothing, stood eyeing us curiously. Presently out of the shrubbery below the cliff came a fellow of lighter skin, clad in short canvas trousers and a blue tam-o'-shanter cap, with a crude wicker basket slung over his back. The pair might have passed for Robinson Crusoe and his man Friday on washday. The cap of the second native came off obsequiously when we landed, while both men extended a right hand of welcome and ingenuously explained in Portuguese that they were murderers serving sentences on the isle. The quadron had been there fourteen years, and his durance was to terminate at the close of eight months more when he would return to his native Pernambuco.

He directed us to a better beach around the westward promontory, where he said he would meet us. Accordingly we pushed off shore, while the poor islander, taking a pair of goatskin sandals from his basket, painfully toiled up a stony, winding path across the ridge, leaving his comrade to cast the net alone.

After our whaleboat had rounded the point of rock there lay before us a charming bit of seashore. The broad beach of golden sand stretched in an even curve to another headland a mile beyond, and sloped gently into the sea which for a long distance from shore was wondrously transparent. The upper beach was a riot of vegetation, among which the tropical morning-glory, *Ipomœa pes-capræ*, and a slender-stalked cactus (*Cereus*) were conspicuous; and still beyond, a thicket of brush and trees, filled with fruit-eating doves (*Zenaida*), concealed the base of the precipice. The latter ran parallel to the water-line as far as the distant headland. Its lower face was covered with vines which clambered up the seams, and its crest was bordered with pink and orange-colored blossoms of small trees whose roots drooped over the edge. Sharp slabs of rock projected here and there, offering perfect nesting sites for the birds which appeared in hosts whichever way we turned. The chattering Noddies, of two species, were most abundant, but large-eyed *Gygis* terns, and satin-feathered Bo'sun Birds (*Phaëthon*), trailing their comet tails, were flying to and from the niches in the cliff; a flock of migrating plover pattered along the edge of the sea; and boobies and Man-o'-war-birds came wheeling in fearlessly from their feeding grounds off shore.

For the sea birds it is always springtime at Fernando Noronha, The year is divided into rainy and dry periods, January to July, July to December, respectively, but there is no fixed breeding season, and eggs and young can be found in every month of the twelve. For this reason the isle is a great center and source of avian population; even such maritime species as the bo'sun birds, which spend most of their lives in the remotest parts of the ocean, can here be seen in their cliff-built homes from the year's beginning to its end.

Our volunteer guide had removed his carefully fostered sandals on leaving the rough rock, and now awaited us on the beach. The *Daisy's* cooper and I joined him, the rest of the boat party rowing

off to a reef to fish. The guide, who was informed of our mission, pointed out the nests of the various birds, and captured for us some of the small lizards which scurried over the sand and rock everywhere. He talked glibly in his Brazilian jargon, giving voluminous information concerning the severities inflicted upon the unfortunate exiles. We met a number of his equally unclad fellow prisoners, as well as several pitiful, rheumatic, illiterate boys, children of the convicts, who, like the adults, followed and assisted us for the sake of gathering our empty cartridge shells. Finally the Pernambucan took the cooper on a visit to some of the convicts' *casas*, miserable huts, half-thatched with cocoanut leaves and destitute of furniture. The women, some of them whites of unmixed blood, were almost as sparsely clothed and as woe-begone as the men.

During the absence of my companions I climbed a rough, nearly perpendicular footpath into the woods. Thorn-shrubs, trailing vines, and numerous berry-bearing plants among which the wild doves were feeding, made a fairly dense cover. The "Pinhao" or pink-flowered tree (*Jatropha gossypifolia*) which we had noted from the beach, was leafless although in full blossom, just as on the occasion of Darwin's visit in 1832. I ascended as far as possible up the bare, steep side of the Pyramid. Directly below me lay the long, picturesque beach, with the fleet-winged birds crossing and recrossing it. Not a trace of the work of human hands was in sight. Here was Prospero's isle, cooled by a tireless trade-wind — a land where fruit trees and melons flourish without cultivation, a land which might become a second Bermuda, yet for a hundred years it has been given up to wretched criminals under the callous régime of the Brazilian penal system.

When we joined our fishing party late in the afternoon we found the whaleboat well laden with various brightly-colored tropical fishes and several sharks. The latter had been a great nuisance to the fishermen all day, biting many of the smaller fishes from the hooks before they could be drawn to the surface, and nipping the larger ones clean in half.

As evening drew near we perceived the brig bearing down the coast toward us, and reluctantly we sailed off to join her, leaving the allurements and the misery of Fernando Noronha. At dusk we were running swiftly down the trade wind, the Pyramid behind us still showing faintly through a bluish haze.

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12. Scharff, R. F. Distribution and Origin of Life in America. 1912, pp. 384, 385.

A LIST OF THE BIRDS OF FERNANDO NORONHA.

1. **Oceanites oceanicus** (Kuhl). A few Wilson's Petrels were seen from the whaleboat between our vessel and the shore.

2. **Phaëthon lepturus** (Lacép. & Daudin). *Phaëthon lepturus*, Grant, Cat. B. XXVI, p. 453, Nicoll, *Ibis*, 1904, p. 39.

The Bo'sun Birds were nesting in niches of the cliffs along the beach, and they could be frightened from their eggs only with difficulty. Three breeding females, of which two are typical *lepturus*, were collected. The third specimen represents a phase of the species hitherto apparently undescribed. In this specimen the white feathers are replaced entirely by a plumage of pale pink, or pinkish salmon, slightly orange on the back but less so than in *P. fulvus* of the Indian Ocean. The pattern of light and dark

coloration differs a little from that of the two white birds in that the black on the outermost primary extends to within 23 mm. (.9 in.) of the tip, and on the third from the outermost primary to within 8 mm. of the tip. It differs moreover in its smaller dimensions and in having the culmen horn-colored instead of yellow. Further collection may possibly show that this pink *Phaëthon* is worthy of taxonomic distinction.

Measurements of skins.

	exp. culmen	tarsus	wing	tail
♀ (white)	48	22	265	403
♀ (white)	46.5	23	264	416
♀ (pink)	44	21.5	251	451
An unsexed specimen of <i>P. fulvus</i> in collection of Am. Mus. Nat. Hist.	49	23	283	530

3. **Phaëthon æthereus** (Linn.). *Phaëthon æthereus*, Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 480. Grant, Cat. B. XXVI, p. 458.

4. **Sula leucogaster** (Bodd.). *Sula leucogastra*, Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 480. *Sula fusca*, Ridley, Zoölogist, 1888, p. 43.

Boobies of this species were exceedingly abundant at the island. While we were passing to and from shore in the whaleboat, they flew about us closely, and three immature examples were collected.

5. **Fregata aquila** (Linn.). *Tachypetes aquila*, Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 480. Mosely, Notes by a Naturalist on H. M. S. *Challenger*, p. 71.

We found the Frigate Bird abundant. Numbers were seen upon their nests about the summits of the smaller islets.

6. **Charadrius dominicus** (Müll.)?

A flock of seven plover, believed to have been of this species, were seen repeatedly along the shore of the inlets. Unlike the native birds these plover were very shy, and I could neither collect one nor approach the flock closely. Fernando Noronha is doubtless a regular station for migrating shore birds, and several of the authors cited above refer to *Limicolæ* at the island.

7. ***Arenaria interpres*** (Linn.). *Strepsilas interpres*, Nicoll, Ibis, 1904, p. 39.

8. ***Sterna fuliginosa*** (Gm.). *Sterna fuliginosa*, Nicoll, Ibis, 1904, p. 39.

9. ***Anous stolidus*** (Linn.). *Anous stolidus*, Saunders, Cat. B. XXV, p. 141. Nicoll, Ibis, 1904, p. 38.

10. ***Micranous leucocapillus*** (Gould). *Anous melanogenys*, Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 479.

At the time of our visit Noddies of this species far outnumbered all other birds. Six breeding adults were collected. Several are in new, unworn plumage, and have the outermost remex only half grown or less.

Measurements of 5 skins.

	exp. culmen	tarsus	wing	tail
♂	46	23	217	122
♂	47	23	222	117
♂	44	23	222	116
♂	43	22.5	225	118
♀	44	23	218	113

11. ***Gygis crawfordi*** Nicoll. *Gygis candida*, Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 480. Saunders, Cat. B., XXV, p. 149. *Gygis crawfordi*, Nicoll, Bull. B. O. C., XVI, 1906, p. 102.

Nicoll, Ibis, 1909, p. 669, states, "Probably all examples of the White Tern from the Atlantic are referable to this species, as a glance at the map will show how completely it is isolated. A few pairs breed on Fernando Noronha Island, and it has been also recorded from St. Helena and Ascension as a breeding species."

About twenty examples of this tern were seen, mostly flying in pairs from shelf to shelf of the upper cliffs, or sitting side by side on the boughs of trees. Four breeding birds were collected, one of which was preserved as a skeleton. They agree in general with Nicoll's description, which, however, is not very detailed: — "Similar to *G. candida*, but may be easily distinguished by the following characters. Bill wholly black (not blue at the base, as in *G. candida*), more slender and narrower at the base; nostril situated much nearer the forehead; wing longer than in *G. candida*; tarsi and toes pale blue, webs white." The species appears also to differ from *G. alba* (= *candida*) in having a heavier ring of black around the eye.

Measurements of skins.

	exp. culmen	tip of bill to nostril	gonys	tarsus	wing	tail
♂	40	27	24.5	14	240	103
♀	41	29	25	15	240	113
♀	41	29	25	14.5	241	115
♀ of <i>G. alba</i> from Japan.	37	26	21.5	14	220	102

The length in inches of the entire culmen of the ♂ from Fernando Noronha is only 1.8 as against "2.1" for the type specimen of *Gygis crawfordi* from Trinidad Islet.

In one ♀ of the Fernando Noronha birds the shafts of the primaries are white; the other two birds have the shafts marked with brownish pigment.

It is interesting to note that this white-feathered bird has a heavily pigmented, coal-black skin, whereas the skin of the black tern, *Micranous*, is white in every part. The dermal melanin of *Gygis* doubtless bears the same relation to the absorption of external heat, or the prevention of radiation of bodily heat, as the black plumage of *Micranous*.

12. **Zenaida auriculata** (Temm.). *Zenaida noronha*, Gray, List B. Brit. Mus., 1856, Columbæ, p. 47. *Zenaida maculata*, Sharpe, Proc. Linn. Soc. (Zoöl.) XX, 1890, p. 479. *Zenaida auriculata*, Salvadori, Cat. B., XXI, p. 384. *Peristera geoffroyi*, Mosely, Notes by a Naturalist, p. 71.

This species is the most abundant land bird at Fernando Noronha. According to Moseley the doves sometimes breed on the ledges with Boobies and Noddies, the nests being intermingled with those of the seabirds.

Of three specimens collected a ♂ and a ♀ were breeding.

Measurements of skins.

	exp. culmen	tarsus	wing	tail
♂	17	25	134	73
♂	17	24	135	80
♀	16.5	24.5	134	76

These figures confirm the statements of Sharpe, l. c., and of Salvadori, Cat. B., XXI, p. 386, that the dimensions of Fernando

Noronha specimens of *Z. auriculata* are somewhat less than those of birds from the South American continent. Probably the form is worthy of subspecific distinction, for according to the astronomer Halley "Turtle Doves" were abundant at Fernando Noronha at the time of his visit in February 1699.

My specimens show three stages of the moult, the sequence of which seems to be as follows:—The inner primaries and central rectrices are first moulted; after the replacement of these by new feathers the remaining quills are lost, primaries 10 and 9 being the last to drop out. The moult of the contour feathers follows that of the quills.

The female dove in the collection is as brightly colored as a male in new plumage.

13. *Elainea ridleyana* Sharpe. *Elainea ridleyana*, Sharpe, Proc. Zool. Soc., 1888, p. 107.

This flycatcher and the following species of *Vireosylva* are endemic.

14. *Vireosylva gracilirostris* (Sharpe). *Vireo gracilirostris* Sharpe, Journ. Linn. Soc. (Zoöl.) XX, 1890, p. 478.

Many of these greenlets were seen in the fig trees and in the thickets near the beach. A ♂ and a ♀, both breeding birds, were collected. Both were in fresh plumage, some of the body feathers not having lost the sheaths, while the quill feathers show only the slightest signs of wear. The contour feathers of the back measure up to 35 mm. in length.

Measurements of skins.

	exp. culmen	tarsus	wing	tail
♂	16	20.5	64	50
♀	15	21	66	55

In addition to the fourteen species listed above, references are made in several of the works which I have cited to the following birds:—"small plover," "bird resembling a Yellowshank," "sandpiper," "curlew," and "a small species of Albatross."

NOTES ON AMERICAN AND OLD WORLD ENGLISH
SPARROWS.

BY JOHN C. PHILLIPS.

IN the spring of 1911 I undertook to collect skins of *Passer domesticus* from various parts of the United States with the object of studying any possible geographical or climatic effects which the species in its new surroundings might have undergone. For this purpose I communicated with a number of collectors, both professional and amateur (about forty in all) throughout the country, but the answers and especially the number of skins received were by no means encouraging. Many of these men had already gone out of business; others could not kill sparrows in places where these birds were confined to city limits; and still others no doubt thought the pursuit of a few specimens of this inglorious and unremunerative species scarcely worth while.

At the present my collection is stationary, and in these notes I shall simply give the meagre results as far as they have progressed. It is as well to state that although the enquiry was started as a study in variation, it would be better with the data now at hand to call it "A study of the stability of a species under wide-ranging climatic and geographical conditions."

In July, 1911, four hundred and forty-six enquiries were sent to postmasters in the western states in order to get an idea of the distribution of the English Sparrow since the map of Barrows, 1889, and also the length of residence of the species in various western districts. Three hundred and twenty-eight answers were received, and these will be mentioned later.

It is necessary at first to outline the native distribution of *P. domesticus* and its subspecies, giving a brief diagnosis of these as they are described by the latest authority on the Passerine birds of Europe, Hartert's 'Die Vogel der Palearktischen Fauna.' Hartert says that *P. domesticus* is found over all of Europe except Italy, where it is very rare (less so in Friaul and Udine). In Scandinavia beyond the Arctic Circle, all over the British Isles, but not on the Faroes, Madeira, Azores or Canaries. All over Russia and Siberia

to Irkutsk; to Darien in East in cities and villages, (here only since permanent habitation) and not in territory of nomads. In South to Gibraltar, Spain and Portugal, to Tangiers, on Balkan Peninsula, and on Balearic Isles. Also imported to New Zealand and Australia and North America. Male wing 76–82.5; rarely 83 (E. Prussia). He says it was not easy to define the limits of *P. d. indicus*, an eastern race, on account of lack of material and the pronounced variation of *domesticus*, especially in the color of the back, lighter or darker, more or less mixed with white, and also in the size. He was not able to separate any races in Europe, but says more material may give other results.

English, Irish, W. German and Dutch specimens he considers smaller, but there is no definite boundary line. The largest male is from Eastern Prussia. Specimens from S. E. Europe have brighter colors, but nothing constant. Caucasus specimens have grey ear coverts, very pure colors, and look like *P. indicus*, but cannot be separated as a race. Some specimens have fine black cross-bars on lower sides. Spanish spring birds are peculiar because of light colors and chestnut brown on the lesser wing coverts and back. We thus see stability over a very large area, with tendency to certain variation.

The following sub-species are recognized by Hartert:

P. d. biblicus Subspec. nov.: size Wing 82–84; beak as large or larger, back light chestnut brown with no white; grey of rump and head covered in fall with a pale brown tint. Wings and tail not as dark. Ear coverts not white as *indicus*, but light grey with brownish tint. Six specimens. (In the Museum of Comparative Zoölogy I have seen five males from near Jerusalem, Selah Merrill Collic; all of them fall below the measurements given by Hartert except one which equals his smallest — Wing 78–82–77–80–79.) Distribution of this race: Syria, Palestine from Beersheba to Beirut.

P. d. tingitanus Locke: Very much like *P. domesticus* but grey feathers of upper head in the male are black towards base; a fact only noticed in fresh feathers when they are raised up. In spring the worn head feathers look dotted with black; ear coverts not as grey, and lower parts somewhat lighter and cream colored. Rump somewhat lighter and wing a little longer. Females also somewhat lighter and less greyish. Distribution: Tunis and Algiers, Morocco.

Occasionally specimens of pure *domesticus* with head characters of this race are found in Germany.

P. d. ahasver Kleinschmidt: Just like *domesticus*, but a round spot in center of the top of the head is grey, surrounded by a circle of brownish red which protrudes a little over the forehead. Author has only one specimen, so form is not definitely fixed. Distribution: Countries south of Atlas.

P. d. arboreus Bonaparte: A small and lively colored species of *domesticus*. Top of head a rusty brownish grey in fall; in spring a lively reddish, chestnut brown, with very narrow black stripes. In fall we can see light rusty brown feather tips which are soon worn off. Rump and upper tail coverts always show more or less rusty red spots. Wing of the male, 72-74; female only distinguished from *domesticus* by smaller dimensions. Distribution: Nile, Dongola and Berber, south to twelve degrees. Found near Khartoum commonly.

P. d. chephreni Phillips: This race, recently separated by myself (Proc. Biol. Soc. Wash., 1913, p. 167), is like *P. d. indicus* but the cheeks and ear coverts are darker. Hartert noticed this difference but did not separate this bird. Its distribution is the northern Nile Valley.

P. d. indicus Jardine & Selby: Noticeably smaller, Wing 74-78; light head areas pure white; upper ear coverts often of light grey tint and general colors lighter. Distribution: Cochin China, Burma (in Terrasserim South to Moulmein), Ceylon, India, Turkestan, Transcaspia, Persia and So. Arabia. Transcaspian birds are sometimes intermediate to *P. domesticus*.

P. d. Pyrrhonotus Blyth: A very small sparrow with a light grey center on the head, small black spot on throat and a chestnut brown lower back. Wing of male, 68-69. Distribution: Sindh (Narra).

Nicoll and Bonhote described another race, *P. d. niloticus* from the desert east of Cairo, which is apparently somewhat like *P. d. arboreus*.

I am not familiar at first hand with these races except *biblicus*, *indicus*, *arboreus* and *chephreni*. *Indicus* is a very strongly marked subspecies and is recognized at a glance, and so is *arboreus*. Some of the other races are less well marked.

Turning now to the series of *Passer domesticus* obtained in 1911, and that already in the collection of the Museum of Comparative Zoölogy, it is well to give a list of the specimens, and to mention some of the individual variations.

Littleton, Colo., May, 1911, ten specimens, four adult males. These four males show rather marked differences in color. Specimen A is an extremely buffy bird with a large amount of rich chestnut on head and neck, and very little black on back. Specimen B is very blackish on the back, with very little buff anywhere. Taken as a whole, this series shows more color variation than any other.

Denver, Colo., winter, 1911-12, F. C. Lincoln, collector, 23 specimens, 12 males. These specimens are more or less soot stained, but two are bright and clean. (This soot staining is easily recognized after it has once been seen.)

Nampa, Idaho, eight skins, two adult males, May and June, 1911. Nothing of note.

Tacoma, Wash., pair, March, 1909. These birds are very dirty, like the London ones.

Blue Rapids, Kans., P. B. Peabody, collector, May, 1911, nine skins, four adult males.

Excelsior, Minn., Albert Lano, collector, eighteen skins, eight adult males, May, 1911. This series presents, I believe, a slight difference in color. The males are very rich red on the post-ocular and neck patch, while the backs are strongly streaked and dark in color. I rather hesitate to mention this, but believe it to be a real fact.

Mount Pleasant, S. C., A. T. Wayne, collector, May, 1911, three adult males.

Warwick Co., Va., H. H. Bailey, collector, May, 1911, Feb., 1912, eighteen skins, fifteen adult males.

Brownsville, Tex., Armstrong, collector, 1889, one pair. The male shows pure white primaries and secondaries on both sides; also some white tail feathers.

Mt. Carmel, Ill., one male, 1878.

Washington, D. C., 1900, one pair.

Sing Sing, N. Y., four skins, two males, 1874-1879.

Princeton, N. J., five skins, three males, 1879.

Boston and vicinity, 1878 to recent date, twenty-four skins.

Boston, 1878, Bangs, collection, two males, Nos. 4746 and 4744.

Both of these specimens show much chestnut on throat and breast, in specimen 4746 practically replacing the black of that region.

Germany, two males, one female.

Roumania, eight males.

Pommern, Prussia, one male, 1871.

England, eighty-six skins, sixty-six males. Many taken near London are very black all over, undoubtedly due to soot. This series shows well the characteristic age differences. The older the bird, the greyer becomes the pileum, the whiter the cheeks and the lighter the abdomen. All the males in immature plumage have an olivaceous pileum, approaching the color of the female pileum.

From the Museum of Vertebrate Zoölogy of the University of California, through the kindness of Mr. Joseph Grinnell, I have had the opportunity of examining the following large series:

Tipton, Tulare Co., Calif., three males, April, 1911. Fine, clean skins.

Berkeley, Calif., eight skins, seven males, 1909-10, except one dated 1892. This series is all soot-colored, especially male 11618 (1892).

Raymond, Madero Co., Calif., one male, April 1911. A very bright clean skin.

Oakland, Alameda Co., Calif., two females, Oct., 1908. One a partial albino, nearly white on dorsum except for primaries and secondaries.

Tower House, Shusta Co., Calif., two males, March, 1911.

Honolulu, Oaha, June and March, 1910, sixteen males and ten females, collected by Miss Alexander. The plumage of this whole series has a very bright and clean look, due perhaps to a clean, showery climate. There appears to be, however, no essential differences either in measurements or color.

As to the size of specimens from various localities, the table (p. 56) will show at a glance all I have been able to learn.

It will also be seen from the table that there is little choice in size either from single localities or grouped localities such as those found in the first part of the table. It is nevertheless apparent that sparrows from England are slightly smaller, a fact pointed out

Loc.	Males				Females & juvenile			
	Wing	Tarsus	Cul.	No. specimens	Wing	Tarsus	Cul.	No. specimens
England	75	19.4	11.6	66	72	19	11.4	20
Roumania & Germany	76.3	18.8	12	11				
New England	77	19.3	11.8	27	75.5	19.6	11.7	6
West America	76.6	19.4	12.1	30	75.3	19.4	11.8	45
South Atlantic	77.1	19.8	11.8	18	75	19.4	12	5
Littleton, Col.	75.2	18.6	12	4	75.3	19.4	12	6
Nampa, Idaho	77.5	20	13	2	76.1	19.8	10.9	6
Blue Rapids, Kansas	76	19.4	11.8	4	75	19.4	11.5	5
Tacoma, Wash.	76	19	11.5	1	74	20	12	1
Brownsville, Texas	73	17.5	12	1	73	20	10	1
Marshall Co., Kansas					76	18	12.5	1
Mt. Pleasant, S. C.	77.7	19	12.3	3				
Warwick Co., Va.	77	20	11.7	14	75	19.4	12	5
Denver, Col.	78	19.5	11.9	12	75	19	11.8	12
Excelsior, Minn.	76.6	19.4	12.5	6	75.7	19.7	12.1	13

by Hartert and noted above. My series from Denver run large, while those from Littleton, Colo., are small. New England and South Atlantic birds are large, especially three males from Mt. Pleasant, S. C., but all these differences are too slight to be of much significance. No birds as large as Hartert's maximum have been seen.

The series lent by the Museum of Vertebrate Zoölogy was not measured individually.

Townsend and Hardy in 'The Auk' for 1909, p. 78, give some measurements for English birds and for recent and early New England birds. They notice the smaller size of English birds. They also obtained larger measurements for the bills of recent New

England birds than for older ones, 13.18 as against 12.64. I think this result must be accidental, as I have found no specimens with bills as large as 13 mm. It is not necessary to say, perhaps, that observers should be careful in comparing their own measurements with those of others, for methods vary a great deal.

It is not my intention to go into the dispersal of the sparrow in America. The map which I constructed from replies to my postal cards showed that the bird was present in all county seats throughout the entire west which replied to my query, except a few places in northern Idaho, northwestern and northeastern Oregon, northwestern California, and some other scattered localities mostly in Nevada and Arizona. The literature teems with notices of the arrival of the English Sparrow at different places through the west, and a very fair map of its advance during the past twenty years could be constructed from this source. I find two notices which require special mention. In the 'Ottawa Naturalist' for May, 1909, Criddle expresses the opinion that sparrows of eastern Canada migrate in part, and that these migrants breed later than the local birds.

Wood (Wilson Bull., XXIII, p. 103) noted at Charity Isle, Lake Huron, Oct. 8, 1910, a flock of several hundred *P. domesticus*, and another flock seen a few days before. He states that the bird does not breed there. Is it possible that the new environment of the English Sparrow will bring about migratory tendencies? One would not be inclined to attach much importance to isolated flights of sparrows like the above, for they may be due to purely local conditions.

P. domesticus was also introduced about 1885 at Ivigut, Greenland, but the colony was said to be diminishing (Auk, 1889, p. 297). It is present also in Bermuda, Cuba and at Nassau. Specimens from these places and also from the desert towns of southern California would be most interesting for comparison, but I have not so far been able to obtain any.

Bumpus has given us two papers on variation in the English Sparrow which should be mentioned, because the second of these, 'The Elimination of the Unfit as Illustrated by the Introduced Sparrow,' (Biol. lectures, 1898) has been quoted as an instance of natural selection in active operation. Bumpus' paper is of great

interest to ornithologists. Briefly, he examined by careful measurements, 138 sparrows which were picked up during a severe storm in February, 1898. 72 of these birds revived while 64 perished. Those birds which perished showed certain constant differences which held through the three following groups, adult male, young males, and females. These differences tend to show that the surviving birds are shorter, weigh less, have longer wing bones, longer legs, longer sternums and greater brain capacity. Some of these differences are very slight and some of the measurements are not the ones that ornithologists might pick out, e. g., alar extent and total length; but there seems to be no questioning the fact that the data point to a real difference in the two classes of birds. Even of greater interest are the figures brought forward in regard to extent of variation in these same birds. Those individuals with any marked tendency towards maximum and minimum measurements nearly always fall into the "perished" class, and as a group the "survivors" are more uniform and conform more closely to the ideal species mean.

J. A. Harris in the 'American Naturalist' for May, 1911, treated Bumpus' figures from a biometrical standpoint and came to the conclusion that they had a real significance. J. A. Allen also reviewed this paper in 'The Auk.'

In an earlier paper, (Biol. Lectures, 1898) Bumpus reported the study of 1736 sparrow eggs, one half English and the other half American. This large series showed that the American eggs had become shorter, more spherical, and much more variable in color and pattern, and the conclusion is reached that American birds have been subject to a slightly changed and perhaps less selective environment.

It has been stated that albinism in the house sparrow is more common here than in the old world, but I do not find any comparative figures.

We might expect that an imported species with a successful history like the sparrow would show an increase of variability in form and color. A well known example of this phenomenon is the land snail, *Helix nemoralis* which introduced from Europe produced in a short time a large number of varieties unknown in its home. Another case is the snail, *Littornia littoria*, which in its

new environment (America) took on a greatly increased variability of size.

All we can say in conclusion is that the English Sparrow has changed very little in outward appearance and gross measurements during his sojourn in America. A careful study of a large series in the flesh would probably give results of interest, and perhaps demonstrate an increased variability in American specimens. I should like to add that sparrow skins from the southwest, from Cuba, Bermuda or other isolated points will be most gratefully appreciated by the writer.

A NEW SUBSPECIES OF SCREECH OWL FROM CALIFORNIA.

BY J. GRINNELL.

(Contribution from the Museum of Vertebrate Zoölogy of the University of California.)

MATERIAL representing the genus *Otus* has been very slow in accumulating from California. For some years local systematic workers have been of the opinion that two races exist in the region west of the desert divides, both being included in the literature under the name *bendirei*. The present writer is at last fortunate in having access to a sufficient series of skins to enable him to arrive at conclusions; and he is convinced of the desirability of recognizing the two races under separate names, though the series is at the same time inadequate for working out properly their respective geographic ranges. The material for study has been brought together from the Morcom, Swarth, Grinnell and Mailliard collections, and from the California Museum of Vertebrate Zoölogy. The latter institution has recently acquired some northern coast Screech Owls of particular value in the present connection.

The two forms here separated belong to the humid coast belt of California, and to the more arid southern and interior parts of the same state, respectively. Since *Scops* [= *Otus*] *asio bendirei* was described (Brewster, Bull. Nutt. Orn. Club, VII, January, 1882, p.

31) from Nicasio, Marin County, which is situated in the northern humid coast belt, it remains to name the southern race.

Otus asio quercinus, new subspecies.

TYPE.— Male adult, no. 5678, coll. J. G.; Pasadena, Los Angeles County California; April 21, 1904; collected by J. Grinnell.

DIAGNOSIS.— Characters in general like *Otus asio bendirei* (see Brewster, l. c.); differs in paler coloration: Light drab or ashy rather than hazel tones prevail dorsally, while beneath the black markings are sharper in outline, with very little or none of the ferruginous marginings. The restriction or absence of ferruginous on the chest, around the facial rim, and on the ear-tufts, is a good character.

GEOGRAPHICAL DISTRIBUTION.— Records of Screech Owls are well distributed over California west and north of the southeastern deserts, from the Mexican line nearly to the Oregon line. In absence of specimens from most of this area, however, it is impossible to fix the boundary lines accurately or to designate the strips of country where intergradation occurs. These can only be inferred, in a general way, from the behavior of better known groups of birds. The material at hand divides up as follows: *Otus asio bendirei*: Guerneville, Sonoma County, 1; Freestone, Sonoma County, 1; Santa Rosa, Sonoma County, 1; San Geronimo, Marin County, 3; Nicasio, Marin County, 1; Oakland, Alameda County, 1; Walnut Creek, Contra Costa County, 4; Palo Alto, Santa Clara County, 2. *Otus asio quercinus*: west slope Walker Pass, Kern County, 2; Bodfish, Kern County, 5; vicinity of Santa Monica, Los Angeles County, 2; vicinity of Los Angeles, 2; vicinity of Pasadena, 7; Mount Wilson, Los Angeles County, 1; Cuyamaca Mountains, San Diego County, 1.

REMARKS.— Birds from the coast belt north of San Francisco Bay are most typical of the race *bendirei* as here restricted. Specimens from Palo Alto, Santa Clara County, and Walnut Creek, Contra Costa County, show more or less departure towards *quercinus*. The palest examples of the latter form are from Walker Pass, Kern County; but there is still plenty of difference between these and *Otus asio gilmani*, of the Colorado River valley. The darkest winter examples of *quercinus*, from Los Angeles County, are darker than Palo Alto skins; but this darkness consists in extension of black and not in a pervasion of warm browns as in Marin and Sonoma County *bendirei*. The latter undoubtedly approach closely to *Otus asio brewsteri*, recently described by Ridgway (Birds N. and Mid. Amer., vi, 1914, p. 700). I have a topotype of the latter, from Salem, Oregon. This specimen is larger than average *bendirei* and is decidedly more pervaded with ferruginous tints on the posterior lower surface. There is thus a series of intergrading forms along the Pacific coast, with *Otus asio kennicottii* at the extreme north, succeeded towards the south by *brewsteri*, *bendirei* and *quercinus*. Of these, so far as yet known, only the latter two occur within the state. The form *gilmani* is distinct, there being no evidence of intergradation between it and *quercinus*.

EARLY RECORDS OF THE WILD TURKEY. III.

BY ALBERT HAZEN WRIGHT.

THE following notes are classified according to political divisions and are arranged in chronological order.

Canada.

The Turkey was not a widely distributed bird in Canada and most of the Jesuit records are outside its confines. In their first note they speak of it in a mythical way. They recount how an Indian chief of the Tobacco Nation supposedly holds thunder in his hand. "This thunder is, by his account, a man like a Turkey-cock."¹ In another way, it enters the repertorie of the medicine men. One² "carried a Turkey's wing, with which he fanned them gravely and at a distance, after having given them something to drink." To his disciples or substitutes, "as a token — he left them each a Turkey's wing, adding that henceforth their dreams would prove true." About Lake Erie (1640),³ "They have also multitudes of wild turkeys, which go in flocks through the fields and woods." One hundred years later (1749) in this same region Bonnacamp says,⁴ "It is at this lake that I saw for the first time the wild turkeys. They differ in no way from our domestic turkeys."

In the Niagara country, Hennepin, in 1698,⁵ "saw great numbers of — Wild Turkey-Cocks." Between Lakes Erie and Huron "Turkey Cocks — are there also very common." And finally, in his "Continuation of the New Discovery (p. 130)," he writes "There are to be had — Turkies, which are of an extraordinary bigness." Following Hennepin, comes Baron LaHontan (1703) who

¹ Thwaites, R. G. *The Jesuit Relations and Other Allied Documents.* 1610-1791. Vol. X, Le Jeune's Relation, 1636, p. 195.

² *ibid.*, Vol. XIII (1637), p. 241, 243.

³ *ibid.*, Vol. XXI (1640-1641), p. 197.

⁴ *ibid.*, Vol. LXIX (1710-1756), p. 161.

⁵ Hennepin, L. *A New Discovery of a Vast Country in America, etc.* London, 1698, pp. 40, 63.

notes along the north coast of Lake Erie,¹ "the great numbers of Turkeys, that we were obliged to eat upon the Spot, for fear that the heat of the Season would spoil 'em." "Upon the brink of this Lake we frequently saw flocks of fifty or sixty Turkey's, which run incredibly fast upon the Sands; And the Savages of our Company kill'd great numbers of 'em, which they gave to us in exchange for the Fish that we catch'd" Finally, in his list of the birds for the South Countries of Canada, he includes the Turkey. In 1760, T. Jefferys writes that² "turkies . . . are found (in Canada),—except in the neighbourhood of plantations, where they never come." "The History of North America, London, 1776" credits (p. 235) Canada with "a great number of . . . turkeys . . ." In 1807, Heriot finds "The birds of the southern parts of Canada are . . . turkeys, . . ."³ In 1820, Sansom gives among⁴ "the feathered game, with which these woods and waters abound in their season, . . . wild geese, . . . wild turkies." Fifteen years later, Shireff states that⁵ "The turkey is found only in the western district (of Canada) in limited numbers." "The turkey is said to inhabit this district (near the Detroit River) in considerable numbers, and the boy who conducted us out of Chatham plains told me he had come on a hen and her brood a short time before, but this bird was not seen by me." In Canada, Godley says⁶ "The only birds which remain all the winter—in the west (are) a few wild turkeys." At Amherstburgh, Canada, "you have . . . wild turkeys." Finally, in 1851, Smith (l. c., Vol. II, p. 405) writes of this form as follows: "In addition to these, we have the Wild Turkey, which, however, is confined to the southwest of the Province; . . . The Wild Turkey, although the stock from whence our English domestic Turkey sprang, is rather difficult to tame, even when taken young from the nest, or reared from the eggs, under the fostering care of the domestic hen; and unless closely watched, they are apt to

¹ LaHontan, Baron. *New Voyages to North America.* London 1703. Vol. I, pp. 99, 82, 83; Vol. II, p. 237.

² Jefferys, T. *The Natural and Civil History of the French Dominions in North and South America.* London, 1760. Part I, p. 39.

³ Heriot, George. *Travels through the Canadas, etc.* London, 1807, p. 516.

⁴ Sansom, Joseph. *Travel in Lower Canada, . . .* London, 1820, p. 49.

⁵ Shireff, P. *A Tour of North America; . . .* Edinburgh. 1835, pp. 390, 214.

⁶ Godley, J. R. *Letters from America, . . .* 2 vols., London, 1844. Vol. I, pp. 247, 248.

make their escape, and take to the woods in the following spring. The Turkey is naturally a very stupid bird."

New England.

In New England, most of the records precede 1800. The first note of this region is incidental in its allusion to the turkey. In "The Relation of Captain Gosnold's Voyage to the North part of Virginia" Gabriel Archer writes that on May 18, 1602,¹ "one of them (Indians) had his face painted over and head stuck with feathers in the manner of a turkey cock's train." The first note of real interest is Champlain's surmise of its occurrence in New England. In the voyage of 1604 we have the following:² "The savages, along all these coasts where we have been, say that other birds, which are very large, come along when their corn is ripe. They imitated for us their cry, which resembles that of the turkey. They showed us their feathers in several places, with which they feather their arrows, and which they put on their heads for decoration; and also a kind of hair which they have under the throat like those we have in France, and they say that a red crest falls over upon the beak. According to their description, they are as large as a bustard, which is a kind of goose, having the neck longer and twice as large as with us. All these indications led us to conclude that they were turkeys. We should have been very glad to see some of these birds, as well as their feathers, for the sake of greater certainty. Before seeing their feathers, and the little bunch of hair which they have under the throat, and hearing their cry imitated, I should have thought that they were certain birds like turkeys, which are found in some places in Peru, along the sea-shore, eating carrion and other dead things like crows. But these are not so large; nor do they have so long a bill, or a cry like that of real turkeys; nor are they good to eat like those which the Indians say come in flocks in summer, and at the beginning of winter go away to warmer countries, their natural dwelling-place."

In "A Description of New England (1616)" John Smith notes

¹ Mass. Hist. Soc. Colls. Third Series. Vol. VIII, 1843, p. 75.

² The Prince Society, The Publications of. Vol. 12, 1878, Boston, pp. 88, 89.

turkeys. In his "New England Trialls, 2nd edit. 1622"¹ he holds "no place hath more goose-berries and strawberries, nor better Timber of all sorts you have in England, doth cover the Land, that afford beasts of divers sorts and great flocks of Turkies, . . ." In his "A Brief Relation of the Discovery and Plantation of New England. London 1622" he says,² "The country aboundeth with diversity of wild fowls as Turkies, . . ." In his "History of the Plymouth Plantation", Wm. Bradford, the second governor of the colony writes³ "besides water fowle, ther was great store of wild Turkies of which they took many" in the fall of 1621. In "New Englands Plantation, London, 1630" Francis Higginson says⁴ "Here are likewise abundance of Turkies often killed in the Woods, farre greater then our English Turkies, and exceeding fat, sweet and fleshy, for here they have abundance of feeding all the yeere long, as Strawberries, in Summer all places are full of them and all manner of Berries and Fruits."

In 1632, the well known "New English Canaan" by Thomas Morton appears.⁵ "Turkies there are, which divers times in great flocks have sallied by our doores; and then a gunne (being commonly in redinesse), salutes them with such a courtesie, as makes them take a turne in the Cooke roome. They daunce by the doore so well. Of these there hath bin killed that have weighed forty eight pounds a peece. They are by mainy degrees sweeter then the tame Turkies of England, feede them how you can. I had a Salvage who hath taken out his boy in a morning, and they have brought home their loades about noone. I have asked them what number they found in the woods, who have answered Neent Metawna, which is a thousand that day; the plenty of them is such in those parts. They are easily killed at rooste, because the one being killed, the other sit fast neverthesse, and this is no bad commodity." "They make likewise some Coates of the Feathers of Turkies, which they weave together with twine of their owne makinge, very pritily:"

¹ Force, Peter. *Tracts Relating to America*. Vol. II, Washington, 1838, pp. 16, 14.

² Prince Soc. Publ. Vol. 18, 1890, p. 230 (orig. p. 26).

³ Mass. Hist. Soc. Colls. Fourth Ser. Vol. III, 1856, p. 105.

⁴ Force, P. Vol. I (1836), p. 10.

⁵ Force, P. Vol. II, pp. 48, 22.

Two years later, 1634, William Wood publishes in London his "New Englands Prospect" in which appears this curious and interesting statement.¹ "The Turkey is a very large Bird, of a blacke colour, yet white in flesh; much bigger than our *English* Turkey. He hath the use of his long legs so ready, that he can runne as fast as a Dogge, and flye as well as a Goose: of these sometimes there will be forty, three score, and a hundred in a flocke, sometimes more and sometimes lesse; their feeding is Acornes, Hawes, and Berries, some of them get a haunt to frequent our *English* corne; In winter when the Snow covers the ground they resort to the Seashore to look for Shrimps, and such smal Fishes at low tides. Such as love Turkie hunting, must follow it in winter after a new falne Snow, when hee may follow them by ther tracts; some have killed ten or a dozen in halfe a day; if they can be found towards an evening and watched where they peirch, if one come about ten or eleaven of the clocke he may shoote as often as he will, they will sit unless they be slenderly wounded. These Turkies remain all the yeare long, the price of a good Turkie cocke is foure shillings; and he is well worth it, for he may be in weight forty pound; a Hen two shillings." In 1643, Roger Williams in his "Key into the Language of America" gives us two notes: The turkey is called² "neyhom." "They (Indians) lay nets on shore, and catch many fowls upon the plains, and feeding under oaks upon acorns, as geese, turkies. . . ." The other statement refers to "Neyhommaushunck: a *coat* or *mantle*, curiously made of the fairest feathers of their Neyhommauog, or *turkies*, which commonly their old men make, and is with them as velvet with us." In "Good News from New England. London 1648" we find³ "The Turkies. . . and their young ones tracing passe." In 1649, John Winthrop publishes his "History of New England from 1630 to 1649," and on Oct. 31, 1632, he speaks of a party who⁴ "came, that evening, to Wessaguscus, where they were bountifully entertained, as before with store of turkeys. . . ."

¹ Prince Soc. Publ. Vol. I, 1865, p. 32.

² Mass. Hist. Soc. Colls. First Series. Vol. III. Reprint 1810, Boston, pp. 219, 225.

³ Mass. Hist. Soc. Colls. 4th Series. Vol. I, p. 202.

⁴ Winthrop, John. History of New England. . . . Edited by James Savage 2 vols., Boston, 1825. Vol. I, p. 93.

John Josslyn Gent, already well introduced to ornithologists, in 1675 presents a strange account.¹ "The Turkie, which is in *New England* a very large Bird, they breed twice or thrice in a year, if you would perceive the young Chickens alive, you must give them no water, for if they come to have their fill of water they will drop away strangely, and you will never be able to rear any of them: they are excellent meat, especially a *Turkie Capon* beyond that, for which Eight shillings was given, their Eggs are very wholesome and restore decayed nature exceedingly. But the *French* say they breed the Leprosie; the Indesses make Coats of *Turkie* feathers woven for their Children." Not long after, 1680, Wm. Hubbard in a "General History of New England" lists² "Turkies" among the birds of the region. In 1686, John Dutton in "Letters Written from New England, London 1705" speaks of the coat of turkey feathers.³ "Within this Coat or Skin they creep very contentedly, by day or night in the House or in the Woods, and sleep soundly too, counting it a great happiness that every Man is content with his skin." The following year, 1687, Richard Blome alludes to this garment as follows:⁴ The New England Indians "weave curious Coats with *Turkey* feathers for their Children etc."

In the first part of the next century, we have little appertaining to the New England turkey. In 1720, Neal states that⁵ "D. C. Mather (Phil. Transactions XXIX, p. 64) says, they have wild Turkies of 50 or 60 Pound Weight, . . ." In 1741, Oldmixon, holds⁶ "there's hardly greater Variety and Plenty of Fowl anywhere than in *New England*, as Turkies. . . ." In travels made 1759 and 1760, Andrew Bernaby finds⁷ "The forests abound with plenty of game of various kinds; hares, turkies, . . ." and includes it in his catalogue of birds as "Wild Turkey Gallo Pavo Sylvestris." In 1760, Paul Coffin "saw wild Turkey's Feathers here and there" near

¹ Mass. Hist. Soc. Colls. Third Series. III, 1833, p. 277 (orig. p. 99).

² Mass. Hist. Soc. Colls. Second Series. V, 1817, p. 25.

³ Prince Soc. Publ. Vol. IV, 1867, pp. 224, 225.

⁴ Blome, Richard. The Present State of His Majesties Isles and Territories in America, etc. London, 1687, p. 235.

⁵ Neal, Daniel. The History of New England. London, 1720, Vol. II, p. 572.

⁶ Oldmixon, J. The British Empire in America. 2nd edit. London, 1741. Vol. I, p. 186.

⁷ Bernaby, Rev. Andrew. Travels, etc. 3rd edit. London, 1798, pp. 13, 127.

New Haven.¹ Ten years later, 1770, Wynne claims² "New England produces a great variety of fowls; such as. . . turkies. . ." In 1782, Rev. Samuel Peters (*A General History of Connecticut*, 1782, p. 255) gives turkeys among the feathered tribe in Connecticut. Belknap 1792, in N. H. says³ "Wild Turkies were formerly very numerous. In winter they frequented the seashore, for the sake of picking small fishes and marine insects which the tide leaves on the flats. . . . They are now retired to the inland mountainous country." In 1819, Warden repeats the same for N. H. Williams, in his "*History of Vermont*", just mentions (p. 120) the "Wild Turkey, *Meleagris gallopavo*." Writing in 1807-1808, Edward A. Kendall, says the Turkey Mountains, (Connecticut)⁴ "have their name from the flocks of wild turkeys by which they were formerly frequented, but of which none are at present seen." In New England, Timothy Dwight records,⁵ "Turkies" among "the Land Birds principally coveted at the tables of luxury. The *Wild Turkey* is very large, and very fine: much larger and much finer, than those which are tame. They are, however, greatly lessened in their numbers, and in the most populous parts of the country are not very often seen." Lastly, in 1842, Zadock Thompson writes of it as follows:⁶ "The Wild Turkey. *Meleagris gallopavo*. The Wild Turkey, which was formerly common throughout our whole country, has everywhere diminished with the advancement of the settlements, and is now becoming exceedingly rare in all parts of New England, and indeed in all the eastern parts of the United States. A few of them, however, continue still to visit and breed upon the mountains in the southern part of the state. The Domestic Turkey sprung from this species, and was sent from Mexico to Spain in the 16th century. It was introduced into England in 1524, and into France and other parts of Europe about the same time."

¹ Colls. Me. Hist. Soc. First Series. Vol. IV, p. 264.

² Wynne, J. H. *A General History of the British Empire in America*; etc. 2 vols. London, 1770, vol. I, p. 41.

³ Belknap, J., l. c. Vol. III, p. 170.

⁴ Kendall, Edward A. *Travels through the Northern Parts of the United States in the Years 1807 and 1808*. 3 vols. N. Y. 1809. Vol. I, p. 219.

⁵ Dwight, Timothy. *Travels; in New England and New York*. 4 vols. New Haven, 1821-22. Vol. I, p. 55.

⁶ Thompson, Zadock. *History of Vermont, Natural Civil and Statistical*. Burlington, 1842, p. 101.

New York.

Most of the notes come in the seventeenth century in the "Narratives of New Netherlands." They begin with John de Laet's "The New World" in which (1625) he says that¹ "In winter superior turkey cocks are taken; they are very fat, and their flesh is of the best quality." In 1628, a letter of Isaac de Rasieres to Samuel Blommaert recounts how² "some (Indians have) a covering made of turkey feathers which they understand how to knit together very oddly, with small strings." In a "Narrative of a Journey into the Mohawk and Oneida Country, 1634-1635" the travellers³ "went out to shoot turkeys with the chief, but could not get any. In the evening I bought a very fat one for two hands of seewan. The chief cooked it for us and the grease he mixed with our beans and maize." In the Vocabulary of the Moquas, "Schawari wane" is "Turkeys." In 1633-1643, David Pietersz De Vries finds the New Netherlands⁴ "a beautiful place for hunting deer, wild turkeys, . . ." Again he writes, "I returned home and on my way shot a wild turkey weighing over thirty pounds, and brought it along with me." Of the Indians, he remarks that "They . . . wear coats of turkey's feathers, which they know how to plait together." He discovers that "Land birds are also very numerous, such as wild turkeys, which weigh from thirty to thirty-six and forty pounds, and which fly wild, for they can fly one or two thousand paces, and then fall down, tired from flying, when they are taken by the savages with their hands, who also shoot them with bows and arrows." The same author when at Wyngaert's Kill⁵ "Went out daily, while here, to shoot. Shot many wild turkeys, weighing from thirty to thirty six pounds. Their great size and very fine flavour are surprising." In the year 1639, "They also had this year, great numbers of Turkeys."

A "Journal of New Netherlands, 1647" gives⁶ "The birds which

¹ N. Y. Hist. Soc. Colls. Vol. I, 1841, p. 311.

² Narratives of New Netherlands, N. Y. 1909, pp. 106, 115.

³ *ibid.*, pp. 141, 142, 158.

⁴ *ibid.*, pp. 209, 215, 217, 221.

⁵ N. Y. Hist. Soc. Colls. New Series. Vol. III, 1857, pp. 28, 37, 90.

⁶ Narratives of New Netherlands, N. Y. 1909, p. 270.

are natural to the country are turkeys like ours, . . .” The Indians “go almost naked except a lap . . . and on the shoulders a deer-skin or a mantle, a fathom square, of woven Turkey feathers . . .” In 1644, Johannes Megalopensis in “A Short Sketch of the Mohawk Indians” says ¹ “There are also many turkies as large as in Holland but in some years less than in others. The year before (1641) I came here there were so many turkies and deer that came to the houses and hog pens to feed and were taken by the Indians with so little trouble. In “The Representation of New Netherland, 1650” by Adrian van der Donck we find ² “The other birds found in this country are turkies, the same as in the Netherlands, but they are wild, and are plentiest and best in winter.” and “others (Indians) have coats made of . . . turkey’s feathers.” The same gentleman in “A Description of the New Netherlands, Amsterdam 1656” calls ³ “The most important fowl of the country, . . . the wild turkey. They resemble the tame turkeys of the Netherlands. Those birds are common in the woods all over the country, and are found in large flocks, from twenty to forty in a flock. They are large, heavy fat and fine, weighing from twenty to thirty pounds each, and I have heard of one that weighed thirty two pounds. When they are well cleaned and roasted on a spit, then they are excellent, and differ little in taste from the tame turkeys; but the epicures prefer the wild kind. They are best in the fall of the year, when the Indians will usually sell a turkey for ten stivers, and with the Christians the common price is a daelder each.”

In the “Voyages Of Peter Esprit Radisson” we find that when in the Iroquois country (1653) he kills ⁴ “stagges and a great many Tourquies.” In 1670, Daniel Denton in “A Brief Description of New York” says ⁵ “Wild Fowl there is great store of as Turkies . . .,” and writes that the settler “besides the pleasure in Hunting, . . . may furnish his house with excellent fat Venison, Turkies . . .” Montanus in his “Description of New Netherlands 1671” finds ⁶

¹ N. Y. Hist. Soc. Colls. N. S. Vol. IV, 1857, p. 150.

² Narratives of New Netherlands. pp. 297, 301.

³ N. Y. H. S. Colls. N. S. 1841, Vol. I, p. 172.

⁴ Prince Soc. Publ. 1885, Vol. 16, p. 66.

⁵ Bull. Hist. Soc. Pa. Vol. I, 1845-47, pp. 6, 15.

⁶ Doc. Hist. State New York. Vol. IV, 1851, pp. 118, 125.

"turkeys . . . are, also easily obtained." "this country particularly abounds in turkeys whose number excites no less admiration than their rich flavour and their large size; for they go together in flocks of thirty and forty; they weigh some thirty or more pounds; they are shot or are caught with a bait concealing the hook." The last note in this century is by Jasper Dankers and Peter Sluyter. In the fall of 1679, they ¹ "had to go along the shore, finding some fine creeks well provided with wild turkeys." Again they "were . . . served with wild turkey, which was also fat and of a good flavour."

At the time of the French and Indian War we have two notes. In the "Journal of Gen Rufus Putnam kept in Northern New York, . . . 1757-1760" he states ² that "on our march in this river (near Dutch Hoosack) this day (Feb. 4, 1758) Capt. Learned killed two turkeys." On the following day, they "killed another turkey . . . which we spared for necessity. We encamped this night with sad hearts and the countenance of every man shewed he was perplexed in mind, in consideration that the turkey was the chief of the provision that we had." In Hugh Gibson's Captivity among the Delaware Indians, July 1756-Apr. 1759, we find that his captors when near Painted Post ³ "killed one turkey." Twenty years later, 1779, two other captives, John and Robert Brice, report that in their journey to Canada the Indians killed plenty of turkeys from Unadilla River to Chemung and Genesee Rivers.⁴ In the time of Tom Quick, the Indian Slayer, or in the latter part of the 18th century, we find that ⁵ "the wild turkey, from which Callicoon (N. Y.) derives its name had not yet fled, like the aborigine, to a more solitary and secure retreat." The Stockbridge Indian country in 1804 is said to have ⁶ "Of the feathered kinds, turkies." The same year, Robert Munro in his Description of the Genesee country gives the turkey among the great variety of birds for game in this fertile region.⁷

¹ Journal of a Voyage to New York and a Tour in Several of the American Colonies in 1679-80. Transl. by H. C. Murphy. Brooklyn, 1867, pp. 123, 145.

² Journal, etc. Edited by E. C. Dawes. Albany, N. Y., 1886, p. 53.

³ Mass. Hist. Soc. Colls. Third Series. Vol. VI, p. 147.

⁴ Priest, Jos. Stories of the Revolution. Albany, 1838, p. 5.

⁵ Tom Quick the Indian Slayer, . . . Monticello, N. Y., 1851, p. 225.

⁶ Mass. Hist. Soc. Colls. 1804. Vol. IX, p. 99.

⁷ Doc. Hist. New York. Vol. II, 1849, p. 1174 (Svo edition).

Pennsylvania, New Jersey and Delaware.

The first note discovered comes in 1634, when Capt. Thomas Yong, in his "Voyage to Virginia and Delaware Bay and R.," records¹ "an infinite number of . . . turkeys," in the latter region. Fourteen years later, 1648, in "A Description of the Province of New Albion" Beauchamp Plantagenet describes² "The uplands (as) covered many moneths with berries, roots chestnuts, walnuts, Birch and Oak Mast to feed them, Hogges and Turkeys, 500 in a flock, . . ." He repeats the same in several places and finds that "Here the Soldier, and Gentlemen wanting employment, . . . with five hundred Turkeys in a flock got by nets, in stalling get five shil a day at least." In 1680, Mahlon Stacy writing to his brother Revell says³ "We have . . . of . . . fowls, plenty, as . . . turkies." Three years later, "A Letter from William Penn" holds that⁴ "Of the fowl of the land, there is the turkey, (Forty and fifty pounds weight) which is very great." The same year, a letter from Pennsylvania by Thomas Paskel mentions that⁵ "There are here very great quantities of birds . . . Turkeys (Cocqs d'Inde) . . . (I have bought) for two or three pounds of shot apiece." The following year, 1684, "A Collection of Various Pieces concerning Pennsylvania," has it that⁶ "The woods are supplied with a quantity of wild birds, as turkeys of an extraordinary size, . . ." About the same time, Pastorius writes⁷ "There is, besides a great abundance of wild geese, . . . turkeys, . . ." "When he first came into the country, an Indian promised for a certain price to bring him a wild turkey, but instead of that he brought him a snake, and wanted to persuade him that it was a real turkey." Towards the close of this century, Gabriel Thomas mentions among the fowl of⁸ "Sus-

¹ Mass. Hist. Soc. Colls. Fourth Series, 1871. Vol. IX, p. 130.

² Force, P. Vol. II, pp. 20, 27, 32, 34, 12.

³ Raum, J. O. History of New Jersey. Phila., 1877, Vol. I, p. 109.

⁴ Proud, Robert. The History of Pennsylvania, etc. Vol. I, 1797, p. 250!

⁵ Penn. Mag. Hist. and Biog. Vol. VI, p. 326.

⁶ *ibid.*, p. 313.

⁷ Memoirs Hist. Soc. Penn. Vol. IV, 1840, p. 91 (Part II); III, p. 117.

⁸ Thomas, Gabriel. An Historical and Geographic Account of Pensilvania; and of West-New Jersey in America. London, 1698. New York, 1848, edit., pp. 13, 22.

kahanah" "Turkies (Of Forty of Fifty Pound Weight)," and lists them "among the Land-Fowl."

Four years later in the next century, 1702, Holm finds¹ "of birds and fowls, there are. . . turkeys, . . ." The same year, Rev. Andreas Sandel tells a funny story of a fox mistaking a hidden man for a turkey.² In a "Journey from Pennsylvania to Onondaga," Conrad Weiser (1737) remarks³ the presence of turkeys along the trip. Six years later, 1743, John Bartram on a similar journey on⁴ "The 4th (July 1743), set out before day, and stopp'd at Marcus Hulin's by Manatony; then crossed Skuykill, and rode along the west side over rich bottoms, after which we ascended the *Flying Hill*, (so called from the great number of Wild Turkeys that used to fly from them to the plains)." In 1748 (November), Kalm finds⁵ "The *wild* Turkeys, . . . were in flocks in the woods." In a "General State of Pennsylvania between the years 1760 and 1770"⁶ occurs this significant statement: "wild turkeys, among the winged tribe, were formerly very plentiful, but now scarce." In 1765 we find that Samuel Smith's "Nova-Caesaria or New Jersey" holds that⁷ "Of these birds there are great plenty: as the wild turkey, . . ." During the Sullivan expedition, Lieutenant Wm. Barton when at Tunkhannock, Pa., (July 3, 1779) finds⁸ "This place very remarkable for deer. . . turkeys, several of which were taken by the troops without firing a single gun, there being positive orders to the contrary: otherwise might have killed many more during our halt." In 1788, John Ettwein in his "Remarks upon the Traditions etc. of the Indians of North America" says⁹ "Of that hemp (wild hemp) they made Twine to knit the Feathers of Turkeys, . . . into Blankets." In "Indian Names of Rivers, Streams, etc." by Maurice C. Jones, Kenzua Cr. Kenjua Cr. (Kentschuak) is said to

¹ Memoirs Hist. Soc. Penn. Vol. III, 1834, pp. 41, 117.

² Penn. Mag. Hist. and Biog. Vol. XXX, p. 290.

³ Penn. Hist. Soc. Colls. Phila. 1853, Vol. I, p. 22.

⁴ Observations Made by Mr. John Bartram, etc. London, 1754, p. 9.

⁵ Kalm, Peter. Travels, etc. Transl. by J. R. Forster. Warrington, 1770, Vol. I, p. 290.

⁶ Proud, R. *ibid.*, Vol. II, p. 263.

⁷ Smith, Samuel. The History of the Colony of Nova-Caesaria or New Jersey. Burlington, N. J., 1765. 2nd. edit. 1877, p. 511.

⁸ N. J. Hist. Soc. Proc. Vol. 2, p. 26.

⁹ Bull. Hist. Soc. Penn. Vol. I, 1845-1847, p. 32.

mean¹ "They gobble (viz wild turkies) The gobbling reply which the turkey cock makes to the call of the hen. The place which bears the name must have been a favorite place of the turkies." Of "Chiknicomika. Chikenecomike or Tschikenumik" it says "Place of turkies, where turkies are plenty." In another place, it appears "Chickahominy Chikamawhomy (Eng. idiom) Turkey lick. Tschikenemahoni (German idiom) Turkey lick, or the lick at which the turkies are so plenty. I know several places bearing this name for the same reasons. These turkies go there to drink," Of this form in Pennsylvania, William Bartram (l. c. pp. 286, 290) writes, "These breed and continue the year round in Pennsylvania."

In the nineteenth century, we have more notes for Pennsylvania than for N. Y. or N. E. and doubtless the species held its own longer in this state. Thaddeus Mason Harris in 1803, when he reaches Laurel Hill, notes that² "For more than fifty miles, to the west and north, the mountains were burning. This is done by hunters, who set fire to the dry leaves and decayed fallen timber in the vallies, in order to thin the undergrowth, that they may traverse the woods with more ease in the pursuit of game. But they defeat their own object: for the fires. . . . destroy the turkies. . . ., at this season on their nests, or just leading out their broods." In 1804 (Dec. 20), Robert Sutcliffe³ "came this day to Jersey town where I slept. In passing through the woods this afternoon I saw a flock of wild turkeys running along the ground." In an "Account of Buckingham and Solebury, Penn. 1806," Watson remarks⁴ "Deer, turkeys and other small game made a plenty supply of excellent provision in their season." In 1810, F. Cuming (l. c. p. 37) finds that wild turkeys "abounds on these mountains" about Strasburg. In the same year, Christian Schultz publishes his "Travels." He says,⁵ "I had never seen a wild turkey before I descended this river (Alleghany), where I had an opportunity of shooting a great many.

¹ *ibid.*, Vol. I, pp. 127, 140, 141.

² Harris, T. M. *The Journal of a Tour into the Territory Northwest of the Alleghany Mountains. Made in the Spring of the Year 1803.* Boston, 1805, pp. 22, 23.

³ Sutcliffe, R. *Travels in Some Parts of North America, in the Years 1804, 1805, and 1806.* Phila., 1812, p. 170.

⁴ *Mem. Hist. Soc. Penn.* Vol. I, 1826, p. 303.

⁵ Schultz, Christian. Vol. I, p. 122.

They are very plentiful in this quarter, and considered the largest known throughout the western country, many of them weighing from thirty to forty pounds, and sometimes so overburthened with fat that they fly with difficulty." In 1818, Rev. John Heckewelder's "History, Manners and Customs of the Indian Nations" speaks of the turkey coats.¹ "The feathers, generally those of turkey and goose, are so curiously arranged and interwoven together with thread and twine, which they prepare from the rind or bark of the wild hemp or nettle, that ingenuity and skill cannot be denied them.

Four years later, Wm. H. Blane (l. c. p. 88) when near Smithfield on the Youghiogheny River, writes "I observed that two hunters, who had just come in with some turkies they had killed, were each of them carrying one of the long heavy rifles peculiar to the Americans." In 1832, Mrs. Trollope when at Brownsville, was² "regaled luxuriously on wild turkey . . ." The same year, Vigne presents his "Six Months in America." When at Moshanan Creek he finds (Vol. I, pp. 88, 89) "The winged game of these forests are the wild turkey, which being pursued with avidity by the sportsman, is becoming more scarce every day: it is larger than the tame turkey and its plumage closely resembles that of the dark-coloured domesticated bird, but is rather more brilliant." The third note to be presented in 1832 is the rather general account of Hinton.³ "The native country of the wild turkey extends from the north-western territory of the United States to the Isthmus of Panama. In Canada, and the now densely-peopled parts of the United States, they were formerly very abundant; but like the Indian and the buffalo they have been compelled to yield to the destructive ingenuity of the white settlers, often wantonly exercised, and to seek refuge in the remotest parts of the interior. On hearing the slightest noise, they conceal themselves in the grass, or among shrubs, and thus frequently escape the hunter, or the sharp-eyed birds of prey: and the sportsman is unable to find them during the

¹ *Memoirs Hist. Soc. Penn.* Vol. XII, 1881, p. 203.

² Trollope, Mrs. *Domestic Manners of the Americans.* 4 edit. London and N. Y., p. 162.

³ Hinton, J. H. *The History and Topography of the United States.* London, 1832, 2 vols. Vol. II, p. 177.

day, unless he has a dog trained for the purpose. When only wounded, they quickly disappear, and, accelerating their motion by a sort of half flight, run with so much speed that the swiftest hunter cannot overtake them. The traveller driving the declivity of one of the Alleghanies, may sometimes see several of them before him, evincing no desire to get out of the road; but on alighting in the hopes of shooting them, he soon finds that all pursuit is vain." Finally, in 1843, Maximilian, Prince of Wied, when at Bordentown, Penn., says ¹ "Fans, are, in fact, an article of luxury, and are purchased in the towns; they are made of the tail feathers of the wild turkey, the crane or the swan, '...'"

Virginia and Maryland.

These furnish numerous records in the seventeenth century. Only one note precedes this period and this occurs in Thomas Heriot's "A Briefe and True Relation of the New Found Land of Virginia, London, 1588." He gives ² "Of Foule. *Turkie cockes* and *Turkie hennes.*" The first note of the 17th century is that of Master George Percy in his "Observations gathered out of A Discourse of the Plantation of the Southern Colonie in Virginia by the English 1606" wherein he asserts ³ "We found store of Turkie nests and many egges." "A Gentleman of the Colony" (Gabriel Archer) in "A relaytion of the Discovery" ⁴ "founde (1607 May 22) an Ilet, on which were many Turkeys" and later he again writes "we come to the Ilet mentyoned which I call Turley Ile." In 1612, Captain John Smith in "A Map of Virginia With a Description of the Countrey" remarks ⁵ "wilde Turkies as bigge as our tame," and finds that the Indian arrows are "headed with . . . the spurres of a Turkey . . ."

The interesting Wm. Strachey in 1610?-1612? gives us three notes. First of all he says, ⁶ "We have seene some (Indian women)

¹ Early Western Travels. XXII, p. 68 (orig. Part I, p. 19.)

² Heriot, Thomas. etc. Reprint London, 1900, p. 41.

³ Arber, Edward. Capt. John Smith, etc. Works 1608-1631, Eng. Scholars Library. No. 16, p. lxvi.

⁴ *ibid.*, pp. xli, xlii.

⁵ *ibid.*, pp. 60, 68, 70.

⁶ Strachey, William. *Historie of Travaile into Virginia.* Hakluyt Soc. London. 1849, pp. 65, 72, 125.

use mantells made both of Turkey feathers and other fowle, so prettily wrought and woven with threads, that nothing could be discerned but the feathers, which were exceeding warme and handsome." In another place, he writes "Nor (do they) bring up tame poultry, albeit they have great stoore of turkies, nor keepe birdes, squirrels, nor tame partridges, . . . In March and April they live much upon their weeres, and feed on fish, turkies . . ." Finally comes a more general statement. "Turkeys there be great store, wild in the woods, like phesants in England, forty in a company, as big as our tame here, and it is an excellent fowle, and so passing good meat, as I maye well saie, it is the best of any kind of flesh which I have ever yet eaten there." In "A True Declaration of the Estate of the Colonie in Virginia, . . . London, 1610" we have the following:¹ "The Turkeye of that Countrie are great, and fat, and exceeding in plentie." In 1613, Alex. Whitaker says² "The woods be everywhere full of wilde Turkies, which abound, and will runne as swift as a Greyhound." In 1614, Ralph Hamor, in the same country, finds³ "There are fowle of divers sorts, . . . wild Turkeyes much bigger then our English Cranes." Four years later, 1618, in "Newes of Sr. Walter Rauleigh . . ." there appears⁴ "you shall not sleepe on the groun nor eat any new flesh till it be salted, two or three hours, which otherwise, will breed a most dangerous fluxe, so will the eating of . . . Turkies." A "Briefe Intelligence from Virginia by Letters, etc., 1624," "Virginias Verger 1625," and "Some later Advertisements touching His Majesties Care for Virginia 1624" — all three remark⁵ the abundance of turkeys in Virginia.

In 1631, Henry Fleet, Early Indian Trader notes that⁶ "the woods (above Washington) do swarm with "turkeys. Three years later, Father Andrew White in "A Briefe Relation of the Voyage into Maryland" observes⁷ "Their weapons are a bow and

¹ Force, P. Vol. III, p. 13.

² Hakluyt Posthumus or Purchas His Pilgrimes. By Samuel Purchas. Hakluyt Soc. Extra Series Glasgow 1905-1907. Vol. 19, p. 115.

³ *ibid.*, Vol. 19, p. 97.

⁴ Force, P. Vol. III, p. 17.

⁵ Hakluyt Posthumus. Vol. 19, p. 209, Vol. 20, p. 134.

⁶ Neill, Rev. E. D., *Founders of Maryland.* Albany, 1876, p. 27.

⁷ *Narratives of Early Maryland.* 1633-1684. N. Y., 1910, pp. 34, 43, 44.

a bundle of arrowes, an ell long, feathered with turkies feathers." These Indians "daily catch . . . turkies, . . ." and "the poore soules are daily with us and bring us turkie, . . ." In "An Account of the Colony of the Lord Baron of Baltimore, 1633" the author writes that¹ "There are also great quantities of wild turkeys, which are twice as large as our tame and domestic ones . . ." About the same time, "A Relation of Maryland" records that² "they (at Yoacomaco) went dayly to hunt with them for Deere and Turkies, whereff some gave them for Presents, and the meaner sort would sell to them for knives, beades and the like." "Of Birds" it relates that "there is . . . also wild Turkeys in great abundance whereof many weigh 50 pounds and upwards." In this period, another relator holds that³ "every day they are abroad after . . . turkies and the like game: whereof there is a wonderful plenty." In another instance, he recounts how the modest Indian women brought turkies to the homes of the settlers.

About 15 years afterwards, in "A Perfect Description of Virginia . . ." there appears a note concerning⁴ "Wild Turkies, some weighing sixtie pound weight." In 1650, Edward Williams publishes the second edition of his "Virginia" wherein he mentions⁵ "infinites of wilde Turkeyes, which have been known to weigh fifty-pound weight, ordinarily forty," and in comparing Virginia with China, he exclaims, "Let her shew us Turkies of 50 pound weight." Six years later, 1656, "Leah and Rachel" appears. Hammond, its author, claims⁶ "wild Turkeys are frequent, and so large that I have seen some weigh neer threescore pounds." Ten years later, George Alsop, in describing the "Character of the Province of Maryland" notes⁷ "especially the Turkey, whom I have seen in whole hundreds in flights in the Woods of Mary-Land, being an extraordinary fat Fowl, whose flesh is very pleasant and sweet." Shortly after, 1669, Nathaniel Shrigley enumerates⁸ "Turkies"

¹ *ibid.*, p. 10.

² *ibid.*, pp. 75, 80, 98.

³ Shea's *Early Southern Tracts*. No. I, pp. 16, 18.

⁴ Force, P. Vol. II, pp. 17, 3.

⁵ Force, P. Vol. III, pp. 12, 21.

⁶ Force, P. Vol. III, p. 13.

⁷ *Narratives of Early Maryland*. pp. 347, 357.

⁸ Force, P. Vol. III, p. 4.

among the "Fowle naturally to the Land." In 1688, Mr. John Clayton the Botanist, communicates to the Royal Society the following:¹ "Ther be wild Turkies extream large; they talk of Turkies that have been kill'd, that have weighed betwixt 50 and 60 Pound weight; the largest that I ever saw, weigh'd someting better than 38 Pound; they have very long Legs, and will run prodigiously fast. I remember not that ever I saw any of them on the Wing, except it were once. Their Feathers are of a blackish shining Colour, that in the Sun shine like a Dove's neck, very specious." The year previous, 1687, Richard Blome (l. c. p. 189) holds, "They have great plenty of Fowl: as *wild Turkeys*, which usually weigh six Stone, or forty eight pound;" Finally, in "The Social Life of Virginia in the Seventeenth Century," P. A. Bruce (l. c. pp. 212, 167) writes as follows: "As the area of cultivated ground grew wider, the number of partridges steadily increased in consequence of their being able to find a larger supply of food. On the other hand, the number of wild turkeys perhaps as steadily diminished within the same area, as the turkey is distinctly a forest bird, that is very shy of human habitations." "The wild turkeys frequenting the woods were of remarkable weight and afforded a popular repast."

In the eighteenth century, the records number fourteen or fifteen. In 1705, Robert Beverley in his "History and Present State of Virginia. London" (book III, p. 60) writes that "They (Indian) fledged their Arrows with Turkey Feathers, which they fastened with Glue etc.,— they also headed them with the Spurs of the Wild Turkey-Cock." In 1708, Eben Cook, in burlesque verse, remarks its presence in Maryland and adds a footnote that² "Wild turkies are very good Meat, and prodigiously large in *Maryland*." In the "History of the Dividing Line Betwixt Virginia and North Carolina" William Byrd (1728) mentions a dozen or more instances where wild turkeys help to supply the larder. On Sept. 23, he says³ "Our hunters brought us four wild turkeys, which at

¹ Force, P. Vol. III, p. 30.

² Sheas Early Southern Tracts. No. II. The Sotweed Factor. London, 1708, pp. 19, 20.

³ The Westover Manuscripts. Petersburg, Va., 1841, pp. 39, 45, 47, 48, 49, 51, 52, 54, 64, 69, 76, 78, 80.

that season began to be fat and very delicious especially the hens. These birds seem to be of the bustard kind, and fly heavily. Some of them are exceedingly large, and weigh upwards of forty pounds; nay, some bold historians venture to say, upwards of fifty pounds. They run very fast, stretching forth their wings all the time, like the ostrich, by way of sails to quicken their speed. They roost commonly upon very high trees, standing near some river or creek, and are so stupified at the sight of fire, that if you make a blaze in the night near the place where they roost, you may fire upon them several times successively, before they will dare to fly away. Their spurs are so sharp and strong, that the Indians used formerly to point their arrows with them, though now they point them with a sharp white stone. In the spring the turkey-cocks begin to gobble, which is the language wherein they make love." In another place, he mentions the attitude of Indians towards mixing meats in the same dish. "Our men killed a very fat buck and several turkeys. These two kinds of meat they boiled together, with the addition of a little rice or French barley, made excellent soup, and what happens rarely in other good things, it never cloyed, no more than an engaging wife would do, by being a constant dish. Our Indian was very superstitious in this matter, and told us, with a face full of concern, that if we continued to boil venison and turkey together, we should for the future kill nothing, because the spirit that presided over the woods would drive all the game out of our sight." "The Indian likewise shot a wild turkey, but confessed he would not bring it us lest we should continue to provoke the guardian of the forest, by cooking the beasts of the field and the birds of the air together in one vessel. . . ." Of this same practice, "A Journey to the Land of Eden 1733" gives us the following:¹ "It was strange we met with no wild turkeys (Morris' Creek near Banister River), this being the season in which great numbers of them used to be seen towards the mountains. They commonly perched on the high trees near the rivers and creeks. But this voyage, to our great misfortune, there were none to be found. So that we could not commit that abomination, in the sight of Indians, of mixing the flesh of deer and turkeys in our broth."

¹ The Westover Manuscripts. p. 108.

In a Letter written March 21, 1739, John Clayton of Gloucester Co., Va. writes¹ of "Virginia Game and Field Sports." "Then for fowls (there are) wild Turkey's very numerous" and in another place he contends that "the diversion of shooting Turkeys is only to be had in the upper parts of the Countrey where the woods are of a very large extent, and but few settlements as yet tho' they increase daily." Two years later, Oldmixon (l. c. p. 445) remarks, "There's great variety of wild Fowl, as Swans. . . . Curlews. . . . ; and which is best of all of them, wild Turkeys, much larger than our tame; they are in season all the Year. The *Virginians* have several ingenious Devices to take them; among others, a Trap, wherein 16 or 17 have been caught at a time."

In 1765, Rogers states that the colonists in Maryland,² "in their infant state. . . . were greatly assisted by them (Indians) receiving . . . plentiful supplies of. . . turkeys." Of the period from 1763 to 1783, Jos. Doddridge remarks that,³ "The wild Turkeys which used to be so abundant as to supply no inconsiderable portion of provision for the first settlers, are now rarely seen." In his "Travels in North America" Chastellux notes⁴ the wild turkey only in Virginia. In "Notes of the State of Virginia" written in 1781, Thos. Jefferson merely lists (p. 99) "*Meleagris Gallopavo. Gallapavo sylvestris. Wild Turkey*" for the state. About this same period, J. F. D. Smyth records⁵ "a great abundance of game, such as. . . wild turkeys," in Pitsylvania Co., Va. At Wart Mt., when he and a young backwoodsman returned, they "brought a fine wild turkey which he had shot: and he carried it along with us in order to dress for supper where we should halt at night." On Little River, "Here we killed another wild turkey and dressed it for supper as before; indeed they were so numerous that we could have easily subsisted a company of men upon them, and might kill almost any number we pleased." Finally, in "A Topographical Descrip-

¹ The Virginia Magazine. Vol. VII, Oct. 1899. No. 2, pp. 173, 174.

² Rogers, Major Robert. A Concise Account of North America. London, 1765, p. 88.

³ Doddridge, Rev. Dr. Jos. Notes on the Settlement and Indian Wars of the Western Parts of Virginia and Pennsylvania, from the year 1763 until the year 1783 inclusive, etc. Wellsburg, Va., 1824, p. 69.

⁴ Chastellux, Marquis de. Travels . . . Translation N. Y., 1828, p. 251.

⁵ Smyth, J. F. D. A Tour in the United States of America. London, 1784, 2 vols. Vol. I, pp. 289, 309, 311.

tion of the County of Prince George in Virginia 1793" John Jones Spooner presents the last note of the century.¹ "The woods afford wild turkies."

In the next century, John Woods remarks of Pews Town, Va. that² "We were told. . . turkeys. . . were plentiful in many places, but we had not seen any." Three years later, Blane, (l. c. pp. 84, 86, 87, 88, 106) in a journey across the Alleghanies along the road from Hagerstown to Cumberland, remarks (1822-23) that "These mountains abound with such game as deer, wild turkies. . . ." From Cumberland to Wheeling "Wild Turkies. . . are uncommonly plentiful in these mountains, owing to the rocky nature of the ground, which will in all probabilities prevent its being cultivated for centuries," and in this region he holds that the presence of rattlesnakes deters hunters from hunting turkies. Finally, at Blue Lick he finds, "The neighbourhood, however, abounds in deer and wild turkeys, which afford excellent sport for a hunter." In 1824, Candler, in "A Summary View of America," (p. 79) remarks that "Turkies are very common." He may be speaking of the domestic form. In discussing the "Physical Geography of Maryland" J. T. Ducatel says³ "The eastern flank of South mountain (valley of Middletown). . . is the retreat of large gangs of wild turkey (*Meleagris gallapavo*). . . ." In 1842, J. S. Buckingham, in speaking of Virginia, says⁴ "These potatoes and the turkeys, of which Virginia furnished also the first supply to Britain, have neither of them degenerated in this state, from their ancient and original stock." In 1879, J. T. Scharf publishes his "History of Maryland" in which he asserts that⁵ "In the 'backwoods,' the wild turkeys and deer abounded in great numbers; deer and wild turkeys were still shot on the Patapsco at Ellicotts Mills as late as 1773 and no man's larder needed to be empty at any time."

¹ Mass. Hist. Soc. Colls. Vol. III, 1794, p. 86.

² Early Western Travels. X, p. 205 (orig. p. 48).

³ Transactions Md. Acad. Sci. and Lit. Vol. I, Baltimore, 1837, p. 40.

⁴ Buckingham, J. S. *The Slave States of America*, London, 1842. 2 vols. Vol. II, p. 286.

⁵ Scharf, J. T. Vol. II, pp. 8, 4.

THE PRESENT STATUS OF THE TRUMPETER SWAN
(*OLOR BUCCINATOR*).

BY HENRY K. COALE.

Plates VII-X.

At the meeting of the American Ornithologists' Union held in New York City, in the fall of 1913, a number of members were discussing the rarity of the Trumpeter Swan; the general opinion being that this magnificent bird was nearing extinction; and would soon disappear forever.

During the ensuing winter, upon looking up the literature on the subject, I was surprised to find how little was known about this bird; many writers simply repeating Dr. Richardson's remarks in his original description. I determined to gather together the published records of the bird and ascertain as nearly as possible how many specimens are extant.

In the present paper I have brought together many facts from various sources, including information gleaned through correspondence with curators of museums, and private collectors. Of the eighty-five replies received in response to my inquiries, sixty-three from museums having 1,000 or more birds, reported "No specimens of the Trumpeter Swan in our collection." Of the remaining twenty-two replies, eight were from museums and five from collectors, who have specimens; while nine contained interesting information about the species.

It was not until 1831 that the discovery was made by Dr. John Richardson of the existence of a new species of swan in North America (*Fauna Boreali Americana*, by William Swainson and John Richardson, London, 1831). Up to that time the thousands of swan skins that were shipped, through the Hudson Bay Company, were thought to be all of one kind — *Olor columbianus*. In Dr. Richardson's original description of *Cygnus buccinator* we find: "Special characters; white; head glossed above with chestnut; bill entirely black; without a tubercle; tail feathers 24; feet black. This is the most common swan in the interior of the fur countries.



MALE TRUMPETER SWAN (*Olor buccinator*)
Collection of the Chicago Academy of Sciences.

It breeds as far south as latitude 61°; but principally within the Arctic Circle. . . .” The type of the species is a mounted bird in the Hudson Bay Museum. It measures length 70 inches; tail 9.6 inches, wing 26 in., bill above 4.11 in., nostril to tip 2.7 in., tip of bill to eye 6 in., mid. toe 6.9 in.

Lawson observes (*History of North Carolina*, 1831.) “There are two sorts of swans in Carolina, the larger of which is called from its note the Trumpeter,” and Hearne adds, “I have heard them in serene evenings, after sunset, make a noise not very unlike a French horn, but entirely divested of every note that constitutes melody, and have often been sorry that it did not forbode its death.”

At the annual meeting of the Boston Society of Natural History, May 17, 1843, Dr. Wyman “Exhibited the sternum of a male Trumpeter Swan. The keel of the breast bone contains a remarkable cavity extending its whole length designed to receive the trachea. . . . It only exists in the male.”

Preble (*North American Fauna* No. 27) says: “McFarlane states that between 1853 and 1877 the Hudson Bay Company sold a total of 17,671 swan skins. The number sold annually ranged from 1312 in 1854 to 122 in 1881”, and Nuttall is quoted as saying that the Trumpeter Swan furnished the bulk of them.”

Dr. Suckley remarks (*Pacific R. R. Rep.*, Vol. XII, 1853-5): “I obtained a fine Trumpeter Swan on Pike’s Lake, Minnesota, in June 1853. They were quite common on the lakes in that vicinity in the Summer, breeding and raising their young.”

Baird (*Pacific R. R. Rep.*, Vol. IX, 1858) says that it ranges over “Western America from the Mississippi Valley to the Pacific”; and remarks “this large and powerful swan doubtless has special anatomical peculiarities of trachea to distinguish it from *C. americanus*, as the note is much more sonorous.”

McFarlane (*Proc. U. S. Nat. Mus.*, XIV, 1861, 66) says: “Several nests were met with on the barren grounds on Islands in Franklin Bay; one containing six eggs was situated on the beach on a sloping knoll. It generally lays 4 to 6 eggs.”

At a meeting of Linnean Society of London, March 20, 1832 (*Proc. Linnean Society*, p. 2) William Yarrell called attention to the peculiar anatomy of this swan — “I am indebted to Dr. Richardson for an example of the sternum and trachea of a new

species of wild swan, *Cygnus buccinator*. . . . The trachea is made up of narrow bony rings and small intervening membranous spaces as far as the first convolution within the breast bone, but the returning portion of the tube, forming a second convolution is composed of broader and stronger bony rings with broader intervals."

The course of the trachea may easily be traced by consulting Plate IX.

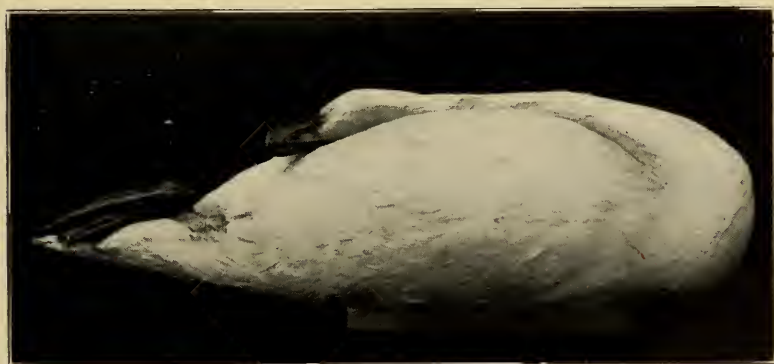
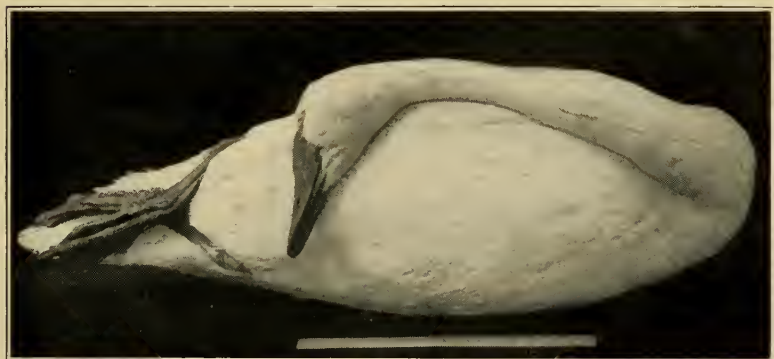
After traversing the neck it enters the lower part of the cavity on the anterior face of the sternum at "A," thence follows backwards through the horizontal covered protuberance in the upper surface of the sternum, a distance of eight inches to near the posterior line "B.," taking the curve of the cavity it comes forward six inches and rises into the vertical bony protuberance, "C.," following its curve, thence downward, and emerges through the upper part of the opening in the sternum, dips below the bridge of the "wish bone" and curving backward between the shoulder blades, "D" (obscured in the picture) enters the breast, where at its junction with the bronchiæ "E." it is flattened vertically to an eighth of an inch in width. The total length of the structure shown is 13.5 in., length of trachea 59 in., length of keel of sternum 11 in., opening $\frac{7}{8}$ in. wide, $2\frac{1}{2}$ in. high.

In *Olor columbianus* the cavity is in the anterior portion of the sternum only, the trachea making but one convolution, which is in the vertical (not horizontal, as some authors state) protuberance "A."

Plate X shows the anterior aspect of the sternum with the trachea entering the cavity below, and emerging above. I am indebted to Dr. C. W. Richmond for the loan of this sternum from the U. S. National Museum Collection.

Stejneger, (Vol. V, Proc. U. S. Nat. Mus. 1882) outlines a monograph of the Cygninae, and on p. 216 gives a table of measurements of ten specimens, with remarks; "The position of the nostrils being set more backwards in the Trumpeter than in the Whistling Swan, is thus the only mark which is possible to express in a short diagnosis, and which I have found constant and easily perceptible."

Baird, Brewer and Ridgway (Vol. 1, Water Birds of N. America, 1884), give an interesting description of the habits of the Trumpeter;



TRUMPETER SWAN (*Olor buccinator*).

1. Head of mounted specimen in Chicago Academy (see Plate VII).
- 2 and 3. Adult male, North Dakota. Collection of H. K. Coale, No. 17779, showing outline of bill.

among other notes, "Mr. W. E. Rice found a nest at Oakland Valley, Iowa, in the Spring of 1871 and took three of the young which were successfully raised. The eggs are of a uniform chalky white color, and are rough granulated on the surface. They measure 4.35 to 4.65 in length, and 2.65 to 2.90 in width."

A number of notes have appeared in the 'Nuttall Bulletin' and 'The Auk'.

J. J. Dalgleish (Bull. Nuttall Orn. Club, 1880, Vol. V) mentions the occurrence of *Cygnus buccinator* in Great Britain: "Five seen, four shot, Adelburg, Suffolk, Oct. 27, 1866, one of these specimens has been examined by J. H. Gurney."

H. Nehrling (Bull. N. O. C., Vol. VII, 1882) says, "Every winter there are large numbers on Galveston Bay and the Gulf of Mexico, near the coast."

W. W. Cooke (Auk, Vol. I, 1884) gives the "Chippewa Indian name 'Wabisi' (White bird)."

A. W. Anthony (Auk, Vol. III, 1886) says that it is "Found in large numbers on the Columbia River."

B. W. Evermann (Auk, Vol. III, 1886) says for Ventura, Cal., "Winter Visitant with the preceding species (*O. americanus*) but more common."

Albert Lano (Auk, Vol. XIII, 1896) speaking of western Minnesota says: "Some of the oldest sportsmen tell me that they have observed this swan quite regularly on Lac qui parle during the Spring and Fall migrations. A beautiful adult male now in my collection, shot near here (Madison, Minn.) April 9, 1893, weighed 15 lbs. but it was not fat. It measured: length 51 in., extent 77 in., wing 28 in., tail 7 in."

E. A. McIlhenny (Auk, Vol. XIV, 1897) says for Louisiana, "known as "Cygne," a winter resident on the coast; more common than the preceding (*O. columbianus*)."

J. H. Fleming, for Toronto, Ontario (Auk, Vol. XXIII, 1906), "There are no recent records, but Prof. Hincks described in 1864 a new swan, "*Cygnus passmori*" taken here, which was really a young Trumpeter and between 1863 and 1866 he was able to get six local birds to examine. There are two specimens in the collection of Trinity University that were no doubt taken here." (Proc. Linn. Soc. 1864.)

Beyer, Allison and Kopman in their *Birds of Louisiana* (Auk, Vol. XXIV, 1907), "In the past this species has proved commoner than the preceding (*C. americanus*) especially about the mouth of the Mississippi."

J. Claire Wood (Auk, Vol. XXV, 1908) reports for Michigan, "One specimen in the City market in Nov. 1893, was taken near Wind Mill Point, Lake St. Clair, according to the statement of Thomas Swan."

In E. H. Eaton's 'Birds of New York' (1909), he illustrates the bills of both swans, side and top view, showing the difference in shape, and position of the nostrils. He remarks, "I have been unable to find any New York specimen of this swan."

McCoun's 'Catalogue of Canadian Birds' (1909) records: "A pair found breeding at Buffalo Lake, Alberta, Apr. 7, 1891, nest contained 5 eggs."

Audubon in his 'Birds of America,' devotes seven pages to the Trumpeter Swan, giving a very complete and interesting history of its movements and habits, from personal observation of the birds on the Ohio and Mississippi Rivers and at New Orleans. He also illustrates the adult, and the young about two thirds grown, drawn from nature, showing it in slaty bluish plumage, head light brown, and legs yellowish brown.

E. W. Nelson (Report of Nat. Hist. Survey made in Alaska 1887) says: "a specimen of this little known swan is noted by Dall as having been secured with its nest and eggs at Fort Yukon by Mr. Lockhart, thus rendering it an Alaskan species."

Elliott Coues (*Birds of the North West*) says: "Chiefly from the Mississippi Valley and northward to the Pacific, Hudson's Bay, Canada, etc."

R. M. Anderson in 'Birds of Iowa' (Proc. Davenport Academy of Sciences, 1907) says: "The only definite breeding record which I have been able to trace is from the veteran collector, J. W. Preston, in a letter dated March 22, 1904 . . . 'a pair of Trumpeter swans reared a brood of young in a slough near Little Twin Lakes, Hancock Co., in the season of 1883. This was positively *Olor buccinator*.'"

W. C. Knight in his 'Birds of Wyoming' gives two or three records, the last being a bird taken by Mr. Van Dyke, at Lake De Smet in the Spring of 1897.

One of the most interesting replies to my inquiries is from Mr. E. S. Cameron of Marsh, Montana (April 30, 1914). He writes: "Twenty years ago Trumpeter Swans were common in Montana, and used regularly to winter here, but are now on the verge of extinction. It is generally stated by the Kootenai Indians that they bred in the Flathead Valley up to the first immigration of whites in 1886; but the latest positive record of Trumpeters nesting is in 1881. These swans nested at Lake Rodgers, 20 miles west of Kalispell, at Swan Lake, and on the east side of Flathead Lake, and on the lakes which drain Clearwater, a branch of the Big Blackfoot River. An adult male Trumpeter was shot at the mouth of Flathead River, Nov. 16, 1910. It weighed 31 pounds. Another similar bird was killed by an Indian on St. Mary's Lake in the fall of 1912. This was the largest Trumpeter ever killed in Montana, and would have approached, if it did not equal, Audubon's record bird of 38 pounds in weight. A young female Trumpeter under two years old, weight 20 pounds full, was shot at Cut Bank, Teton Co., on Nov. 10, 1913."

Mr. C. W. Beebe records seventeen specimens as having been in the New York Zoölogical Park from 1899 to 1910, "three from Idaho, six from Salt Lake City, one from Lewiston, Maine (Nov. 25, 1901, found exhausted) and seven without data. At present one survives."

Through the courtesy of Mr. Frank C. Baker of the Chicago Academy of Sciences I am able to give measurements of the fine mounted Trumpeter in the Academy Museum (Plate VII). It is an adult male and was shot on the Columbia River, three miles west of Portland, Oregon, April 8, 1881. The bird is pure white, except the forehead and crown which are washed with rusty color. It stands 44 inches high. The wing measures 26 inches, tail of 24 feathers 9.5 in., tarsus 4.5 in., middle tcl. 7 in., eye to tip of bill 5.25 in., nostril to tip of bill 2 in.

A Whistling Swan in the same collection measured for comparison, gives wing, 22 in., tail 9 in., eye to tip of bill 4.4 in., tarsus 4 in., mid. tcl. 6.5 inc., nostril to tip of bill 1.5 in.

The Field Museum of Natural History, has three young Trumpeters from one to two and one half years old, presented by Judge R. M. Barnes, who had them alive. They are without data.

The U. S. National Museum has seven skins and one mounted specimen. Those with data are:

No. 5476 ♂. Yellowstone, Wyo., Aug. 22, 1856, F. V. Hayden.

“ 19963 Ad. Fort Resolution, Can., May 24, 1860, R. Kennicott.

“ 62367 Ad. ♂. Snake River, Ida., Sept. 23, 1873, Dr. C. H. Merriam.

“ 70317 Ad. ♂. St. Clair Flats, Mich., Nov. 20, 1875, W. H. Collins.

No. 81290 Ad. ♂. Lake Koshkonong, Wis., Apr. 20, 1880, Thure Kumlein.

Another Wisconsin record is an adult male hanging as “dead game” in a local billiard hall in Chicago. It was shot in Waukesha Co. in February, 1904, by Dr. F. S. Crocker.

The only Mexican record, is a specimen in the Museum of Comparative Zoölogy at Cambridge, which was shot by F. B. Armstrong at Matamoros, Tamaulipas, Mexico, January 21, 1909 (see Phillips, Auk, Vol. X. p. 72). No. 49836, ♀. “There is also in the museum an adult (mounted), from the Greene Smith collection, and a chick labeled *O. buccinator*, with no data” (Bangs—letter June, 1914).

In the Government Museum, Banff, Alta., Can., Dr. N. B. Sanson, states that there is “One specimen from Manitoba, 1887.”

From the Public Museum of Milwaukee, Director Henry L. Ward, writes: “Our only specimen was received from the Wisconsin Natural History Society, with no data except “Wisconsin.”

Prof. R. M. Bagg, Lawrence College, Appleton, Wis., has kindly sent me photos of two mounted specimens in the museum, which have no data.

Prof. Lynds Jones, Oberlin College, Ohio, writes: “There is a specimen in the collection received from J. C. Catlin, late of Ravenna, Ohio, about which it is stated that it was collected thereabouts in the '80s.”

P. A. Taverner, Government Survey Museum, Ottawa, Can., writes: “We have but one specimen in the Museum, a mounted bird, killed on the St. Clair Flats in 1884.

Mr. J. H. Fleming of Toronto, writes, “I have one Trumpeter Swan, shot about 1878 on Lake St. Clair, on the Toronto side.”

Dr. H. H. Brimley, Curator State Museum, Raleigh, N. C.,



TRACHEA AND STERNUM OF MALE TRUMPETER SWAN (*Olor buccinator*).
Shown in skin on Plate VIII.



ANTERIOR VIEW OF STERNUM OF TRUMPETER SWAN (*Olor buccinator*).
U. S. National Museum Collection.....

reports: "So far as I know the Trumpeter Swan has never been taken in this state, though the Whistling Swan is quite plentiful on Carrituck Sound in winter. I saw hundreds if not thousands of them in January, 1914."

Prof. Wm. C. Mills, Curator Museum of the Archæological and Historical Society of Ohio, at Columbus, states: "We have in our collection a great many bones of the Trumpeter Swan. It seems that this bird, although a very rare migrant at the present time, was here in great numbers in pre-historic time, and we find their bones in the villages of the old Indians, who always used the leg bones for making implements, while the wing bones were seldom used. I found specimens in the Baum, Bartner and Madisonville village sites."

Dr. Joseph Grinnell, states that he has "no knowledge of its occurrence in California in recent years: in fact I know of no specimens in any California collection."

Mr. F. C. Lincoln, Colorado Museum of Natural History at Denver, says: "It can only be considered a straggler in Colorado. The one mentioned by W. L. Slater in his 'Birds of Colorado' as a representative of this form, is a Whistling Swan."

Dr. L. B. Bishop, New Haven, Conn., writes: "The only Trumpeter in my collection is an adult male, shot at upper Stillwater Lake, Mont., March 11, 1902, No. 25378 of my collection. It was bought for me by Mr. E. S. Cameron of the owner, Miss G. M. Duncan of Whitefish, Mont."

Dr. Leonard C. Sanford, New Haven, Conn., writes: "I have in my collection three Trumpeter Swans which I purchased as young birds from a dealer, who got them from Montana, but declined to give me the exact locality. They are positively identified by Chapman and Hornaday."

Mr. John E. Thayer, Lancaster, Mass., writes: "I bought a pair of live Trumpeter Swans three years ago, that were taken from the nest in Montana. The male died last autumn and I had him made into a skin. I have a magnificent mounted specimen that a friend gave me, but he did not know where it came from. I think it is one of the rarest."

It was my good fortune to procure from Mr. Charles Dury, the veteran taxidermist of Cincinnati, a beautifully prepared skin of the

Trumpeter, together with the sternum and trachea shown in plate. The bird was taken in North Dakota in Nov., 1891. Mr. Dury informs me that there is a mounted pair in the museum of the Cuvier Club, one of which, the male, was shot from a flock of three, on the Ohio River near Cincinnati in December, 1876. Mr. Dury writes "several were taken at St. Mary's Reservoir in spring and fall, when I visited the place from the early '70s to the late '80s. That body of water was the resort of water birds in vast swarms, including both species of swan. The Whistling Swan was always more abundant than the Trumpeter. They would alight in the open water and were very wary and difficult to shoot. The last time I visited the Reservoir the birds were in such diminished numbers that I never went back."

Same bird shown in Plate VIII, note the parallel lines of bill — a distinguishing feature. (The rule shown in the cuts is 12 in. in length.)

Allen D. Hole, Curator, Earlham College, Richmond, Indiana, writes: "We have in our Museum a mounted Trumpeter Swan without data. Tail of 22 feathers."

F. Smith, Curator, University of Illinois, Champaign, writes that they have "One specimen of the Trumpeter Swan obtained from W. N. Butler, Anna, Ill., in 1880. No data."

Judge R. M. Barnes, Lacon, Ill., writes me: "There are at present ten known birds of this species in confinement, five of which are on my home place. I have been unable to breed any birds here."

A number of alleged Trumpeters which I traced proved to be Whistling Swans and many records also proved erroneous.

Of the great multitudes of Trumpeter Swans which traversed the Central and Western portion of North America sixty years ago, there are sixteen specimens preserved in museums which have authentic data. These were collected between the years 1856 and 1909.

There are besides the type, five other Canadian records, Toronto 1863, Fort Resolution 1860, Lake St. Clair 1878, St. Clair Flats 1884 and Manitoba 1887; and one from Wyoming 1856, Idaho 1873, Michigan 1875, Wisconsin 1880, Ohio 1880, Oregon 1881, North Dakota 1891, Minnesota 1893, Montana 1902 and Mexico 1909.

NOTES ON A CAPTIVE VIRGINIA RAIL.

BY ALVIN R. CAHN.¹

ON the night of October 21, 1913, Madison, Wisconsin, received its first touch of winter weather in the shape of a premature snow-storm, accompanied by high northwest winds. A university student, walking down State street near the Capitol after dark, picked up on the street an exhausted bird, which he put into his coat pocket. The next morning he brought the bird — still in the coat pocket — to the Zoölogical Laboratory for identification, and it proved to be a Virginia Rail (*Rallus virginianus*). The bird was undoubtedly migrating when overcome by the fury of the storm.

Examination showed the rail to be in remarkably good condition and it was decided to try various feeding experiments on it. The bird was accordingly placed in a room in the vivarium, where it could hide beneath the ferns and have plenty of exercise, yet find no food except that which was given it.

On the 22nd and 23rd the bird refused all food, and spent the days asleep amid the ferns, perched on one leg with its head buried under its wing. It showed no signs of fear, and slept undisturbed until actually touched, evidently regaining its lost strength. On the morning of October 24, a shallow dish of water containing ten good sized Amphipods (*Dikerogammarus faciatius*) was placed among the plants, and half an hour later the crustaceans had disappeared. From then on there was no question as to whether or not the rail would eat; the difficulty lay in obtaining an adequate supply for its insatiable appetite. From October 24 to November 1, inclusive, the bird was fed entirely on these Amphipods, together with caddice-worms (*Platyphylax designatus*) which had been removed from their cases. Thirty amphipods and fifteen caddice-worms were fed daily, and the rail was apparently in excellent condition, although its appetite was evidently not satisfied.

On the morning of November 2, the bird was placed in a glass show-case covered with wire, size 24 × 12 × 12 inches, having a

¹ Zoölogical Laboratory, University of Wisconsin.

sand floor covered with moss, in which a dish of water was sunk, and in one corner a clump of growing ferns was located to afford the bird shelter when desired. This cage was then placed on exhibition in the entrance hall of the Biology building, where hundreds of persons passed it daily. In this situation the rail grew remarkably tame, and was apparently far more contented when surrounded by noisy students than when left alone. The presence of people was evidently associated with the idea of food, for which it was constantly on the look-out. So tame did the bird become that after two days it was allowed to fly out of the cage and feed from the hand. The rail was on exhibition under these conditions from 8 to 5:30 o'clock daily from November 2 to 9, inclusive, and it was during this period that a careful record was kept of its food, as shown in Table 1.

TABLE 1.

November:	2	3	4	5	6	7	8	9	10
Caterpillar		2	1	1			1		
Stickleback		1	1					1	
Sunfish		2	2	3	5	2		2	2
Water-bug, Zaitha	2	4	11	3		1	3	3	2
Meal worm	20	11	12	18	50	30	25	22	12
Grasshopper	2	1	12	3	3			4	2
Amphipods	45	144	85	95	95	80	85	38	60
Crayfish				1	1				1
Snake (DeKay)				1					
Snake (Garter)					1				
Frog (<i>Acris</i>)				1		1		1	
Frog (<i>R. pipiens</i>)							1		
Hornet (<i>V. maculata</i>)		1	3	5	2	1		4	2
Bullhead					1	2	1		
Caddice-worm		22	15		6	32	10	14	12
Snails			2		4	3		5	
Water Scorpion			3		2	2			
Earthworm		6	6	11	5	6	8		4
House-fly			1	5	5		7	1	3

What proved to be perhaps the most interesting part of the food habits was the discrimination shown in the manipulation of the

various kinds of foods. In the case of the larger aquatic animals — the sunfish, stickleback, bullhead, crayfish, Zaitha, and water-scorpion — the victims were immediately removed from the water and carried to the far end of the cage, where they were swallowed entire. Once caught, they were never dropped, but were dextrously juggled in the beak until the proper position for swallowing was obtained. The bird apparently realized the danger of allowing a captured fish to drop again into the water, and proceeded to eliminate the possibility of escape by taking the victim as far as possible from the water. It experienced no difficulty whatsoever in making away with the sunfish and stickleback, and the bullheads went down easily enough — with the exception of one which succeeded in extending its pectoral spines at the moment of passing down the narrow throat, and stuck fast. Strangulation might soon have followed had not the fish been removed, as the bird was utterly unable to dislodge it, although it made desperate efforts to shake it out. The fish was removed with forceps, whereupon the bird undaunted by its narrow escape, proceeded to make another, and this time successful attack on the same fish!

The crayfish, once caught, were pecked and shaken violently until practically all the legs had been dislodged, and the victim, thus rendered entirely helpless, was swallowed easily. After disposing of the body, the bird proceeded to search out the isolated legs, and sent them after the body.

In the case of the smaller aquatic forms, the victims were swallowed on the spot. The caddice-worms and snails (*Physa gyrina*) were left untouched while in the case, the bird making no attempt to swallow them, contenting itself with merely poking at them whenever they moved. However, when the worms and snails were removed from the cases, they were eaten greedily. Amphipods were devoured as fast as they could be caught — which was faster than they could be fed the bird — and seemed to be one of the favorite foods. The rail showed remarkable skill in the capture of these little animals, and almost never missed its aim.

On the other hand, all non-aquatic forms were promptly brought to the water and soused until soft and pliable enough to be swallowed with ease. The larvæ of the Isabella Tiger-moth (*Pyrrharcia isabella*) which were large, well developed specimens, were

manipulated the longest of all the foods except the garter snake, the largest caterpillar being soused continuously for a period of twenty-one minutes. At the end of this time the caterpillar was greatly reduced in size, as the bristles had become softened and broken, and the body limp. The frogs were hammered into insensibility in the water, where there was less chance of escape for them than on land. It took but a very few — usually less than six — vigorous thrusts of the long bill to put the frog in so helpless a condition that its escape was impossible, yet much poking and shaking followed before it was finally devoured.

The surprise, however, came when the bird was given a DeKay's snake (*Storeria dekayi*) measuring seven and one half inches in length. It was hardly expected that the bird would attempt to eat it, yet not only was the attempt made, but it proved successful and apparently easy. The snake was attacked with vigorous thrusts of the bill, and in a very short time was entirely helpless, whereupon the Rail devoured it, beginning with the head. The whole performance occupied less than fifteen minutes — less time than was required for the caterpillar — and was witnessed by a large crowd of noisy students.

The next day a second snake, this time the common Garter variety (*Thamnophis sirtalis*) was introduced. This individual measured just twelve inches when fully extended. The Rail attacked it at once, but had a great deal of trouble subduing it. After half an hour of intermittent attacks the first attempt was made to swallow the snake. The first few inches went down easily, but then quite suddenly the dazed victim managed to loop its body. Further progress being thus rendered impossible, the bird proceeded to recall what it had already swallowed, and for a few minutes stabbed violently at the snake with its beak. Satisfied by the passivity of the victim that all was now well, a second attempt was made, with the same results and sequel. Many unsuccessful trials followed in the next hour and a half, during which time the bird exhibited great concern over the constant twitching of the last inch of the snake's tail, and it was not until two strenuous hours had elapsed that the reptile was finally swallowed. After gasping a few times and settling the enormous meal into as comfortable position as possible, the bird — now a most distorted individual —

settled down for a sleep. It may be said that the only time the rail seemed perfectly satisfied was during the hour following the consumption of these two snakes. After the hour, however, it was ready once more for food, though evidently not particularly hungry.

Attempts were made to feed the rail on a less carnivorous diet, but all proffered rice and cracked corn was refused, even when the bird showed marked signs of hunger. Finely chopped liver was likewise ignored, and small pieces of bread were merely played with.

GENERAL NOTES.

Concealing Posture of Grebes.— The note under this heading in the last number of 'The Auk' by Mr. Delos E. Culver recalls to my memory a similar and yet different experience with a Pied-billed Grebe (*Podilymbus podiceps*) on August 22, 1911. Near Addison, Illinois, is a slough of about five acres area and around the edge a fringe of open water, which is two to four feet deep in spring, but becomes shallower as the season progresses, until, in very warm summer, there is sometimes no water left. In the center is a large area grown up with rushes, tall sedges and marsh grasses. On the above-named day I went into this slough, crossed the open water, which now had almost disappeared, then through the large grassy center space. When near the farther edge of this, I noticed a grebe, which was frantically trying to hide itself. Had I come from the shore near which it was, it would have had no difficulty in getting into the grassy wilderness in the center, but since I came from the other direction, it could not do so without being in my vision. When all attempts at diving proved unavailing, it nevertheless suddenly disappeared from view, although I was only fifteen feet from it. Trying to get to the bottom of this remarkable phenomenon, I looked closely and saw that it had swum as closely as possible to a small tussock of grass and stretched its neck and upper part of the body over this. The color of its plumage matching well in general effect the brown and green of the grass, the bird became next to invisible. It remained in this position until I approached to within about ten feet, when it splashed away and performed the same maneuver on another tussock.— C. W. G. EIFRIG, *River Forest, Ill.*

The Double-crested Cormorant in the Chicago Area.— November 20, 1914, I saw a Double-crested Cormorant (*Phalacrocorax dilophus dilo-*

phus) resting on ice at the edge of the water on one of the lagoons of Jackson Park, Chicago. It appeared during an unusually cold wave. Mr. F. M. Woodruff in his 'Birds of the Chicago Area' published in 1907 writes of this species as being a rather rare fall visitant in the area covered by that book, and no doubt since then it has become still more rare. At least, in nearly six years acquaintance with the birds of this region, this is the first cormorant that I have ever seen.—EDWIN D. HULL, *Chicago, Illinois.*

Note on the Feeding of the Mallard.—That the Mallard (*Anas platyrhynchos*) does not dive for its food seems to be the general impression. Therefore an exception which I was fortunate enough to witness would seem worthy of record. January 28, 1914, on one of the lagoons of Jackson Park, Chicago, I saw an adult male Mallard in company with a female Lesser Scaup. When the birds were first seen about 4:30 P. M. the Scaup was diving repeatedly near the middle of the lagoon in deep water, while the Mallard was following her about, rushing up to her every time she appeared at the surface, but unable to rob her of any food. Nearly twenty minutes later the Mallard dove for the first time. A few more dives followed in fairly quick succession. Meanwhile the Scaup had been diving continuously. The diving of the Mallard in comparison with that of the Scaup was clumsy in the extreme, and accompanied with much flapping of wings and splashing of water. The actual time spent by the Mallard under water was very short, in fact, when it dove after the Scaup had disappeared it was still the first to rise. The diving would seem to be unsuccessful, for the bird quit shortly although the Scaup kept up its diving, and later about 5:00 P. M. when the birds swam off to another part of the lagoon and the Scaup again commenced diving the Mallard made no effort to do so. It is highly improbable that sufficient food, if indeed any at all, was secured in these short clumsy dives. At any rate the bird brought no food to the surface, and if any was obtained it was swallowed under water.

I notice J. G. Millais¹ states that young Mallards when about three-quarters grown and before they are able to fly, encouraged by their mothers secure a considerable part of their food by diving. This author states further in his notes on the Mallard that surface-feeding ducks exceptionally dive for choice bits of food, but he does not name the species, although presumably the Mallard is included.

From the few available observations, the most plausible theory, it seems to me, in regard to the feeding of the Mallard is that the species has nearly changed in adult life from a diving to a surface-feeding duck, although diving is habitual in the young. Reversions to this juvenal behavior occur among adults under the pressure of a very strong stimulus, as an unusually choice morsel of food, or in imitation of a diving duck after that bird has

repeated its diving many times. It should be noted at this point that a solitary Mallard observed from January 3 to January 13, 1914, and possibly the same bird, was never seen to dive, but fed by immersing its head merely. The action of the mothers encouraging their young to dive, as noted by Millais, if they themselves dive, cannot be explained by any of the stimuli mentioned, and provided the Mallard is a surface-feeding duck, as is generally believed, the cause is entirely obscure. Many more observations throughout the bird's life-history are badly needed.—EDWIN D. HULL, *Chicago, Illinois.*

Piping Plover at Cape May, N. J.—On September 7, 1913, while studying the birds on the beach at Cape May, five Piping Plover (*Ægialitis meloda*) were observed. The birds were first found directly in front of the resort on the beach and at all times staid by themselves in a close compact band. Being exceedingly tame they allowed me to approach very close, and then ran but a very short distance when they settled down to feeding again. Only at rare intervals when hard pressed did they take wing and then as before went but a very short distance. At the moment of observation I did not fully realize what a rare bird the Piping Plover had become on the New Jersey coast.

Again on September 13, 1914, Mr. J. K. Potter, who was with me on the Cape May beach, found an individual of this species in almost the identical spot that the five of the year before had been observed.

This bird was alone and after a careful search no others were found. It was also very tame and allowed us to approach very close to it. There were at the time in the immediate vicinity, in fact all about us scattered flocks of Sanderling (*Caladris leucophæa*) and Semipalmated Plover (*Ægialitis semipalmata*) but the Piping Plover showed not the slightest tendency to associate with them, in fact kept as far away from them as it possibly could.—DELOS E. CULVER, *Addingham, Delaware Co., Penna.*

The Yellow-crowned Night Heron in Colorado. A Correction.

—The writer regrets that he was in error in reporting (*Auk*, Oct. 1914, p. 535) the individual of this species taken at Byers as being "the second record for this State for this species and the first with full data as to location of occurrence and date of collection." He unintentionally overlooked an earlier record made by E. R. Warren, with full data (*Condor*, XI No. 1, p. 33 and *Auk*, April, 1910, p. 145), and now makes this correction and presents his apologies to Mr. Warren for this inexcusable oversight.—W. H. BERGTOLD, *Denver, Colo.*

The American Bittern Nesting on Long Island, N. Y.—Previously the American Bittern (*Botaurus lentiginosus*) has been classed as a transient visitant on Long Island, since, heretofore, no definite record of its nesting there has been forthcoming. Though the breeding range of this species includes New York State, and though the area of Long Island has been

perhaps the most attentively examined by bird students and sportsmen, it has not heretofore been recorded as a nesting bird there.

Giraud wrote seventy years ago (*Birds of Long Island, N. Y., 1844*) of this species on Long Island in his pleasing manner; of its habits and comparative scarcity, but makes no mention of its nesting. George N. Lawrence in his 'Catalogue of Birds observed on New York, Long and Staten Islands, and the adjacent parts of New Jersey,' merely lists the bird, without remark of any sort. Mr. Dutcher's notes on the birds of Long Island in Chapman's 'Handbook' 1894, and subsequent editions mention no record of its breeding, but give its status as "common transient visitant."

In my 'List of Birds of Long Island' (*Abstr. Proc. Linn. Soc. of N. Y., 1907*) I also gave its status as a common transient visitant, recording the limits of its occurrence, observed and collected to that time, in spring, April 16 (Sheepshead Bay) to May 5 (Montauk); autumn, August 4 (Shinnecock) to December 11 (Rockaway). I may say that data since collected have extended the spring arrival nearly a week earlier, *i. e.* to April 10 (1909, Seaford).

The actual discovery of a nest, eggs and young of the American Bittern on Long Island has apparently been reserved till the present year. On Sunday, June 14, 1914, Mr. Robert W. Peavey, to whom students of Long Island birds are indebted in many instances for his indefatigable enthusiasm, discovered a nest of this bittern on the part of the Great South Bay of Long Island, known as Jones' Beach, or locally, as Seaford Beach. This is one of the least frequented parts of the ocean-side Long Island beaches. The nest contained two newly-hatched young birds and two eggs. It was placed on salt meadow hay and was built up several inches above the level of the ground. Mr. Peavey flushed the bird off the nest when he was within three feet of her. The locality was one mile east of the High Hill Life Saving Station near the back or bay side of the beach, and within a newly-established game-preserve of about 5000 acres, which is guarded by a patrolman.

It may be said that he was the less surprised in that he had been informed of the unusual occurrence of one or more "Look-ups," as they are named in this part of Long Island, by Nelson Verity, one of the veteran gunners of this locality, and had himself seen an American Bittern on June 7 on Seaford Creek, almost within the limits of the village of the same name.

It is safe I think to say that the bird as a breeding species is exceptional on the whole of Long Island, as well as in this restricted locality — Seaford region, since Mr. Peavey has spent a day each week for many summers in this place, and his own observation as well as the testimony of the baymen of the region make its occurrence here in the nesting season altogether unprecedented.— WILLIAM C. BRAISLIN, *Brooklyn, N. Y.*

Cory's Least Bittern in Illinois.— On May 23, 1914, the writer was staying on the edge of a small swamp along the Fox River, about forty miles northwest of Chicago. While standing motionless to watch the

abundant water-fowl such as King, Virginia and Sora Rails, Coots, Florida Gallinules, and Least Bittern, which were either stepping out of the dark recesses of the clumps of cat-tail and other swamp vegetation to feed along the edge of the open places, or swimming in patches of open water further out, or at least giving vent to their various queer notes, in which they were ably seconded by multitudinous Redwings and Prairie Marsh Wrens (*Telmatodytes p. iliacus*), I was startled by a bird about the size of a Least Bittern flying out of some *Scirpus lacustris* and heading toward a thicket of button-bush, willow, etc., at the edge of which it alighted and disappeared. The bird in coloration looked unlike anything I had ever seen. The shape, size and flight all fitted the Least Bittern, but it seemed to be all black or blackish with the exception of brown crescent on the wing next to the primaries. Thinking the light or my eyes were deceiving me, I put it down as a Least Bittern. Still having some doubts, I put out in a boat which was with some difficulty poled through the dense vegetation by a friend. When nearing the bushes above mentioned the dark bird got up and flew a distance back of the boat, again alighting in the rushes. My friend, anxious to have at least one shot for his hard work of pushing the boat, took my 44 caliber shot-gun, fired — and the bird stayed there. Poling on as quickly as possible, which was still slow enough, I was surprised and elated to find the bird to be an *Ixobrychus moxenus*. On dissection it proved to be a female, the largest egg would have been ready for extrusion in a few days or a week; the stomach contained two sunfish, each about three inches long. The following is a description of the skin now in my collection. Length, from tip of bill to end of tail, $11\frac{3}{4}$ inches, to tip of longest toe, $14\frac{1}{2}$ inches, tarsus $1\frac{1}{2}$ inches, bill, $1\frac{1}{8}$ inches. Color, back, tail and broad line from crown along back of neck, where the ends of the feathers on sides of neck form it, greenish-brownish-black; wing coverts dark purplish-chestnut; primaries, dark slaty, with a trace of the flour-like bloom characteristic of the herons; cheeks, throat and neck chestnut, the fluffy tuft of feathers streaming over the bend of the wings, blackish; belly dark-purplish brown, quite different from the neck, in middle of abdomen some white feathers, forming an irregular white patch; sides gradually darkening into blackish; culmen of bill blackish shading to dark brownish horn color on sides and on lower mandible, different from the straw color in *I. exilis*; tarsi and feet also blackish to brown. From this it is apparent that the coloring of *noxenus* is quite different from that of *exilis*, only some of the dark brown on the back of the latter being identical with the same colored areas on the wing of the former, as well as the greenish-black on the crown.— C. W. G. EFRIG, *River Forest, Ill.*

Willow Ptarmigan in Minnesota.— A specimen of the Willow Ptarmigan (*Lagopus lagopus lagopus*) was shot on April 20, 1914, at Sandy Island Lake of the Woods, Minnesota. Sandy Island is located in Section 21, Township 163, Range 36, of Warroad. This seems to be the first authentic record of the species in the state. The specimen is owned by Mr.

Steve Whitey of Crookston, Minn.— J. W. FRANZEN, *Minnesota Academy of Sciences, Minneapolis, Minn.*

Audubon's Caracara in New Mexico.— On May 4, 1914, Mr. Andrew Archeer brought to my office a specimen of Audubon's Caracara (*Polyborus cheriway*) that had been shot by Mr. Harold Church from a cottonwood tree standing in an alfalfa field near Mesquite, N. M., below Las Cruces in the Rio Grande Valley. This specimen was an immature male not yet in typical color. In the stomach were found the almost completely digested remains of a small bird and a small rodent, whose identification could not be determined. The skin is now in the collection of the New Mexico College of Agriculture, at State College, N. M.

This constitutes the second established record of the occurrence of this species near here. Mr. E. W. Nelson, of the U. S. Biological Survey, kindly gave me the following note on its occurrence. "There is but a single other record, so far as we know, of this bird's occurrence in the State. This was one taken by Dr. Henry at Ft. Thorne in the winter of 1856 and sent to the U. S. National Museum."— D. E. MERRILL, *State College, N. M.*

Actions of the Red-tailed Hawk.— In 'The Auk' for 1913 (page 582) I described the very active defense of her nest offered by a Red-shouldered Hawk (*Buteo lineatus lineatus*). It may be recalled that two sets of eggs, April 6, and April 29, 1913, were collected from this pair of birds. I was then especially anxious to observe the birds the next year, and early in April I visited the Sawyer woods for this purpose. The birds flew from trees on the east side of the woods from which direction I was approaching. They were very noisy but flew high and no nests which seemed to be recently occupied were seen. On April 23 I again visited the woods approaching from the east, near the southern edge. Both birds met me at the edge of the woods and flew about with noisy screaming at some elevation as I walked westward. At the west side of the woods I turned and walked in a northeasterly direction directly towards the beech tree in which the first set of eggs were taken in 1913. The female was in a tree top near this beech and when I was possibly 200 feet away she launched herself directly at me. I could hardly conceive she would attack me as I stood on the ground, but she came straight on and I had to drop to my knees to avoid her blow. She alighted west of me and I walked on toward the nest, watching her over my shoulder. I had hardly stepped forward when she again dashed to the attack with more fierceness possibly than before and I again was compelled to drop to my knees. She came to rest about 30 feet from me in a small maple where she rested in a threatening attitude for some time while I stood admiring her. Her plumage was perfect, her breast being almost red, and her attitude of fearless defiance as she stood leaning toward me made a picture impossible to forget. She made no further attacks till I began climbing the tree when she struck at me viciously four times.

It is needless to say I kept her in sight all the time, keeping the tree between us as much as possible, and jerking my head out of the way to avoid her outreached claws. She made no attacks after the eggs were taken from the nest. The male left the woods or at least kept out of sight while the female was attacking me. Later he returned and the pair soared screaming at a considerable height. The eggs were three in number, incubation just begun, and as stated, were laid in the same nest occupied in April 6, 1913.

It may be added that I visited Mr. Sawyer, who owns the woods, explaining to him that the hawk would now be more wary, but even yet might fall an easy prey to any gunner and asking him to do what he could to prevent her being killed. Though apparently not very appreciative of the traits I so much admired in the bird, and my reasons for the preservation of her life, he promised to do what he could to prevent her being killed.

Other nests visited in 1914 were occupied in every case by wary and cautious birds. The conditions which developed the audacious daring of the one exception without at the same time costing her her life are not easily understood.—E. B. WILLIAMSON, *Bluffton, Ind.*

Richardson's Owl in Illinois.—Records of the occurrence of Richardson's Owl (*Cryptoglaux funerea richardsoni*) in Illinois, are so few that the following hitherto unpublished note, unimpaired, I hope, by age, may be of interest.

During the last week of January, 1887, in a period of great cold and deep snow, an owl of this species was caught by some school-boys in a farmer's barn near Sycamore (50 mi. west of Chicago) and brought to me alive. Identification was easy but I did not then appreciate the rarity or value of the specimen; and small stuffed owls being in great demand just then as parlor "what not" decorations, I sold this to a neighbor for the munificent sum of \$1.25, for that purpose.—L. E. WYMAN, *Museum of History, Science and Art, Los Angeles, Calif.*

An albinistic Bobolink.—While walking over a piece of prairie, near Stickney, southwest of Chicago, Mr. Kohmann, the taxidermist, and the writer saw an extremely queer-looking Bobolink. It appeared to be all white, but on closer inspection showed some checkering of black. This impression was found to be true, when it was taken. The buff of the nape is also white; some feathers on the crown and cheeks, on the sides of the breast, on the back and in the wings are black, but not in symmetrical arrangement, thus on one wing the fourth primary is the first black one, whereas in the other the first primary is black, while the tail is all white with the exception of the outermost section on one side. Altogether, it is a unique specimen.—C. W. G. EFRIG, *River Forest, Ill.*

Leconte's Sparrow in Wisconsin.—Kumlien and Hollister in 'The Birds of Wisconsin' state concerning this species: "It is also rather remarkable that the closest search has failed to produce a single specimen in spring." On April 11, 1914, three were seen and one taken at Madison,

Wis., April 13 one seen; and on April 15 two were taken. The above records would indicate that this species is a not uncommon spring migrant.—A. W. SCHORGER, *Madison, Wisc.*

The Evening Grosbeak at Portland, Maine.—I found seven Evening Grosbeaks (*Hesperiphona vespertina vespertina*), representing both sexes, in the Western Cemetery, Portland, early in the afternoon of April 16, 1914. It was a wintry day, and snow was falling at the time, with several inches of a fresh deposit on the ground. The birds were feeding on sumac fruit. They were easily approached but moved about with a peculiar abrupt activity, calling frequently and loudly.

Though the Evening Grosbeak is no longer a stranger in Maine, its occurrences have not been so frequent that another is without interest; and the middle of April appears to be a rather late date for it.—NATHAN CLIFFORD BROWN, *Portland, Maine.*

Two Species of Cliff Swallows Nesting in Kerr County, Texas.—The Mexican form of Cliff Swallow (*Petrochelidon fulva pallida*), described by Nelson, was found nesting by my collector near Japonica in Kerr County, Texas, during the month of June, 1914. He collected a series of birds and eleven sets of eggs. There was rather a large colony nesting in a cave. The entrance of this cave was like a mine shaft. The ceiling was covered with holes where the water had once eroded into the limestone rock. The Swallows nest in these holes, plastering a little mud like a balcony to hold the eggs in. A forty foot ladder was used to get up to them. The cave was poorly lighted and very damp. It was 50 feet from the floor of the cave to the ground, where the entrance was. The opening was about 8 ft. in diameter. About 10 feet down, the cave widened out into a spacious chamber. The only light was from the shaft-like entrance. To enter the birds pitched head first and diverged into the semi-dark chamber and began a detour of circles to check the impetus of their plunge.

The eggs are marked all over with fine markings of light to dark brown with a few spots of lilac.

I give the measurements of the eleven sets of eggs, in hundredths of an inch.

1. 77 × 57, 77 × 56, 81 × 58, 75 × 56
 2. 81 × 55, 78 × 58, 77 × 55, 77 × 55
 3. 83 × 55, 81 × 54, 73 × 54, 73 × 55, 78 × 54
 4. 76 × 56, 81 × 54, 84 × 57, 75 × 55
 5. 80 × 53, 77 × 54, 85 × 56, 78 × 55
 6. 76 × 54, 80 × 55, 81 × 57, 81 × 54
 7. 78 × 56, 76 × 57, 79 × 57, 77 × 56
 8. 76 × 56, 76 × 54, 79 × 57
 9. 82 × 56, 81 × 53, 85 × 54, 83 × 54
 10. 77 × 57, 77 × 54, 83 × 56, 76 × 54
 11. 68 × 54, 73 × 55, 80 × 55.
- Averages 43 eggs 77 × 55

In this connection I wish to state that in recording the occurrence of this bird in Texas (Auk, 1914, p. 401) I entirely overlooked Dr. Louis B. Bishop's previous record (Auk, 1910, p. 459).

A Colony of the Lesser Cliff Swallow (*Petrochelidon lunifrons tachina*) was found nesting not far from where *Petrochelidon fulva pallida* was breeding. Most of their nests were roofed over. They select a part of a perpendicular cliff that has a projection and plaster their nests up under this. On these rocky walls of the cañon there seem to be ridges, probably the high water mark in times of floods, where the rushing water has eaten into the face of the cliff, leaving a projecting shelf. This supplies a roof in rainy weather, which protects the nests.

My collector says, "The Lesser Cliff Swallows, I am pretty sure, carry the mud for building in their mouths, while the other one (*Petrochelidon f. pallida*) carry it in their feet. I judge this by the actions of the birds while alighting on a muddy spot and picking up the mud. The Lesser Cliff Swallows will dive into the mud with their tails up, just skimming the surface like a flock of teal, feeding in a shallow pond. They look as if they were standing on their heads, while the other swallow alights on the mud with head erect balancing himself by quivering his wings, while he settles his feet into the mud, then rises and flies straight to his nesting place."

The Lesser Cliff Swallow uses very little lining for his nest, sometimes not over two or three feathers, while the Coahuila Cliff Swallow, as a rule, gathers quite a lot of grass-roots and feathers.

The eggs of these Swallows vary in size as will be seen by the measurements, but the coloring is nearly alike, although the Lesser Cliff Swallow's is more heavily marked, while the feature of the other is the fine spots all over the egg instead of large blotches. These markings in the case of the Lesser Cliff Swallow are brownish, while in *pallida* they are light brown to dark brown and purple.

Measurements of fourteen sets in hundredths of an inch:

1. 80 × 56, 82 × 53, 80 × 52, 78 × 56, 79 × 52
2. 79 × 53, 69 × 53, 73 × 55, 75 × 55
3. 83 × 55, 75 × 56, 69 × 51, 79 × 53
4. 78 × 54, 83 × 55, 82 × 58, 83 × 57
5. 78 × 53, 77 × 52, 80 × 52, 77 × 56
6. 77 × 54, 77 × 56, 79 × 56
7. 77 × 55, 73 × 54, 73 × 55, 71 × 53
8. 74 × 54, 73 × 56, 71 × 52, 73 × 53
9. 91 × 57, 87 × 53, 91 × 52, 85 × 53
10. 78 × 57, 76 × 58, 76 × 56, 77 × 56
11. 76 × 54, 79 × 51, 77 × 52, 77 × 53
12. 80 × 55, 84 × 57, 82 × 58, 79 × 57, 82 × 57
13. 79 × 54, 76 × 57, 84 × 56, 78 × 58, 80 × 56
14. 76 × 53, 82 × 55, 79 × 53, 78 × 56

Average of 58 eggs. 80 × 54.—JOHN E. THAYER, Lancaster, Mass.

The Cape May Warbler in Eastern Massachusetts.— In view of the extreme rarity of the Cape May Warbler (*Dendroica tigrina*) in eastern Massachusetts, their occurrence in unusual numbers during the past autumn in Lexington, Mass., seems worthy of note.

Between Sept. 9 and 14, 1914, I met nine Cape Mays in four widely separated parts of the town,— three on the 9th, five on the 13th, and one on the 14th. Three of the birds were about my house in the town centre,— two in a maple, and one in a mountain ash tree. Three other birds frequented a red cedar pasture where I watched them for an hour. They kept close together, generally in the same tree, and passed repeatedly over a beat which included two or three acres. We met another individual on the border of a piece of woodland, and another in an isolated dead oak tree.

The birds showed a remarkable range of plumage; some, old males evidently, were almost as brilliantly marked with yellow and orange as in spring, others, birds of the year no doubt, were pale grey, streaked above and below with brown, and lacked all yellow except on the rump. The Cape Mays accompanied a heavy flight of migrants, composed chiefly of Bay-breasted and Magnolia Warblers.

Mr. William Brewster kindly sends me a record of three more Cape May Warblers which he saw in the nearby town of Concord, Mass. His dates extend materially the limits of the flight.

“ August 31, ♀ in red cedar in berry pasture. *Very tame.*

“ September 12, ♀ in oaks and larches. *Very tame.*

“ September 30, ♀ spent several minutes in bush directly in front of our dining room window through which I viewed her at a distance of not over five feet. She was accompanied by three Black-polls.”

Mr. Walter Faxon, who saw two of the Lexington birds, had previously met the Cape May Warbler but three times in this vicinity during twenty-eight years of constant observation.

Mr. William Brewster (*Birds of the Cambridge Region 1906*, pp. 329, 331) summarizing all the instances which his notes supply of the bird's occurrence in the Cambridge Region, says,— “ It will be noticed . . . that during twenty-four — or two-thirds — of the total thirty-six years which the records cover, the beautiful bird was not noted at all, and that during eleven out of twelve years where it was observed only a single individual was seen each season. These facts appear to me to warrant the conclusion that the species is really one of the very rarest of the Warblers which visit us with any degree of regularity.”

In his summary, which includes the records of many observers, he mentions but a single occurrence in this region in autumn.

From the evidence of Mr. Faxon's and Mr. Brewster's experience the flight of Cape May Warblers during the past autumn must be considered unprecedented.— WINSOR M. TYLER, M. D., *Lexington, Mass.*

The Records of the Tennessee and Cape May Warblers in South-western Maine.— Up to the summer of 1914 the Tennessee Warbler

(*Vermivora peregrina*) seems to have eluded the few observers who have looked for it in southwestern Maine. There is a bare mention, in a migration list published by the 'Journal of the Maine Ornithological Society,'¹ of its occurrence at Westbrook on May 30, 1902; and Mr. Arthur H. Norton is given as the authority for this. But Mr. Norton tells me that the record was made without his knowledge, through a typographical or editorial error, and that he has never seen the bird in the vicinity of Portland.

A Tennessee Warbler, apparently a male, came into my garden, with many other little migrants, on August 30, 1914, and, after giving for a long time only inconclusive evidence of his identity, flew to the lower branches of an old apple tree, amongst which I was standing, and displayed his specific characteristics at very close quarters. Constantly moving about, but unhurried and seemingly quite free from fear, he was several times within three feet of me on a level with my eyes, offering me in a good light a perfect opportunity for studying him, whilst he pecked at leaves and twigs, made futile little sallies a-wing in the attempt to snap up insects and voiced his feelings in subdued call-notes. His plumage was beautifully smooth, and he was very plainly recognizable.

Late in the afternoon of September 6, 1914, a Tennessee Warbler appeared in the same old apple tree. The flutterings of a moth which he had caught absorbed his attention, and he permitted me to approach him as near as I chose. I scrutinized him carefully, until he was chased away by a Myrtle Warbler,—long enough to note that he was indistinguishable in appearance from my visitor of August 30; and he may, of course, have been the same bird.

The writer obtained on Cape Elizabeth, August 21, 1876, the only specimens of the Cape May Warbler (*Dendroica tigrina*) which have thus far been taken in the vicinity of Portland, and there has since been no announcement to his knowledge, of other examples seen. Perhaps it is safe to assume that the species is a regular migrant; but for the present more data seem desirable in support of this hypothesis.

The Cape May Warbler passed at least four times through some of the gardens at the West End of Portland during September, 1914, and on these occasions the birds were so tame and leisurely that close inspection of them was easy. On the 3rd I detected one in a troop of Warblers. On the 10th one remained about my house the greater part of the day, alone, several times visiting a piazza roof, in the gutter of which rain water was standing, and at times foraging on the open lawn. Two came together on the 18th and with other Warblers, including the Parula, the Myrtle and the Black-throated Green, bathed long and fully in the spray of a sprinkler placed so as to play upon an apple tree about four feet high. They permitted themselves to be showered in the tree and also descended to a little pool under it where they splashed about vigorously. On the 21st I found

¹ Vol. VI, p. 79.

a solitary bird at the edge of a group of native spruce and hemlock saplings, near one corner of my garden.

This garden is a recent inclosure, and most of the trees and shrubs in it are young. One is disposed to believe that otherwise it would sooner have harbored examples of both of the warblers which form the subject of the present note.—NATHAN CLIFFORD BROWN, *Portland, Maine.*

Cape May and Tennessee Warblers in Philadelphia.—In 'Cassinia' for 1913 (p. 36) I recorded these two species in a small yard 20 by 40 feet in the rear of my home in the thickly built up section of West Philadelphia. A Tennessee Warbler on September 12, an adult and two young Cape Mays on September 21, and two young on September 30. During the autumn of 1914, they were still more frequently noted; a Tennessee on October 1, and two or three Cape Mays on September 14, 24, 25, October 12 and 20. The yard contains rose bushes and a patch of native shrubbery as well as a small tree. The birds spent most of their time in the rose bushes picking off the aphides and allowed me to approach to within a few feet of them. Numerous records of the Cape Mays have been made at a number of nearby localities, but these, well within the city proper seem particularly interesting.—WITMER STONE, *Academy of Natural Sciences, Philadelphia.*

San Lucas Verdin in Arizona.—In the October number of 'The Auk' (Vol. XXXI, p. 543) is a record of the San Lucas Verdin (*Auriparus flaviceps lamprocephalus*) taken by Mr. H. Wright at Mecca, Cal., March 19, 1911.

Recently I received a typical specimen of this little known species (Mus. H. K. C., No. 18003) which was taken 20 years previously, and bearing the original label of the collector, Mr. F. T. Pember: "collected at Gila Bend, Ariz., April 18, 1891, ♂ L. 4.30, Ex. 6.64, W. 2., T. 1.90 inches."

Gila Bend is a small place in southwestern Arizona, elevation 1000 ft. It is about 90 miles north of the Mexican line and 100 miles east of the Colorado River.

This bird is even smaller than the California specimen, and can instantly be recognized upon comparison with true *Auriparus flaviceps*.—HENRY K. COALE, *Highland Park, Ill.*

Bluegray Gnatcatcher nesting in Wisconsin.—On May 31, 1914, in company with Mr. Normann DeWitt Betts, I found a pair of Gnatcatchers (*Poliophtila cerulea cerulea*), nesting at Lake Waubesa, Wis. This is probably close to the northern breeding limit for the interior of the state.—A. W. SCHORGER, *Madison, Wis.*

Robin's Nests.—Last spring, when Robins were beginning to build nests, a farm laborer in Champaign Co., central Illinois, removed an old nest from the crotch of an apple tree, and place it upon the tongue of a binder in a shed, near the farm residence. Although a year old, weather-

beaten, and stripped of its loose interior furnishing, the nest was essentially intact. Its walls of dark clay were strongly reinforced with tough grasses, and the foundation, bearing the impress of the two branches between which it had been held, was unusually generous in its proportions. During the winter the nest doubtless had contained snow and water, which, owing to the small soil particles of the clay, probably escaped almost altogether through evaporation, for the nest as it stood would hold water like a cup. I should estimate its weight at fully 18 ounces. In our orchard in Missouri I used to observe a number of robins' nests in the spring that had successfully weathered the winter, and it had often occurred to me that the birds would exhibit commendable economy if instead of building new nests they would remodel the old structures; but if this ever was done it escaped my notice. However, the nest that the farm employée placed upon the harvester tongue attracted a pair of robins, and I observed the female sitting in it. She evidently was getting the feel of it, and deciding whether or not to accept it in preference to the labor required to construct a new one. Being interested in the matter I asked the proprietor of the farm to report to me a fortnight later what the pair had decided. He wrote that they had "taken it" for the season. I should like to know whether this is a common practice among robins, or any other species. Charles Dixon in his 'Birds' Nests,' first edition, published in 1902 by Grant Richards in London, says, on page 242: "... various species of swallows breed in the disused nest of the Oven-bird . . . We might almost presume that these birds have relinquished the habit of forming a mud shell or outer nest when they discovered that these mud 'ovens' saved them the trouble of making one for themselves." Purple Martins will year after year occupy the same house or box. It is but one step further to an old nest in the case of robins.—DEWITT C. WING, *Chicago, Ill.*

Two New Records for British Columbia.—LARK BUNTING (*Calamospiza melanocorys*). On June 8, 1914, I collected a male Lark Bunting in a thicket of hawthorns on the shore of Okanagan Lake at Okanagan Landing.

WHITE-THROATED SPARROW (*Zonotrichia albicollis*). On October 6, 1913, I collected a male White-throated Sparrow that was with a large flock of Nuttall's and Golden-crowned Sparrows at Saanich, Vancouver Island. Both these birds are now in the provincial museum.

SITKA KINGLET (*Regulus calendula grinnelli*). A female taken at Okanagan Landing, December 29, 1913, is the first record east of the Cascades. A series collected here in summer have been identified as *calendula* by Dr. Louis B. Bishop. There are no winter records for this form.

BLACK MERLIN (*Falco columbarius suckleyi*). On February, 1913, I collected a Pigeon Hawk at Okanagan Landing, identified as *suckleyi* by Mr. Allan Brooks. This form is a straggler east of the Cascades.

YELLOW-HEADED BLACKBIRD (*Xanthocephalus xanthocephalus*). Usu-

ally a scarce summer resident, this bird was unusually plentiful this year (1914). On July 28, I saw a flock of about 60, nearly all were adult males.— J. A. MUNRO, *Okanagan Landing, B. C.*

Some Unusual Breeding Records from South Carolina.—WOOD DUCK (*Aix sponsa*). In view of the alarming decrease in numbers of this species in recent years, the following record is of particular interest. On June 23, 1912, in the Otranto Swamp near Charleston, S. C., I found a brood of seventeen well grown young. This, I believe, is an unusually large number, as all of the authorities which I have consulted on the subject give the full complement of eggs as ranging from eight to fifteen. In this case it is probable that even more than seventeen eggs were laid as it must be rare indeed for a full set of eggs to be hatched and the young brought to the age of two or three weeks without casualty of any kind.

It has been suggested that two sets of eggs may have been laid in the same nest.

WOODCOCK (*Philohela minor*). Although Woodcock are known to breed sparingly in the coast region of South Carolina, definite records of breeding are few. On February 22, 1913, a female was shot at Summer-ville, near Charleston, S. C., and was found to contain several eggs the largest of which would probably have been laid the next day.

LOGGERHEAD SHRIKE (*Lanius ludovicianus ludovicianus*). While the Loggerhead often begins nest building in February, it is seldom that eggs are laid before the end of March, and I have never before known a pair to be successful in incubating during the inclement weather that usually prevails in the early part of that month. However, on March 30, 1913, I saw a young Loggerhead which could not be distinguished from its parents in size, and could be recognized as a young bird only by its actions and because it was being fed regularly. We had ample opportunity to watch this performance for the parents were busy catching insects while the young bird followed them closely and by fluttering and squawking, insisted upon having his share. Allowing twelve days for incubation and at least as many for the then age of the youngster—both of which estimates are probably very low—the full set of eggs must have been complete by March 6, if not earlier.—FRANCIS M. WESTON, JR., *Charleston, S. C.*

Notes on Some Birds of the Maryland Alleghanies; An Anomaly in the Check-List.—After a lapse of twelve years, the writer was fortunate enough to be able to again spend a week in the highest part of the Maryland Alleghanies, namely at Accident in Garrett County. This is the westernmost county of Maryland and the hamlet in question is about ten to fifteen miles northeast of Deer Park and Mountain Lake Park, the well-known summer resorts on the Baltimore and Ohio Railroad. The natural features of this so-called glade region of the Alleghanies, its beauty and attractiveness to the naturalist and nature-lover, have been more fully described in Vol. XXI of 'The Auk,' in the article headed: 'Birds of Western Maryland.' Excepting the melancholy fact that saw-mill and

narrow gauge had laid low some extensive stands of primeval spruce and hemlock, the country was little changed, the same fine air, the same dearth of mosquitoes, so welcome to the tired vacationist, the same mountains, which are here low and easy to get over, since the whole country is high. Thus George's Hill is the second-highest point in Maryland, 3004 ft. above sea-level, yet it is only 500 to 800 ft. higher than the adjoining lower land. The mountains nearly all run in long parallel ridges from southwest to northeast, the usually low depressions between some of them, are the glades, formerly the home of innumerable flocks of Wild Turkeys and Ruffed Grouse, of deer, panthers, bears and catamounts. The best known of these long mountains near Accident are Negro and Meadow Mountains. On the former the writer spent many delightful though laborious hours or days on former and on the present visit.

Knowing full well the psychological and other reasons against the reliability of testimony of this kind, I would say that the Magnolia Warbler (*Dendroica magnolia*) has somewhat increased in numbers as compared to twelve years ago. On July 7, Mr. F. Burkhard, a keen nature lover and observer of Accident, and the writer saw and heard about fifteen to twenty males; no doubt some males were not singing at this time of the year, it being an extremely warm day besides. They were found in the stands of primeval spruce and hemlock, which fortunately the lumbermen have so far not been able to secure, as well as on the crest of the mountain, where chestnut is the prevailing tree, interspersed with here and there a few spruce and hemlock. In the same kind of places the Black-throated Blue Warbler (*D. c. carulescens* not *cairnsi*), and the Black-throated Green (*D. virens*) are found, both in about the same numbers as formerly; the former also descends into the rhododendron thickets of gullies lower down. The Carolina Junco (*Junco h. carolinensis*) is found in the open scraggy growth of chestnut along the flat and rocky crest of the mountain. Here the Pileated Woodpecker (*Phlebotomus p. abieticola*), the Scarlet Tanager and the Crested Flycatcher hold forth in undiminished numbers, also the Red-tailed Hawk and the Turkey Buzzard, while from the sides comes the bell-like chorus of Veery (*Hylocichla f. fuscescens*) and Wood Thrushes. One or two of the Turkey Buzzards seemed to follow us about for hours over the mountain; they probably had their young near by, as there is no lack of large hollow logs and cracks and crevices in the rocks, here and there piled up in huge masses, as if by titans. Canadian and Chestnut-sided Warblers (*Wilsonia canadensis* and *D. pennsylvanica*) are found in bushy places, grown up with second growth deciduous trees and shrubs, the former has a fondness for wet places in such areas, usually very thickly grown over. A surprise awaited us in a depression between Negro and Meadow Mountains, half way between Bittinger and Accident. There is some fine tall spruce and hemlock, so thick that no direct sunlight reaches the ground, which is covered with rhododendron, many northerly species of plants, and some upturned roots of spruce. I was just about to remark, "If this were in Canada, we should now hear a Winter Wren," — the moss-

covered ground and the flattish upturned roots involuntarily produced this thought — when suddenly, clear and loud, rang out the beautiful notes of the Winter Wren. For a moment I was in doubt whether I was really in Maryland or in Quebec, but if nothing else, the luxuriant growth of rhododendron quickly dispelled any illusion. I had formerly never heard that song here, or if I did, I did not know it, and therefore did not put down this wren as a permanent resident for western Maryland, which it now turns out to be. The Bobolink, by the way, was also recorded for the first time for this vicinity, in a pasture near the village.

Now, as to the anomaly in the A. O. U. Check-List regarding a species of bird of the tops of our eastern mountains. For obvious reasons I did not collect many birds on this last trip. But the few I took confirmed a suspicion I had in my mind since my residence in that part of the country. I took two male *D. caerulescens*. I expected to find some pronounced black on the back, to fit in with the description of *D. c. cairnsi*, which, according to the Check-List in the resident variety, geographical race or subspecies. They were adult males in high plumage, well colored. But they were not *cairnsi*, as is borne out by a comparison with skins from Canada and Illinois. That brings us into this dilemma: Either *D. c. cairnsi* is not the prevailing form here, as stated in the Check-List, and *D. c. caerulescens* comes down to not only Pennsylvania, as stated there, but to Maryland; or we have *cairnsi* and *caerulescens* together here, which militates against the underlying principle of geographic races and subspecies; or the difference between the two is slight and not constant. If the last explanation is correct, as I am inclined to believe, I should favor doing away with the race *cairnsi* entirely.— C. W. G. EFRIG, *River Forest, Ill.*

The Status of the Song Sparrow and the Chipping Sparrow as Early Birds.— Since writing my notes on the 'Morning Awakening' printed in 'The Auk' for April, 1913, I have been paying particular attention to the awakening of the Song and Chipping Sparrows as evidenced by their earliest morning songs. These later observations confirm my conviction that these two birds are much later risers than the Robin. In fact, I should now place the Song Sparrow 25 or 30 minutes after the Robin, instead of only 13 minutes as my earlier observations made it. This discrepancy I account for by the greater care exercised in these recent notes in eliminating from consideration all sporadic night songs and including only the songs that indicated a permanent morning awakening.

The new records are of six mornings in 1913 and five in 1914, all at my house in West Roxbury, Mass. One Song Sparrow sang regularly both seasons very near the house, and often another could be heard not far away, while one or two Chipping Sparrows were always equally in evidence, and no Robin sang near enough to drown the songs of the sparrows. Strange to say, my notes include no records whatever of very early singing on the part of the Chipping Sparrow, which leads me to suspect that the nocturnal singing for which that species is well known may be chiefly confined, in

some localities at least, to the earlier part of the night. (About 10 o'clock in the evening is, I think, a favorite time.) The Song Sparrow, however, does often indulge in song in the very early morning, before he gives evidence of having awakened for the day. The records of the eleven mornings are as follows:—

May 14, 1913. Sunrise 4.24. Song Sparrow sang once at 3.24, then was silent till 3.58, when it began to sing continuously. Robin began at 3.25. Chipping Sparrow sang at 3.40, then was silent till 3.47, when it began to sing continuously. (This preliminary song was an unusual occurrence in my experience.)

May 31, 1913. Sunrise at 4.10. Robin singing when I awoke at 3.15. Song Sparrow sang at 3.20 and again at 3.27, and began frequent singing at 3.29. Chipping Sparrow began at 3.35.

June 1, 1913. Sunrise at 4.10. Robin singing at 3.12, when I awoke. Song Sparrow sang at 3.19 and again at 3.22, and began frequent singing at 3.24. Chipping Sparrow began at 3.32.

June 19, 1913. Sunrise at 4.07. I awoke at 2.45. Song Sparrow sang once at 2.47; another Song Sparrow sang once at 3.07; first bird sang again at 3.20, then at 3.29; second bird began a song-period at 3.48. Robin began at 2.50 (unusually early). Chipping Sparrow began at 3.29.

July 12, 1913. Sunrise at 4.18. Robin singing at 3.15 (estimated), when I awoke. Song Sparrow sang once at 3.30. Chipping Sparrow began at 3.35.

July 18, 1913. Sunrise at 4.23. Awoke at 3. Robin began at 3.42. Song Sparrow sang once at 3.52 and began continuous singing at 3.58. Chipping Sparrow began at 3.56.

April 10, 1914. Sunrise at 5.12. Song Sparrow began at 4.38. Robin began calling at 4.42 and singing at 4.43. The Song Sparrow on this early spring day thus awoke 34 minutes and the Robin 30 minutes before sunrise. As compared with late spring and early summer singing, the Robin was late rather than the Song Sparrow early.

May 29, 1914. Sunrise at 4.11. Robin began at 3.17. Song Sparrow had sung once about 10 minutes earlier but did not sing again till after 3.45. Chipping Sparrow began at 3.33.

June 10, 1914. Sunrise at 4.06. Cloudy and cold. Robin calling at 3.23; began singing at 3.24. Chipping Sparrow began at 3.40. Song Sparrow's beginning later and not noted.

June 14, 1914. Sunrise at 4.06. Robin began at 3.12. Chipping Sparrow sang once at 3.20, again at 3.26, and began morning song at 3.28. Song Sparrow sang twice at 3.41; began in earnest at 3.46.

June 17, 1914. Sunrise at 4.06. Out at 2.45 and listening carefully in all directions about my house for the earliest bird-notes. Nothing heard till 3.13, when Robin began. Chipping Sparrow sang once at 3.20; began in earnest at 3.23. Song Sparrow began at 3.40; another at 3.41. Just before 4.30 the two Song Sparrows were among the more conspicuous singers to be heard. Their failure to begin singing earlier than 3.40 was evidently not due to any marked waning of the song-impulse.

Averaging the eight definite records of the Song Sparrow's complete awakening included in the foregoing notes, I make it $29\frac{3}{4}$ minutes (practically an even half-hour) before sunrise. The average of nine records of the earliest song heard from this species is 45 minutes before sunrise. On eight mornings one or more Song Sparrow songs preceded at varying intervals the full awakening, and on three of these occasions the early songs preceded the Robin, but the average of these earliest songs is about 9 minutes later than the Robin, while the average of what I regard as the actual awakening of the Song Sparrow is 15 minutes later still. The situation is complicated a little by the fact that my Robins and Chipping Sparrows seem to be later risers than the average of their respective species. The average of the six definite records I got here in these two years for the height of the season (excluding the April 10 record) is only $53\frac{3}{4}$ minutes before sunrise, nearly 10 minutes later than the average obtained from my former observations. My Chipping Sparrows, too, with an average of 36 minutes before sunrise for ten mornings, are some 10 minutes later than my former average. On the other hand, I find that my Crows wake unusually early for this species, the average of eight records made in 1912, 1913, and 1914 being 42 minutes before sunrise, while my previous average from various localities was 34 minutes before sunrise, precisely the same as Mr. H. W. Wright's latest Jefferson, N. H., average ('The Auk,' XXX, 529, October, 1913). This may be because my post of observation is near a nesting-ground of Crows, but, taken in connection with the lateness of my Robins and Chipping Sparrows, it suggests that local or individual variation may account for all such differences. In the case of the Song Sparrow, however, my new notes, made with the matter of nocturnal singing definitely in mind, show a much greater difference, and though local or individual variation may play some part in it, I am moderately certain that it is chiefly to be accounted for by the more careful exclusion of night songs.

These observations strengthen my conviction that the Robin's well-established reputation as an early bird cannot be successfully assailed by either of the two sparrows in question. As to the four other birds which Mr. Wright in his paper of October, 1913, ranks ahead of the Robin, it may be pertinent to call attention to the fact that three of them — the Wood Pewee, Oven-bird, and White-throated Sparrow — are known to be addicted to this same habit of nocturnal singing. Mr. Wright gives good evidence that, on some occasions at least, the Wood Pewee deserves the high rank he gives it, but as to the Oven-bird and the White-throated Sparrow the evidence is not quite so clear. The flight-song of the Oven-bird, is, so far as my experience goes, peculiarly an afternoon and evening performance. I have heard it before noon, but only on rare occasions, and if I heard it in the very early morning I should instinctively regard it as left over from the evening before rather than belonging to the coming day. The White-throated Sparrow has been called the "Nightingale of the North." The last time I heard its morning awakening on its breeding-ground was on August 8, 1913, on Sunapee Mountain, N. H. It then sang

several times during the night, but its actual awakening followed that of the Hermit Thrush, which began singing at 4.02. The times noted were 4.08, 4.13, and 4.15, when frequent singing began.

I hope that more notes on the morning awakening may be made in many localities. Only thus can we get the data for accurate generalizations. And due allowance for the night-singing habit must be made in all such observations.—FRANCIS H. ALLEN, *West Roxbury, Mass.*

RECENT LITERATURE.

Cooke's 'Distribution and Migration of North American Rails.'¹

— In this important report Prof. Cooke presents a concise account of the geographic distribution and migration of the rails following the same plan adopted in his previous reports on the shore-birds, herons, etc. The bibliography of North American ornithology is becoming so enormous that it is practically impossible for the individual to compile with any degree of completeness such data as are here presented. The formation of such a card index as has been prepared by Prof. Cooke, from which reports like the present may be readily compiled, constitutes one of the most important pieces of work, from the standpoint of the ornithologist, that the U. S. Biological Survey has undertaken.

Maps showing graphically the summer and winter distribution of each species add greatly to the value of the report. The summary shows that 44 forms of rails and their allies occur north of Panama. Of these 21 are restricted to the West Indies and Middle America and two are stragglers from Europe leaving 21 forms occurring regularly in the United States.

The wanton slaughter of Soras and Clapper Rails by so called sportsmen has sadly reduced the number of these birds and the killing of 3000 of the former species on a 500 acre marsh on the James River, Va., in a single day, or of 10,000 Clapper Rails at Atlantic City, N. J., in a day, are incidents only too well known to those who were familiar with the practices of a few years ago.— W. S.

Wetmore on the Growth of the Tail Feathers of the Giant Hornbill.²

— In this bird, as is well known, the middle pair of rectrices greatly exceed the others in length. The fact that the examination of a considerable series failed to show any in which more than one of the pair was fully

¹ Distribution and Migration of North American Rails and their Allies. By Wells W. Cooke. Bull. U. S. Dept. Agriculture, No. 128. Sept. 25, 1914.

² A Peculiarity in the Growth of the Tail Feathers of the Giant Hornbill (*Rhinoplax vigil*). Proc. U. S. Nat. Mus., Vol. 47, pp. 497-500. October 24, 1914.

developed led Mr. Wetmore to a careful study of the available specimens which demonstrated beyond question that this is the normal condition in the species. One of these long feathers develops and is retained for more than a year, probably for two. The other one does not appear until the first has attained its full growth. Upon the molt of the first feather the other takes its place, so that there is always one long feather — the right and left alternately — while the other one is always very much shorter and only partly developed.— W. S.

Chapman on New Colombian Birds.¹— In the present paper Dr. Chapman describes twenty-six additional new forms from the rich collections obtained by the several expeditions sent out, under his direction, by the American Museum of Natural History. The problems of distribution presented by a study of these collections demand for their solution additional material from Antioquia and eastern Panama and to secure this the Museum has sent out two additional collecting parties under Messrs. L. E. Miller and W. B. Richardson.

Dr. Chapman is sparing no pains to make his study of the Colombian avifauna thorough in all its details and the further his work progresses the more anxiously do we await the final report upon the subject.

The present contribution even though admittedly preliminary, is a welcome relief from the wretched descriptions of two or three lines with which our literature is becoming overburdened. Not only are the diagnoses here presented full and adequate, with appropriate discussion, but in many instances brief contrasted descriptions of all the known forms of a group are given with their respective geographic ranges.— W. S.

Shufeldt on the Young of *Phalacrocorax atriceps georgianus*.²— This paper consists of a detailed account of a young cormorant twenty-four hours out of the egg. While no generalizations are suggested the condition of the various organs is minutely described as well as the progress of ossification in various parts of the skeleton, making a permanent record of facts that may be used in future comparative study.— W. S.

'Alaskan Bird-Life.'³— Through the generosity of one of its members the National Association of Audubon Societies has been enabled to carry its

¹ Diagnoses of apparently new Colombian Birds. III. By Frank M. Chapman. Bull. Amer. Mus. Nat. Hist., XXXIII, Art. XL, pp. 603-637. November 21, 1914.

² Anatomical Notes on the Young of *Phalacrocorax Atriceps Georgianus*. By R. W. Shufeldt, M. D., extracted from a Report on the South Georgia Expedition. Sci. Bull. Mus. Brooklyn Inst. Arts and Sci., Vol. 2, No. 4, pp. 41-102. November 5, 1914.

³ *Alaskan Bird-Life as Depicted by Many Writers*. Edited by Ernest Ingersoll. Seven Plates in Colors and other Illustrations. Published by the National Association of Audubon Societies. New York, 1914.

educational work into the far off settlements of Alaska. The medium is an attractive booklet, containing well prepared accounts of the bird-life of the various portions of the territory compiled from the publications of Dall, Nelson, Grinnell, Osgood, Bishop, Bent, and other explorers of the extreme northwest; the 'Arctic Coastal District' being written by Mr. Nelson himself. The illustrations consist of half-tones, and colored plates from the series of 'Educational Leaflets' published by the Association, each being accompanied by its respective text.

This little volume is to be freely distributed among the people of Alaska, in the effort "to cultivate a better appreciation of the value to mankind of our wild birds and animals."

The book is admirably adapted to its purpose and should go far toward preserving an interesting and valuable fauna.—W. S.

Mrs. Bailey's 'Handbook of Birds of the Western United States.'
— **Fourth Edition.**¹—The excellence of Mrs. Bailey's well known 'Handbook' as well as the increased interest in ornithology through our western states are attested by the issue of a fourth revised edition of the work. While the main text is the same, important additional matter is contained in the 'Addenda.' The changes made in the nomenclature of the American Ornithologists' Union Check-List are summarized, and lists of species to be added and eliminated are given, as well as a complete list of the birds of the western United States with their ranges, as they appear in the third edition of the Check-List. There is also an additional list of 'Books of Reference' bringing the bibliography up to date. All of these improvements tend to make this authoritative work still more indispensable to the student of western bird life.—W. S.

McIlhenny's 'The Wild Turkey and Its Hunting.'²—This work consists of two parts. Chapters III and IV treating respectively of 'The Turkey Prehistoric' and 'The Turkey Historic' are by Dr. R. W. Shufeldt; while the remainder, dealing with the hunting of this famous game bird and its actions in its native haunts, is compiled by Mr. McIlhenny, largely from the manuscripts of the late Charles L. Jordan, a life long turkey-hunter and manager of the Morris game preserve at Hammond, La. In his introduction Mr. McIlhenny says, "After Mr. Jordan's death . . . I secured his notes, manuscript, and photographic plates of the wild turkey,

¹ Handbook of Birds of the Western United States. Including the Great Plains, Great Basin, Pacific Slope, and Lower Rio Grande Valley. By Florence Merriam Bailey. With thirty-three full-page plates by Louis Agassiz Fuertes, and over six hundred cuts in the text. Fourth Edition, Revised. Boston and New York. Houghton, Mifflin Company. Riverside Press, Cambridge. 1914. 12mo, pp. i-li+1-570. \$3.50 net, postpaid \$3.69.

² The Wild Turkey and Its Hunting. By Edward A. McIlhenny. Illustrated from photographs. 12mo, pp. i-viii+1-245, 20 plates. Doubleday, Page & Co., Garden City, New York. \$2.50 net.

and with these, and my knowledge of the bird, I have attempted to compile a work I think he would have approved. . . . I have carried out the story of the wild turkey as if told by Mr. Jordan, as his full notes on the bird enable me to do this."

Mr. Jordan had long been contemplating the publication of a book on the turkey and Mr. McIlhenny's aim has been to carry out his intentions. In this he seems to have been eminently successful and the habits, habitats, and calls of the bird are fully described while methods of hunting and calling the turkey as well as of cooking it, are treated in a manner calculated to interest the sportsman.

Dr. Shufeldt's account of the fossil turkeys is largely reprinted from his recent paper in 'The Auk,' while in his historical account the several races and their ranges are differentiated, and the anatomy and the eggs of the species, the early historic records, and the relation of the wild and domestic forms are discussed.

Much of the contents of the book appeared serially in 'Out Door World and Recreation.' — W. S.

Mathews' 'Birds of Australia.'¹ — The fourth volume of Mr. Mathews' work begins with the Anseriformes and the author presents a general review of the classification of these birds and the probable relationship and origin of the various Australian genera. His studies lead him to the recognition "that the hypothesis that the Australian Fauna considered as a whole reached the continent from the north has been rejected by nearly every recent worker in other branches" while he thinks "that all the available evidence points to *Antarctica* as a stepping stone" between South America, New Zealand and Australia. This however, is not necessarily his final view as he promises further consideration of the question, later.

The systematic treatment of the species follows the plan of the other volumes and both text and plates maintain their high standard. No new names appear in this installment.— W. S.

Kuroda's Recent Ornithological Publications.² — Mr. Nagamichi Kuroda has published a number of contributions to ornithology during the past few years. Most of these refer to the birds of Japan but two handsomely printed brochures on the *Anatidæ* cover the species of the world.

¹ The Birds of Australia. By Gregory M. Mathews. Vol. IV, Part I, With-
erby & Co., 326 High Holborn, W. C. October 6, 1914. pp. 1-80, pl. 200-209.

² Ducks of the World. By N. Kuroda. The Ornithological Society of Japan.
1912. pp. 1-64 + 1-2, 6 plates.

Geese and Swans of the World. By N. Kuroda. The Ornithological Society
of Japan, 1913. pp. 1-118 + 1-2, 9 plates.

A Hand List of the Birds of Haneda and Tsurumi near Yokohama. [By N.
Kuroda]. August, 1913. pp. 1-11.

Nests and Eggs of Japanese Birds. Including Formosa, Saghalin and Corea.
By Nagamichi Kuroda. April 10, 1914. pp. 1-31.

These are illustrated by half-tone plates, some of them in colors. While the technical names are in Latin and some of the data in English, the main portion of the text is in Japanese which renders the publications difficult to consult. The general typography and make-up leave little to be desired.— W. S.

The Annual Report of the National Association of Audubon Societies.¹— When one looks over the bulky report of the Association for the year 1914 and reads of receipts and expenditures totalling \$90,000, and then harks back some eighteen years, when two State societies and some scattered individuals were struggling along, with scarcely any receipts but unlimited opportunities for expenditures, it seems hard to realize the tremendous breadth and power of the organization that has developed from the hard work of these few pioneers.

We cannot do justice to the report in the short space of a review and recommend that all of our readers study it in detail. We shall merely call attention to some of the more salient features. Among publications distributed during the year, are 2,358,000 educational leaflets, 2,078,000 colored bird pictures and 1,619,000, outline drawings for coloring.

On the protected gull colonies of Maine it is estimated that there were in 1914, 59,420 adult Herring Gulls and in the Laughing Gull colonies in the south 118,400 individuals, besides other species in proportionate numbers.

The Junior Audubon Societies have a total enrollment to date of 115,039 members and subscriptions for the continuance of this work during the year have been made — \$5000 by Mrs. Russell Sage for the south and \$20,000 by an unnamed patron for work in the northern schools.

A new department of "Applied Ornithology," has been started with Mr. Herbert K. Job in charge, with the object of instructing the public in practical methods of attracting birds and in raising wild game birds.

Trained field agents of the Association — Messrs. Arthur H. Norton, Winthrop Packard, Katharine H. Stuart, Eugene Swope, and William L. Finley present reports of great interest and the reports of secretaries of twenty-five State societies close this most encouraging record of bird protection.— W. S.

Recent Literature on Bird Protection.— Three publications of the U. S. Department of Agriculture deserve notice in this connection. 'Bird Houses and How to Build Them'² by Ned Dearborn is a welcome pamphlet giving just the information that hundreds of people are asking for in connection with their efforts to attract birds to their grounds. The usual publication 'Game Laws for 1914'³ contains a convenient summary of game legislation throughout the United States and Canada, revised to date. A third Government publication is the 'Report of the Gover-

¹ Tenth Annual Report of the National Association of Audubon Societies, Inc. Bird-Lore, Nov.-Dec., 1914, pp. 481-565.

² Farmers' Bulletin, No. 609, published September 11, 1914.

³ Farmers' Bulletin, No. 628, published October 20, 1914.

nor of Alaska on the Alaskan Game Law,' with an appendix giving all information relative to hunting and collecting in the territory.

'California Fish and Game,' a new publication of the State Fish and Game Commission,¹ contains many timely articles including one by Joseph Grinnell on 'Bird Life as a Community Asset' which is well worth careful perusal. The 'Hingham Journal' for October 2, 1914, states editorially that thanks to the efforts of Mr. Alexander Pope an extensive bird sanctuary has been established in Hingham, Mass.

Mr. W. L. Finley's 'Oregon Sportsman' and the 'Bulletins' of the District of Columbia and New Jersey Audubon Societies continue to keep the public interested in matters of bird and game preservation in their respective communities.

'Bird Notes and News,' the British quarterly, is full of information on the plume trade and bird protection abroad. The autumn number conveys the unwelcome information of the failure of the plumage prohibition bill to come to a final vote in Parliament on account of the war. The passage of the bill was assured but the policy of delay so successfully carried out by its opponents, which under ordinary circumstances would have had no ultimate effect, has under the extraordinary conditions now prevailing, caused its adoption to be postponed until another session.—W. S.

Studies in Egg Production in the Domestic Fowl.—The Staff of the Maine Agricultural Experiment Station have continued their investigations on this important problem and some of their recent publications contain data of considerable interest to students of inheritance as well as to ornithologists and such oölogists as concern themselves with anything beyond the external shell of the egg. In a paper by Drs. Raymond Pearl and Frank M. Surface² it is ascertained that eggs are relatively more variable in length than in breadth and considerably more in shape than in either of the linear dimensions while in weight and volume they vary more than in any of the other characters.

The whole process of egg laying is analyzed and many interesting data are presented.

A paper on somewhat similar lines by Maynie R. Curtis³ discusses the variation among eggs of the same bird and in eggs laid in consecutive months, and the individuality of eggs of the same bird.

Dr. Pearl also discusses 'Improving Egg Production by Breeding'⁴ and 'The Brooding Instinct in its Relation to Egg Production.'⁵—W. S.

¹ Edited by H. C. Bryant, Museum Vert. Zool., Univ. of Cal., Berkeley, Cal.

² Variation and Correlation in the Physical Characters of the Egg. U. S. Dept. of Agriculture, Bureau of Animal Industry, Bull. 110, pt. III. July 31, 1914.

³ Factors Influencing the Size, Shape and Physical Constitution of the Egg of the Domestic Fowl. (Reprinted from Ann. Report, Maine Agr. Exper. Sta., 1914.)

⁴ Reprinted from Ann. Report, Maine Agr. Exper. Sta., 1914.

⁵ Reprinted from Journal Animal Behavior, July-Aug., 1914.

Birds as Carriers of the Chestnut-Blight Fungus.¹— Birds have been charged with distributing various plant diseases, but their relation to chestnut blight is the only case of this nature that has been scientifically investigated. The writers of the article here cited examined 36 birds belonging to 9 different species which were collected among diseased chestnuts in Pennsylvania. Using a most careful and thorough technique, they found that of the 36 birds tested 19 were "carrying spores of the chestnut-blight fungus. The highest positive results were obtained from two Downy Woodpeckers, which were found to be carrying 757,074 and 624,341 viable spores of *Endothia parasitica*. The next highest was a Brown Creeper with 254,019 spores." (p. 412). The other birds upon which spores were found were the Golden-crowned Kinglet, Junco, White-breasted Nuthatch, and Sapsucker. Three species, the Black and White Creeper, Flicker, and Hairy Woodpecker gave negative results. It was found also that the birds carried spores of a large number of fungi other than that producing chestnut-blight.

The authors conclude that "birds in general are important carriers of fungous spores," and that in particular "birds which climb or creep over the bark of chestnut trees are important agents in carrying viable pycnospores of the chestnut-blight fungus, especially after a period of considerable rainfall."

"Birds are probably not very important agents in spreading the chestnut blight locally, on account of the predominance of other and more important factors of dissemination, as, for example, the wind."

"The writers believe, however, that many of the so-called 'spot infections' (local centers of infection isolated from the area of general infection) have had their origin from pycnospores carried by migratory birds. Some of the birds tested were not permanent residents of eastern Pennsylvania, but were shot during their migration northward. These, no doubt, carry spores great distances. Each time the bird climbs or creeps over the trunk or limbs of a tree some of the spores may be brushed off and may lodge in crevices or on the rough bark. From this position they may be washed down into wounds by the rain and may thus cause infections." (p. 421).

The findings of this paper are based upon unimpeachable evidence and the conclusions must be accepted at face value. Nevertheless, the part birds play in the general spread of this disease is so small that it will never be seriously urged as a reason for diminishing bird protection.— W. L. M.

Reichenow's "Die Vögel."² The second volume of this important work was distributed on October 24. It follows the plan of volume one,

¹ Heald, F. D., and Studhalter, R. A., Journ. Agr. Research, II, No. 6, Sept. 1914, pp. 405-422, Pl. XXXVII, 2 figs.

² Die Vögel. Handbuch der Systematischen Ornithologie von Anton Reichenow Zwei Bände. Zweiter Band. Mit 273 text bildern gezeichnet von G. Krause. Verlag von Ferdinand Euhe. Stuttgart, 1914. Svo. pp. 1-628. Price, M. 18.40.

citing nearly all of the important genera and a fairly representative list of species under each, although some of the most common North American species, such as the Downy Woodpecker, are omitted. The text illustrations are numerous, well chosen, and admirable both in execution and in reproduction.

With the completed work before us Dr. Reichenow's classification can be better understood than from the outline given in Vol. I.

He divides the birds primarily into I, Ratitæ; II, Natatores; III, Grallatores; IV, Cutinares; V, Fibulatores; and VI, Arboricolæ. The limits of the first three groups are easily understood. The others can be best appreciated in tabular form as follows:

4. Reihe: Cutinares
 Ord. Deserticolæ (*Turnicidæ*, *Thinocoridæ* and *Pteroclidæ*)
 Crypturi (Tinamous)
 Rassores (Gallinaceous birds)
 Gyrantes (Doves)
 Raptores (Vultures, Hawks and Owls)
5. Reihe: Fibulatores
 Ord. Psittaci (Parrots)
 Scansores (Woodpeckers, Toucans, etc., and also Trogons and Cuckoos)
6. Reihe: Arboricolæ
 Ord. Insessores (Hornbills, Kingfishers, Hoopoes, Rollers, Motmots, Bee-eaters, etc.)
 Strisores (Nightjars, Swifts and Hummingbirds)
 Clamatores (in the usual sense)
 Oscines (including the Lyre-bird and the true song-birds)

Such a classification takes us back a good many years, to the time when characters of bill and feet were the basis of our systems. It was this fact and the ignoring of various generally recognized relationships that caused us to refer to the classification as conservative in reviewing Volume I. It was perhaps unfair, however, to make this remark without setting forth the underlying principles of Dr. Reichenow's system which we preferred not to discuss until the whole work was before us.

Briefly his views, as we understand them, are, that in order to become acquainted with the great multitude of bird species it is necessary to arrange them in a system wherein each one finds its place through a successive subdivision of groups from orders down to species. Further that such a system for general, practical use had better be based upon more or less obvious external characters, than upon deep seated phylogenetic characters which are not recognizable without dissection and minute study. He does not belittle the importance of the latter but does not regard them as practical for a "logical system." Indeed he states definitely that "System and Genealogy have absolutely different ends in view and must advance side by side."

While these premises make criticism of the "system" to a great extent impossible we nevertheless cannot agree with the principle. Such a stand is absolutely opposed to the modern views of classification, and we fail to see why we are better off in grouping together two species which are superficially alike when we know that they have sprung from very different stocks, and have converged through the action of similar necessities of life or environment. Even the popular student would, we think, prefer to know that a system reflected the actual phylogenetic relationship of the groups, even though he were unable to see similarities in a cursory examination of the species.

No linear arrangement such as is necessitated in a book can be truly accurate phylogenetically or "systematically" but we see no need for two arrangements and consider that the best "system" is a phylogenetic one.

Apart from the nature of the "System" the uniting of a number of families into several composite groups it seems to us serves no purpose, especially when the larger groups are put in different primary divisions; as the "Scansores" and "Insesores," of Dr. Reichenow's system. The reduction in the number of families is on the same line and we can see no advantage in uniting the *Phytotomidae* and *Cotingidae*; the *Tyrannidae*, *Pipridae* and *Oxyrhynchidae*; or in the grand amalgamation of *Timaliidae*, Wrens, Mockers, Thrushes and Old World Warblers under the family name of *Sylviidae*!

More misleading still is the disposition of some of the genera. The removal of *Vireosylva* from the *Virconidae* to the *Mniotiltidae* is certainly not due to any obvious external characters. And the appearance in the latter family of the genera *Rhodinocichla*, *Phænicophilus*, and *Tachyphonus* is hardly less unfortunate, especially in the case of *Rhodinocichla* which Dr. Hubert Lyman Clarke has shown pretty conclusively to be Tanagra in its affinities. (Auk, 1913, p. 11.)

While, as said before, we can see no reason for a system such as Dr. Reichenow advocates, nevertheless if we adopt such a system, it would, it seems to us, have been more consistent to have carried it further and placed the swallows in the same group with the swifts, and to have recognized several other obvious cases of external resemblance.

However, no matter what system is adopted 'Die Vögel' fills a long-felt want in presenting the more important genera and species in a concise manner under each family as well as furnishing in a convenient form a vast amount of valuable information. It will thus take its place among the standard works of reference on the birds of the world — a broad field truly, but one which Dr. Reichenow is eminently fitted to cover.— W. S.

Second Report on the Food of Birds of Scotland.— In 1912 Miss Laura Florence published analyses of the contents of 616 stomachs of Scottish birds. Now a report¹ has appeared upon the continuation of that work. It includes analyses of 1390 stomachs representing 81 species.

¹ Trans. Highland and Agr. Soc. Scotland. Fifth Series, Vol. XXVI, 1914, pp. 1-74.

Some of the species most numerously represented are Starling, 107 stomachs, Rook, 288, and Black-headed Gull, 137. The results are given in numerical form and the identification of items is in most cases very definite. Summaries for the various species note the number of stomachs containing items of various economic groups.

The preface explains why no percentage system is used in the following passage quoted from Mr. C. F. Archbald: "it would be unwise to attempt to show the proportion in which the components of their food are consumed because individuals of the same species vary much according to opportunity and their own particular fancy. For this reason it would require records extending over several years, and including observations on an enormous number of birds from different localities, to enable us to draw any definite conclusions as to the proportionate amount of good and harm with which each species should be credited."

This is the theoretical opinion of one who has not given percentage methods a thorough trial. As a matter of fact even a moderate number of stomachs will give results as to proportions of principal items of food that will not materially be changed by doubling or trebling the number of stomachs. Moreover every economic investigation should aim at ultimate completeness, and it is just as well to do the earlier work in the style that must eventually be adopted for handling a large mass of data.

Among the general conclusions are the following: the Starling and the Rook are too numerous; the Herring Gull is spending more time inland and feeds extensively on grain; it and the Common Gull (*Larus canus*) should be left unprotected until their numbers have greatly decreased; the Black-headed Gull is beneficial.— W. L. M.

Feilden on Birds of Trinidad and Tobago.¹—This paper contains notes on 35 species; about 300 are known from these islands. Notes on the food of several species are included, though few of them are very definite. The most interesting annotation refers to the Oil-bird (*Steatornis caripensis*). It is as follows: "The food consists of fruit and berries. It is the only fruit-eating night bird. It feeds on the wing, picking off the fruit as it passes the tree. The stones of the fruit are subsequently ejected from the mouth. A species of palm *Thrinax argentea* growing in the Botanic gardens was visited nightly by these birds to the number of three or four as long as the tree remained in fruit. As the only known colonies of these birds are on the north coast of the island, it is probable that they made the long journey nightly in order to secure food. The Guacharo. . . is of economic value, the young becoming very fat when about a fortnight old. They are then collected and the fat melted down into a colorless oil which is used for purposes of cooking and illumination" (pp. 31-32). With all the modern methods of producing light, it would seem the Oil-bird might be excused from serving as a substitute.— W. L. M.

¹ Feilden, G. St. Clair, Notes on some birds of Trinidad and Tobago. Bull. Dept. Agr. Trinidad and Tobago, Vol. xiii, Jan. 1914, pp. 25-33.

The Ornithological Journals.

Bird-Lore.¹ Vol. XVI, No. 5. September-October, 1914.

Some Observations on Bird Protection in Germany. By William P. Wharton.—A visit to the estate of Baron von Berlepsch, describing the use of nesting boxes, etc., and the pruning of shrubs so as to produce crotches suitable for nest building.

An Island Home of the American Merganser. By Francis Harper.

Impressions of the Voices of Tropical Birds. V. By Louis Agassiz Fuertes.—Toucans, Cuckoos, Trogons, Motmots, etc., described and figured.

Migration of North American Sparrows includes Worthen's and the Texas Sparrows and the Green-tailed Towhee.

The 'Notes' and Audubon Department are particularly full and instructive. The educational leaflet by H. K. Job describes the Pintail.

Bird-Lore. Vol. XVI, No. 6. November-December, 1914.

Bird Life in Southern Illinois. By Robert Ridgway.—The first of a series of three articles describing his properties and the methods that have been taken to increase wild bird life thereon.

Impressions of the Voices of Tropical Birds. By Louis Agassiz Fuertes.—The concluding installment covering, the Parrots, Guans, Pigeons, etc.

On the Trail of the Evening Grosbeak. By Arthur A. Allen. Studies of the birds at Ithaca, N. Y. February-May, 1914, with a series of remarkably successful photographs.

The Juncos form the subject of the North American Sparrow installment and the educational leaflet treats of the Crow.

The Annual Report of the National Audubon Society (noticed on p. 117) occupies nearly half of this bulky number.

The Condor.² Vol. XVI, No. 5. September-October, 1914.

The Nesting of the Spotted Owl. By Donald R. Dickey.—*Strix occidentalis occidentalis* in Ventura, Cal. Excellent illustrations.

Henry W. Marsden. By Louis B. Bishop.—An appreciative obituary.

Notes on a Colony of Tri-colored Redwings. By Joseph Mailliard.

Bird Notes from the Sierra Madre Mountains, southern California. By H. A. Edwards.

A Study of the Status of Certain Island Forms of the Genus *Salpinctes*. By H. S. Swarth.—The treatment of the A. O. U. Check-List endorsed in preference to that of Ridgway. *S. guadeloupensis proximus* from San Martin Island, L. Cal., is described as new (p. 215).

¹ Organ of the Audubon Societies. Edited by F. M. Chapman. Published by D. Appleton & Co., Harrisburg, Pa. (Bimonthly) \$1 per year.

² Edited for the Cooper Ornithological Club by Joseph Grinnell. Published at The Condor office, First Nat. Bank Building, Hollywood, Cal. (Bimonthly) \$1.50 per year.

A Survey of the Breeding Grounds of Ducks in California in 1914. By H. C. Bryant.—A valuable summary of careful field investigations undertaken in the interest of game conservation. The evidence shows conclusively that the breeding ducks of the State are decreasing owing to the reclamation of marsh lands and excessive shooting.

A Method of Cleaning Skulls and Disarticulated Skeletons. By F. H. Holden.—A valuable taxidermical contribution.

The Wilson Bulletin.¹ Vol. XXVI, No. 3. September, 1914.

The Prothonotary Warbler at Lake Okoboji, Iowa. By T. C. Stephens.
Habits of the Old-Squaw (*Harelda hyemalis*) in Jackson Park, Chicago.
By Edwin D. Hull.

The Kentucky Warbler in Columbiana County [Ohio]. By H. W. Wersgerber.

Spring Migration (1914) at Houston, Texas. By George Finlay Simmons.

The Pine Siskin Breeding in Iowa. By W. J. Hayward and T. C. Stephens.

The Oölogist.² Vol. XXXII, No. 9. September 15, 1914.

Fall Migration of the Olive-backed Thrush, 1912. By Paul G. Hawes.—While Prof. W. W. Cooke has shown in his various papers that observations at one locality only, throw but little light upon the direction of migration as a whole, and that temperature has but little to do with the problem, nevertheless Mr. Hawes will find that his theory corresponds with the migration route of the Olive-backed Thrush as worked out carefully by Prof. Cooke from abundant data some ten years ago (see Auk, 1905, p. 1). One may be pardoned for wondering how the birds mentioned by Mr. Hawes as flying 150–200 feet overhead without stopping could be positively identified specifically.

The Oölogist. Vol. XXXII, No. 11. November 15, 1914.

A List of Birds Observed in the Big Hole Basin, Montana. By E. R. Forrest.

Blue-Bird.³ Vol. VII, No. 1. October, 1914.

The White Ibis. By O. E. Baynard. Excellent illustrations.

Blue-Bird. Vol. VII, No. 2. November, 1914.

Bird Friends in a City Back Yard. By L. S. Loveland, Lincoln, Nebraska.
The Black Vulture. By O. E. Baynard.—In Florida.

The Ibis.⁴ X Series. Vol. II, No. 4. October, 1914.

On *Herodias eulophotes* Swinhoe. By Tom Iredale.

¹ Edited for the Wilson Ornithological Club by Lynds Jones, Oberlin, Ohio. (Quarterly) \$1 per year.

² Edited and published by R. M. Barnes, Lacon, Ill. (Monthly) \$1. per year.

³ A Monthly devoted to Junior Audubon Classes and Nature Study Work Edited by Eugene Swope, 4 W. 7th St., Cincinnati, Ohio. 50 cts. per year.

⁴ Edited for the British Ornithologists' Union by W. L. Sclater. Published by Wm. Wesley and Son, 28 Essex St., Strand, London, W. C. (Quarterly) £ 1. 12s. per year.

Some Remarks on the Subspecies of Crested Larks (*Galerida cristata*) found in Egypt. By M. J. Nicoll.

With the Tropic-birds in Bermuda. By Karl Plath.—Some excellent illustrations and a popular account of this much studied bird.

The Spring Migration at Chinwangtao in North-east Chihli. By J. D. La Touche.—A continuation of the author's studies of bird migration in Northern China published in Bull. B. O. C., XXIX, pp. 124-160.

A Note on the Breeding of the White-rumped Swift (*Micropus pacificus*). By H. L. Cochrane.

Notes on Birds observed in the South Pacific Ocean during a voyage from Sydney to Valparaiso. By C. F. Belcher.

The Birds of Prince's Island. By D. A. Bannerman.—This is the first of five papers covering collections made by the late Boyd Alexander during his last expedition to Africa.

The Gannetry at "The Stack," Orkney Islands. By J. H. Gurney.

Bulletin of the British Ornithologists' Club.¹ No. CC. November 4, 1914.

The following are described as new. By Hon. Walter Rothschild: *Casuarinus papuanus goodfellowi* (p. 7), Jobi Island. By Messrs. Rothschild and Hartert: *Accipiter (Astur) eudiabolu*s (p. 8), Babooni, British New Guinea. By Mr. Ogilvie-Grant from Utakwa River, Snow Mts., Dutch New Guinea; *Oreopsittacus arfaki major* (p. 11); *Neopsittacus muschenbrocki alpinus* (12), and *Psittacella modesta collaris* (p. 13). Also by Mr. Grant; *Alcyone richardsi bougainvillei* (p. 13) and *A. r. aolae* (p. 13) from Bougainville and Guadalcanar, Solomon Isls.

Dr. Hartert describes *Egretta dimorpha* (p. 14), Madagascar; and *Nycticorax cyanocephalus falklandicus* (p. 15), Falkland Islands.

Mr. E. C. Stuart Baker proposes *Trichalopteryx erythrolaema woodi* (p. 17), Loi Sing, N. Shan States; *Ixulus flavicollis baileyi* (p. 17), Mishmi Hills; *Ithagenes tibetanus* (p. 18), Sela Range above Tavanz and *Tragopan blythi molesworthi* (p. 18), Dangan La, Tibet.

Mr. Claude Grant describes *Pterocles quadricinctus lowei* (p. 19), Renk, White Nile; *Streptopelia senegalensis sokotrae* (p. 19), Hadebu Plain, N. Sokotra and *Poicephalus meyeri naevei* (p. 19), Kahili Valley, Belgian Congo.

Lord Brabourne and Mr. Chubb describe *Buarremon matucanensis*, (p. 20), Matucana, Peru; and *Upucerthia juninensis* (p. 20), Junin, Peru.

British Birds.² Vol. VIII, No. 4. September 1, 1914.

A Report on the Land Rail Inquiry. By H. G. Alexander.

Rüppell's Warbler in Sussex. A New British Bird. By H. W. Ford-Lindsay.

British Birds. Vol. VIII, No. 5. October 1, 1914.

¹ Edited by D. A. Bannerman. Published by Witherby & Co., 326 High Holborn, London, W. C. 6s. per year (nine monthly numbers).

² Edited by H. F. Witherby, 326 High Holborn, London, S. W. (Monthly), 10s., 6d. per year.

Increase and Decrease in Summer Residents. By M. Vaughan.

British Birds. Vol. VIII, No. 6. November 2, 1914.

Cormorants in Norfolk. By Miss E. L. Turner.—Illustrated.

Avicultural Magazine.¹ Vol. V, No. 11. September, 1914.

Notes from the Zoological Gardens [London]. By D. Seth-Smith.

Glimpses of South American Ornithology. By Lord Brabourne.—Notes on the character of bird-life in various parts of the continent collected during a residence of six years.

Avicultural Magazine. Vol. V, No. 12. October, 1914.

The Rufous-necked Laughing Thrush (*Dryonastes ruficollis*). By D. Seth Smith.—With good color plate.

Some Canadian Birds. By H. B. Rathborne.—This paper describes the writer's bird observations on a trip through the United States and Canada. Despite the title nearly half of it treats of "Fairview" [= Fairmount] Park, Philadelphia, where the author discovered "a spring in a dell surrounded by brambles" where he was able to observe the habits of Swainson's Warbler, a bird by the way unknown north of the cane brakes of our southern states! It is remarkable how some of our British visitors ignore the A. O. U. Check-List and a full century of American ornithological literature when they come to write up their trips!

Avicultural Magazine. Vol. VI, No. 1. November, 1914.

Bird Keeping in China. By Alex. Hampe.

The Emu.² Vol. XIV, Part 2, October, 1914.

Rarer Birds of the Mallee. By F. E. Howe and T. H. Tregellas.—With photographs of nests including one of the feather-decked nests of the Honey-eater (*Glyciphila albifrons*).

Bird Life in the National Park, N. S. W. By E. B. Nicholls.—Account and photograph of a Cockatoo reputed to be 117 years old.

The Emu of King Island. By L. Brazil (translation).

The South Australian Ornithologist.³ Vol. I, Part 4. October, 1914.

Life of Samuel White (continued). By S. A. White.

The Birds of Kallioota. By A. M. Morgan.

Reappearance in South Australia of the Swift Lorikeet. By E. Ashby.

A Long-Lost Bird. By S. A. White.—Rediscovery of *Aphelocephala pectoralis*.

Description of Some Interesting Birds from the Northern Territory. By Edwin Ashby.—*Karua leucomela mayi*, and *Dulciornis alisteri mayi*, (p. 27), subspp. nov. from Union Bore, near Pine Creek, Northern Territory.

¹ Edited by Hubert D. Astley for the Avicultural Society. Published by West, Newman & Co., 54 Hatton Garden, London E. C. (Monthly) 15s. per year.

² Edited for the Royal Australasian Ornithologists' Union by J. A. Leach and C. Barrett. Published by Walker May & Co., 25 Mackillop St., Melbourne. (Quarterly). Witherby Co., European Agents.

³ Edited for the South Australian Ornithological Association by F. R. Zietz and others. Published quarterly by W. K. Thomas & Co., Adelaide. 8s. per year.

It would save a great deal of future trouble if the author would designate a definite type specimen stating in whose collection it is to be found with date of capture, etc. The description of new forms, like some other things, if worth doing at all is worth doing well.

Bird Notes.¹ September, 1914.

A Sunbird Aviary. By W. T. Page.

A Journey Across the Sierras of Southern California. By W. S. Baily.—The author continues to identify the birds he sees in his own remarkable way which has already been referred to in these columns and in 'The Condor,' XVI, No. 5. The present article is continued in the October number. In it we find *Carpodacus purpureus* breeding in the verandas of buildings in California, while a "Hermit Thrush" (*Hylocichla ustulatus* [sic]) and a remarkable Bank Swallow "*Cotyle erythrogaster*" will prove valuable accessions to our western avifauna!

Bird Notes. October, 1914.

Parrot Finches. By W. T. Page — Color plates of the various species of *Erythrura*.

Aviculture in the Days of Ancient Rome. By Dr. L. Lovell Keays.

Sir William Ingram's Birds of Paradise at Little Tobago. By Per O. Millsum.— Report of the progress of this interesting experiment in acclimatization.

Wild Life. This beautifully illustrated monthly published at 55 Bank Bldg., Kingsway, London, presents some of the most exquisite pictures of wild life to be found anywhere. The series of photographs of Herons, Kingfishes, etc., in recent issues are of particular interest to ornithologists.

The Austral Avian Record.² Vol. II, No. 5. September 24, 1914.

On the Genus name *Mathewsia*. By Tom Iredale.— Preoccupied by *Mathewsia* Sanley, 1868, and *Mathewsena* proposed as a substitute, type *Ardea rubicunda* Perry.

Additions and Corrections to my List of the Birds of Australia. By G. M. Mathews.

Geopelia shutridgei Grant, shown to be a hybrid. By Tom Carter.

New Genera. By G. M. Mathews.— Fourteen proposed mainly for Australian groups. *Alphagygis* is proposed in place of *Gygis* preoccupied by *Gygis*.

Plumage Changes of *Elsemyornis melanops*. By G. M. Mathews.

Ornithologische Monatsschrift.³ Vol. XXXIX, No. 7. July, 1914. (In German).

Sixth Annual Report of the Experimental and Model Station for Bird Protection. By Hans Freiherr von Berlepsch.

¹ Edited for the Foreign Bird Society, by Wesley T. Page. Published by J. H. Heustock, Ashbourne, England. (Monthly) 15s. per year.

² Edited by Gregory M. Mathews. Published (at intervals) by Witherby & Co., 326 High Holborn, London, W. C. 1s. 6d. per part.

³ Edited by Dr. Carl R. Hennicke for the German Society for Bird Protection. Published by Max Kretschmann, Creutz'sche Verlagsbuchhandlung, Magdeburg. (Monthly) 8 Marks per year.

Bird Protection in the Prussian Chamber of Deputies.

Ornithologische Monatsberichte.¹ Vol. 22, No. 9. September, 1914. (In German).

The Thrush; a Composer among Birds. By C. Schmitt and H. Stadler.
On Paradise Birds from Keiser Wilhelm's Land. By H. Keysser.

Ornithological Articles in Other Journals.²

Miller, L. H. Bird Remains from the Pleistocene of San Pedro, California. (Bull. Dept. Geol., Univ. of Cal. Publ., VIII, No. 4.) — Species apparently all recent, *Gavia* and *Diomedea* new to American paleontology.

Martin, E. W. The Birds of the Latin Poets. (Leland Stanford Jr. Univ. Publ., series 13.) — Intended "to present in their own words a tolerably full picture of the Roman attitude toward bird-life as reflected in their greatest poets."

Oberholser, H. C. Four new Birds from Newfoundland. (Proc. Biol. Soc. Wash., XXVII.) — *Dryobates pubescens microleucus* (p. 43); *Bubo virginianus neochorus* (p. 46); *Perisoreus canadensis sanfordi* (p. 49) and *Pinicola enucleator eschatosus* (p. 51).

Mearns, E. A. Diagnosis of a New Subspecies of Gambel's Quail from Colorado. (Proc. Biol. Soc. Wash., XXVII, July 10, 1914.) — *Lophortyx gambellii sanus* (p. 113), Olathe, Colo.

Riley, J. H. On the Remains of an Apparently Reptilian Character in the Cotingidæ. (Proc. Biol. Soc. Wash., XXVII, July 10, 1914.) — An apparently closed pore was found on the back of the tarsus of *Carpodectes* and eleven other genera of the Cotingidæ, considered to be possibly analogous to the femoral pores of reptiles.

Riley, J. H. An Apparently new *Sporophila* from Ecuador. (Proc. Biol. Soc. Wash., XXVII, Oct. 31, 1914.) — *Sporophila incerta* (p. 213), Gualia, Ecuador.

Wetmore, Alex. A New *Accipiter* from Porto Rico with Notes on the Allied Forms from Cuba and San Domingo. (Proc. Biol. Soc. Wash., XXVII, July 10, 1914.) — *Accipiter striatus vcnator* (p. 119), Cerro Gordo.

Jackson, H. H. T. The Land Vertebrates of Ridgeway Bog, Wisconsin: their Ecological Succession and Source of Ingression. (Bull. Wisc. Nat.

¹ Edited by Dr. A. Reichenow. Published by R. Friedlander & Son, Berlin, 6. Karlstr 11. (Monthly) 6M. per year.

² Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

The scarcity of articles from the continent of Europe, owing to the war, is noticeable. In this connection it may be mentioned that the records of the Philadelphia Academy library show a decrease of 1000 books and pamphlets received since August 1, 1914, as compared with the same period in 1913.

Hist. Soc., XII, Nos. 1 and 2.)—A careful ecological paper covering birds along with other vertebrates.

Alphonsus, Brother. Comparative Migration of our Birds in Autumn. (Amer. Midland Nat., III.)

Saunders, W. E. The Problem of Bird Encouragement. (Ottawa Naturalist, XXVIII, No. 7. October, 1914.)

Cook, F. C. Migratory and Other Ornithological Notes from Lowestoft (The Zoologist, No. 879, September 15, 1914.)

Aplin, O. V. Notes on the Ornithology of Oxfordshire, 1913. (The Zoologist, No. 881, November 15, 1914.)

Clarke, W. Eagle. The "Blue Fulmar": its Plumage and Distribution. (Scottish Naturalist, No. 34, October, 1914.)

Rintoul, Leonora J. and **Baxter**, Evelyn B. Notes on some Passerine Birds found Migrating in Moulting. (Scottish Naturalist, No. 35, November, 1914.) — Much valuable information on the subject is presented.

Rintoul, L. J. and **Baxter**, E. V. Birds Singing while in Migration. (Scottish Naturalist, No. 32, August, 1914.)

Stresemann, E. A Contribution to our Knowledge of the Avifauna of Buru. Zoological Results of the second Freiburger Moluccan Expedition. (Novitates Zoologicae, XXI.)—Annotated list of 67 species, with much preliminary discussion. *Accipiter torquatus buruensis* (p. 381) subsp. nov. and *Toxorhamphus* (p. 394) gen. nov. type *Cinnyris novaeguineae*.

Rothschild, W. and **Hartert**, E. The Birds of the Admiralty Islands, north of German New Guinea. (Novitates Zoologicae XXI.) — The collection here reported upon is the second ever obtained from these islands, and the interior of Manus, the largest island, still remains to be explored. The list contains 46 species of which the following, all from Manus, are described as new: *Phlegoenas beccarii admiralitatis* (p. 287); *Cacomantis blandus* (p. 290); *Tyto manusi* (p. 291); *Collocalia esculenta stresemanni* (p. 293) and *Pachycephala pectoralis goodsoni* (p. 296). Incidentally the name *Accipiter hiogaster rooki* (p. 288), is proposed for the Rook Island form of this hawk.

Gurney, J. H. Are Gannets Destructive Birds? (Irish Naturalist, XXIII, No. 10.) — The verdict is in the negative as it is not considered that the amount of fish they catch has any appreciable effect upon the supply for human consumption. The annual market catch of herring alone in Scotland amounts to about a billion and a half!

Keywood, K. P. List of Birds Observed in the Neighborhood of Croydon [England]. (Proc. & Trans. Croydon Nat. Hist. & Sci. Soc., Feb., 1913–Jan., 1914.)

Montague, P. D. A Report on the Fauna of the Monte Bello Islands. (Proc. Zool. Soc., London, 1914, pt. III.) — A list of 25 species of birds.

Berlepsch, Hans Graf von. Report on the Collection of Bird Skins made by Dr. H. Merton on the Kei Islands. (Abhandl. Senckenb. Naturf. Gesell., XXXIV, hf. 4.) — List of 29 species of which the following from

Greater Kei Island are new. *Halcyon chloris keiensis* (p. 494); *Porphyrio mertoni* (p. 498) and *Cinnyris zenobia marginata* (p. 494). (In German.)

Roth, E. Bird Protection on the German sea-coasts. (Zool. Beobachter LV, No. 7.) (In German.)

Gerhardt, Ulrich. On the Morphology of the Penis in Birds. (Zool. Anzeiger, XLIV.) (In German.)

Knauer, Fr. New Results of Bird-handling Experiments. (Zool. Beobachter LV, No. 7.) (In German.)

Tschusi, Victor Ritter von. History of Ornithology in Stiermark. (Mitth. Naturw. Ver. für Stiermark XLVIII.) (In German.)

Salvadori, T. and Festa, E. The Zoological Expedition of Dr. E. Festa to the Island of Rodi: Birds. (Boll. Mus. Zool. Anat. Comp., Torino, XXVIII, No. 673.) (In Italian.)

Someren, Dr. V. G. L. von. The African Brown-bellied Kingfisher, *Halcyon semicaruleus*. (Jour. E. African and Uganda Nat. Hist. Soc., IV, No. 8, Aug., 1914.) — With excellent plates.

Dobbs, C. M. Notes on Crested Cranes at Kericho. (Jour. E. Afr. and Uganda, Nat. Hist. Soc., IV, No. 8, Aug. 1914.)

Williams, R. B. Some Notes on Birds in Sarawak. (The Sarawak Museum Journal, II, pt. 1, No. 5.)

North, Alfred J. The Birds of New South Wales. (Brit. Asso. Adv. Sci., 1914 Handbook of N. S. Wales.) — A brief popular résumé of the bird life.

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CORRESPONDENCE.

Obituary Notices.

EDITOR OF 'THE AUK':

The undersigned begs to call attention to the following facts disclosed by an examination of the last list of Deceased Members of the A. O. U.

(1). That 3 Corresponding Fellows (Altum, Hoast and Philippi) and 1 Member (Judd) have never had any obituary notices in 'The Auk.'

(2). That nearly one half (55) of the deceased Associates have never had obituary notices.

(3). That during the last two years eight Associates have died without mention except in the list of Deceased Members. These Associates are Beers, Butler, Mrs. Davis, Hales, Hill, Miss Howe, Marsden and Welles.

(4). That every obituary notice should give at least the full name of the person and the date and place of birth and death. Fully 50 percent of the obituaries in 'The Auk' fail to mention one or more of these essential facts.

Respectfully,

T. S. PALMER.

1939 Biltmore St., N. W.
Washington, D. C.
November 16, 1914.

[While entirely in accord with Dr. Palmer's suggestion, the editor begs to call attention to the fact that incomplete notices of deceased members are often sent in for publication only a short time before the number of

'The Auk' goes to press. Promptness of publication is important and there is no time for the necessary correspondence to complete the records. In the case of Associates the editor seldom learns of deaths until the list of members for the next year is submitted for publication.

The best plan that suggests itself for keeping an accurate record of deceased members, and ensuring proper obituary notices, would be to appoint some competent member of the Union, such as Dr. Palmer, as a permanent committee on History and Biography, a suggestion which is hereby respectfully offered to the president and council. ED.]

Time of Incubation.

EDITOR OF 'THE AUK':

The writer is gathering data on the length of the incubation in various bird species. He would like to ask if any of the readers of 'The Auk' could help him in this quest. Knowledge of the exact time would be preferred but an approximate might help. He has already collected a considerable mass of information on this subject, but wishes more, especially concerning the lower and lowest forms of bird life. Any expense in this matter would be gladly defrayed by the writer.

Yours cordially,

W. H. BERGTOLD.

1159 Race St., Denver, Colo.,
November 26, 1914.

Proposed Revision of the By-Laws of the American Ornithologists' Union.

EDITOR OF 'THE AUK':

I wish to address all working ornithologists and oölogists in the United States and Canada,—through the columns of 'The Auk,' 'Condor,' and 'Wilson Bulletin.' For a number of years, there have been many of the working ornithologists and oölogists who have not been satisfied with the present by-laws of the American Ornithologists' Union. This dissatisfaction has been shared alike by "Fellows," "Members" and "Associates" of the Union. We have seen in a mild form from time to time this dissatisfaction expressed in the columns of 'The Auk,' only to be side-tracked and dropped with but small notice and courtesy.

I have just received the annual circular letter from the A. O. U., stating my dues for the ensuing year are now due, and asking for new members, etc., etc. Each year as I look over this communication I ask myself, "Shall I continue in the A. O. U., and what can I offer a new member as an inducement to have him join the "Union?" Carefully looking through the pages of the by-laws I can find no inducement to offer him, nor do I see any

inducement offered me to continue in the Association after this year, should the by-laws not be changed. I have no quarrel with any officer, or class of member of the A. O. U., my quarrel is with the by-laws. We all know that the A. O. U. was only a continuation of the "Nuttall Club," and when re-organized and incorporated in 1888, nearly all active members at that time could be, and were, embraced in the class of "Fellows" and "Members." Active members since that time have increased, so much so that now many of the most active workers are in the Associate class. The by-laws have remained the same, not keeping pace with the changed conditions. How many of the different class of members of the A. O. U. have ever seen a copy of the by-laws? The copy that I now have before me, I secured in March, 1914, through the courtesy of the Treasurer. In reply to my query as to who was entitled to a copy of the by-laws, the Secretary informed me on 10/28/1914, "That every member and associate of the A. O. U. is entitled to a copy of the by-laws, but it is not customary to send a copy unless requested to do so." I believe if every new member could see the by-laws before joining, that he would think them so narrow, and the inducements offered therein so small, that he would refrain from joining the Union. I trust every class of members will at once send to the Secretary, and secure a copy of the by-laws, and see for themselves if the following assertions are correct or not.

About eight per cent of the membership are "Members," paying four dollars yearly dues. They have no vote or voice in the business matters of the Union.

About ninety per cent are "Associate" members, paying three dollars yearly dues. They have no vote or voice in the business affairs of the Union.

The business meetings are of the "Star Chamber" kind, and are not open to the main supporters of the Association.

There is no given method for the advancement of members from one grade to that of a higher grade, nor is there any given standard for a member to measure up to; before he can be advanced to a higher grade. This is one of the weakest points in the by-laws. Judging from the membership list in the April, 1914 'Auk,' we gather the following has nothing to do with one's chances for advancement.

Length of time as a member.

Field work in any of the active lines.

Attending annual meetings of the A. O. U.

Published articles in 'The Auk.'

Amassing a collection of scientific specimens, and a library on ornithology, either through purchase or by personal work.

What qualifications then must a person have, to attain a higher grade in the Union? Are the majority of the "Fellows" in a position to know just who is doing active work, or eligible to advancement? What member wishes to make out his own application for nomination to a higher class, and have it signed by three "Fellows" as required by Section 4, Article 4,

of the by-laws? What chance is there for a member to become a "Fellow" except through dead men's shoes, and who likes to wait for such advancement? A "Fellow" can only be retired by his own desire, Article 1, Section 3. No one can blame any of the "Fellows" for desiring to remain in that class, even though some may take no active part in ornithology and its branches today. The present grades in the membership of the Union, are unsatisfactory and undemocratic. Acting in conjunction with other members of the A. O. U., I forwarded proposed changes in the A. O. U. by-laws, to the last meeting of the Union. I had the support and endorsement of two "Fellows," as required by Article 8. I have not been informed in an official way by any officer of the Union, what action, if any, was taken, nor have we seen any mention of the subject in the columns of the official organ, 'The Auk.'

The A. O. U. was supposed to be an organization for the "Advancement of its members in ornithological science." A large percentage have been taken into the Union merely for the payment of their \$3.00 dues, and not with any idea of strengthening the Club scientifically. There are other societies where this class of members can do more good than in the A. O. U. Some of the most active workers today in the various ornithological branches are not, and will not, become members of the A. O. U. on account of the class distinction, and star chamber methods of conducting the business of the Union. Let us have the needed changes in the by-laws, and let all class of members express their views and desires through the columns of the several ornithological journals. Let us hear from the "Fellows" in a broad-minded way, just how much they have the interests of the A. O. U. at heart. Above all, let us have a democratic organization, equal rights to all, special privileges to none. If, after a fair fight, we cannot get our desired changes, let those who are dissatisfied with the present by-laws and way of management, withdraw from the A. O. U., and give their support to some organization who will offer us the coöperation of their organization.

H. H. BAILEY.

Newport News, Virginia,
November 25th, 1914.

[As Mr. Bailey asks for comment upon his letter and as some of his statements are evidently the result of misinformation or misunderstanding we take this opportunity to state our views on the matter.

As we understand him he presents three claims. 1st, That the A. O. U. offers no inducement to new members. 2nd. That there is no definite standard for the advancement of members and that the results of the elections to advanced classes of membership as presented in the current list of members are unsatisfactory. 3rd, That all classes should be abolished resulting in one grade of membership for all.

Taking up these points seriatim:

1st. The A. O. U. at its annual meetings offers opportunities for omni-

thologists of all classes to meet together on perfect equality to participate in a three days scientific session and to enjoy the hospitality which is generously offered by institutions and local members. It maintains a high class ornithological journal in which papers of merit by any Associate, Member or Fellow may be published and which presents a résumé of the progress of ornithology not only in America but throughout the world. And through its committees, publications and meetings it brings ornithologists in all parts of the country in touch with one another and opens the way for the beginner or the isolated student to acquire, through correspondence with specialists and recognized authorities, the knowledge and advice that he would not otherwise be able to obtain.

We cannot agree with Mr. Bailey that there is no inducement to join the A. O. U. We think on the contrary that the A. O. U. has been responsible for the wonderful development of ornithology in America and that every member who has made use of the opportunities which it offers to him has profited largely thereby.

2nd. Election to any limited society or membership is bound to be unsatisfactory to some. There are always those who think that they or their friends have been unjustly rejected and that those who have been chosen did not merit the honor. Mr. Bailey's list of those eligible for advancement would no doubt differ widely from ours and neither of our lists would suit the views of a third member of the Union. This is inevitable and it should be obvious to all that a vote in this connection as well as for any elective office or position, is based on personal opinion, which varies so widely that in many societies, and the A. O. U. is no exception, it is sometimes impossible to get the necessary majority for any candidate so that a vacancy in advanced membership cannot, for the moment, be filled. If it were possible to establish a definite standard for the different classes of membership no election would be necessary, but the establishment of a definite standard is quite impossible. The points to be considered in any candidate are his eminence in some branch of ornithological science and his service to ornithology, but the relative merits of several candidates can only be decided by a vote, and the majority vote of the Fellows called for in the By-Laws, seems a reasonable requirement for election. We cannot question, as does Mr. Bailey, the qualifications of the Fellows to make a choice, surely they are as well fitted as either the Members or Associates.

We can hardly take Mr. Bailey seriously when he says that "Length of time as a member"; "Field Work"; "Attendance at Meetings"; "Published articles"; "The Amassing of a collection or library," had nothing to do with the advancement of the 40 ornithologists who have been elected Fellows since the A. O. U. was founded or the 75 who have been elected to Membership. Surely he does not mean what he says! At the same time it may be noted that a man might be a regular attendant at meetings, might gather together hundreds of specimens or books and might publish many papers of a certain quality, and yet not reach the

stage of intellectual development, nor display the scientific knowledge, that would entitle him to advancement.

3rd. As to abolishing the classes and having but one grade of membership much may be said. The establishment of an advanced class of Fellows, membership in which is based upon scientific eminence, is an almost universal custom in scientific societies and the value placed upon such distinction seems proof enough of its desirability. The enlargement of such a class immediately detracts from its significance. The 'Fellows' of the A. O. U. represent the fifty leading ornithologists of America; standards may become higher and higher but at any given time the Fellows may always be so characterized.

The class of Members was established some years ago, to meet just such criticism as is contained in part in Mr. Bailey's letter, and represents another grade of distinction, a stepping stone as it were to Fellowship. This class was not originally provided for and the By-Laws have therefore not remained stationary as Mr. Bailey states.

The question of entrusting the business of the Union entirely to the Fellows is a matter quite apart from the establishment of "advanced classes," and it is here and here only, we think, that Mr. Bailey's views may find support.

This matter of enlarging the business body has as a matter of fact been under consideration by the A. O. U. Council for some time and has the general approval of the members. As the Union moreover is not a secret society, and has no desire or intention of concealing its actions, it may we think, be stated in this connection that there is every probability of the adoption at the next meeting of a suggested plan whereby the Members will be allowed to share with the Fellows the business management of the society, thus bringing about the desired result.

The entrusting of the business affairs to a small body of members was never intended to create a "star chamber" as Mr. Bailey infers but to relieve the general membership of a burden and to permit of the entire open session each year being devoted to ornithological matters.

Whatever changes may be made in the way of enlarging the business body of the Union we feel sure that the opening of business discussion to the entire membership would be strongly opposed by Associates and Members at large. The A. O. U. is not a political body and the details of its business are not of very serious moment to the membership. Those who attend meetings, come, in large part, from considerable distances; their time is limited and the desire to enjoy the scientific and social features of the gatherings, not to waste valuable time in prolonged discussions of minor matters which would inevitably result from open business meetings. The present plan of a preliminary business session before a relatively small body leaves three whole days for the discussion of ornithology, for which the A. O. U. was organized.

In regard to Mr. Bailey's proposed changes in the By-Laws, his statement is a little misleading, and it is only fair to say that his communication was sent to the Editor of 'The Auk' for presentation at the last meeting of

the Union. It was however mailed so late that it was not received until after the meeting had adjourned. Mr. Bailey was of course, so informed; but has received no "official" report of action for the simple reason that his communication cannot be even presented to the Union for consideration, until the 1915 meeting. It is needless to say that any properly prepared proposal to amend the By-Laws, received prior to any meeting of the Union, will be given, as it always has been given, careful and courteous consideration.

Mr. Bailey says of the Associates "a large percentage have been taken into the Union merely for the payment of their \$3. dues and not with any idea of strengthening the Club scientifically." He would we think have a different conception of the Associate membership if he glanced at the early history of the Union. The society was of course started with but one grade and could readily have limited its membership strictly to ornithologists of high scientific attainments as has been done by many similar organizations, leaving the rank and file of the subscribers to its publications entirely outside of the society. It was thought better however to take in these subscribers as "Associates" without any additional fee, and to open to them all the social and scientific privileges of membership. The Union has thus helped to develop many an ornithologist who would not otherwise have taken up the study seriously, and we have reason to think that the vast majority of Associates are in entire agreement with the plan.

In conclusion we must take exception to Mr. Bailey's statement that dissatisfaction with the A. O. U. By-Laws when expressed in 'The Auk' has been "sidetracked" and dropped with but small notice and courtesy. We think he made this statement without due consideration since the only expression of the kind that we have found (Auk, 1908, p. 494) was considered and answered with the greatest courtesy by the Editors.—WITMER STONE.]

NOTES AND NEWS.

DR. THEODORE NICHOLAS GILL, a retired fellow of the American Ornithologists' Union, died in Washington, D. C., on September 25, 1914. Dr. Gill was born in New York City on March 21, 1837, and after completing his education came to Washington in 1860 to fill a position in the Columbian (now George Washington) University, with which institution he was connected for fifty years as professor, successively, of physics, natural history, and zoölogy. He was also assistant librarian of the Congressional Library, 1867 to 1875, and one of the past presidents of the American Association for the Advancement of Science.

It was however, in connection with the Smithsonian Institution that Dr. Gill is best known and here he conducted the studies and investigations that made his name familiar in scientific circles throughout the world.

Ichthyology was his specialty and it was in that field that he won his greatest renown. His publications were by no means limited to the fishes however. His learning was broad, his knowledge of literature enormous, and he was in every sense a philosophical naturalist, one of the last of a group, the like of which, in these days of specialization, we shall probably not see again.

Dr. Gill was elected a Fellow of the A. O. U. at the first meeting in 1883, and was a prominent figure at all the meetings held in Washington. He was a member of the Committee on revision of the A.O.U. Code of Nomenclature and was ever ready with helpful suggestions in matters of nomenclature and taxonomy with which the Union has had to deal. Most of his ornithological publications dealt with matters of taxonomy in connection with the classification of the vertebrates in general, although during his editorship of 'The Osprey' (1899-1902) he wrote upon a great variety of topics.

To how many of us does Dr. Gill's name bring up memories of the old Smithsonian building, where he had a room, and in the library of which he could usually be found engaged in some literary research, but never too busy to discuss with his friends the problems with which they were struggling, or to turn to the young naturalist with helpful words of advice or reminiscences of the past.

By all visitors to the scientific centers of the national capital Dr. Gill's cheerful greeting and sympathetic interest will be sadly missed, and in still greater degree by his associates in Washington.

A biographer will be appointed by the president of the A. O. U. to prepare an adequate sketch of Dr. Gill's life and work which will later appear in 'The Auk.'

THE following communication from the Chairman of the local Committee of Arrangements for the San Francisco Meeting of the A. O. U., May 18-20, 1915, will be read with interest by all members of the Union. This however will not make the meeting a success. A large number of the readers must make up their minds to be present at the meeting, to enjoy the pleasures and hospitality which Mr. Mailliard and his fellow members of the Cooper Club offer, and to make them feel that their efforts have not been in vain. Many members in the east can make the trip by arranging their plans now, and even though it puts them to some little inconvenience it is their duty to California and the A. O. U. to make such sacrifice and to help to make this the most notable meeting that the Union has ever held.

Mr. Mailliard's announcement follows:

THE 1915 MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.

On February 20th, 1915, the Panama-Pacific International Exposition will be formally opened. The stage is already set, and only the finishing touches remain to be applied. Already the wonderful color scheme is a thing of beauty and a joy to the sight-seers who throng the grounds even

before a single exhibit is in place. The great trouble in the countries across the Atlantic may lessen the exhibits and the number of visitors from that part of the world, but this will be more than made up by the even more interesting exhibits of the Oriental nations and the great number of Americans who have at this late day determined to "see America first!"

Yet it is not the exposition that will be the greatest attraction to the ornithologist. There have been a number of expositions in the United States, and most of you have seen more or less of them. So it is an old story. But there will be opportunities to visit this State under conditions never before brought about, and which will not prevail again for many years to come.

We have been called a hospitable people here in California. I do not know. Perhaps we are. We were brought up in the customs of a new country, where habitations were few and far between. If you reached a house at meal time, or at night, you tied your horse and entered to find a welcome. You were offered what there was, much or little as might be, and you accepted in the spirit in which it was offered. Perhaps we have not gotten over this. In 1915 we are going to be on our mettle to be hospitable, and we are going to give a welcome to our neighbors and friends that will linger in their memories as long as they may live — and may our friends live long!

No, it is not the Exposition that we wish to call especially to your attention, it is *California*. You may have seen many expositions but you have not seen many Californias. Most of you have not seen ours. From the summit of Tamalpais we want you to see the sun set in the great Pacific, and from this point of vantage to watch the lights of San Francisco glow and glimmer as the stars appear, and to see the same sun rise over the Sierras, if you have the energy to be up so early.

We want you to see the Farallon Islands, only a couple of hours run from the Exposition grounds, with their wonderful seabird life, the thousands of California Murres on their nests, the Cormorants busy in their rookeries, Tufted Puffins peeping from their holes, not to mention Gulls, Cassin's Auklets, Rock Wrens, etc.

We want you to visit the Los Banos breeding grounds, so well represented in the American Museum of Natural History in New York City, where you can see many varieties of ducks, herons and shore birds building their nests and raising their young on the swamp lands and among the tules. We want to show you our Humid Coast Belt, with its characteristic forms of bird life, and only a few miles inland our desert and semi-desert areas where water brings about a revolution, and where Nature asserts her will, insisting upon desert forms predominating but a short distance from where are to be found those darker forms which moisture with lower temperatures seem to create.

We want you to see Lake Tahoe, with its wonderful scenery, surrounded by snowy peaks where breed the Gray-crowned Leucosticte and the California Pine Grosbeak, and for those of you who like it the magnificent

fishing the lakes and streams of the Sierras afford. We want you to see the beauty and grandeur of our unrivalled Yosemite, and to walk with you beneath our great redwoods which were old when our forefathers landed on the eastern coast.

We have more to show you than most of you imagine, and under conditions never before existing as far as rates of travel, good fellowship, a wish to welcome all the world and the desire to please our guests are concerned, to say nothing of the fact that there will be gathered here in various conventions of numerous bodies, many of the world's greatest minds. Traveling rates will be low, hotel keepers have agreed not to raise their prices above the everyday mark, accommodations will be ample, good, and at rates to meet one's purse, while the desire to make the Exposition a success, rather than to make large profits out of those who come, seems to prevail.

The meeting will be held May 18th to 20th, this being chosen as being the best average date at which to see our bird life in the nesting season, which really commences in February and lasts until August! Let us all do our best to make this meeting a grand success, to form new friendships, and to make of it a pleasant memory that will never leave our hearts. Each who comes can do his or her share to make the A. O. U. meeting in California something to look back upon with pleasure, and to talk of around the fire on snowy winter nights.

Come all who can, yet bear in mind, one and all, that while we have warm weather in the interior of California, San Francisco is a *cool spot* where light overcoats and wraps are always in order and may be needed at any moment!

Details as to rates of travel, hotel expenses, interesting side trips, etc., will be furnished later.

JOSEPH MAILLIARD,
Chairman Committee on Arrangements.
San Francisco, Cal.

AFTER preparing the note in the last issue of 'The Auk,' on beneficial effect of the new tariff in stopping the importation of Rhea plumage and thereby putting an end to a trade that threatened the extinction of this splendid bird, we were astonished to learn that by a decision of the Treasury Department, the Rhea was excepted from the operation of the law. The official notice states: "It appears from the best information obtainable by the department that the so-called Rhea is, in fact, an ostrich, and the feathers of such birds may, therefore, be admitted without requiring proof that the plumage was taken from domestic birds." With the wealth of technical knowledge so easily obtainable from the scientific departments of the government it is rather remarkable that the Treasury Department should have taken upon itself the settlement of such an important ornithological question.

However open to criticism its action in this respect may be, its willingness to promptly admit an error is exceedingly praiseworthy, and we are grati-

fied to learn from a subsequent order that: "Further investigation by the department has shown that the rhea is not properly classed as an ostrich put is in fact a wild bird, the plumage of which should be prohibited importation."

FULL NAMES OF AUTHORS IN 'THE AUK.'—In preparing the general Index of 'The Auk' published in 1907 the committee in charge of the work endeavored to give names of authors in full but the requisite information proved impossible to obtain in many cases and consequently about 170 names appeared in more or less incomplete form. The committee which is indexing the volumes from 1901 to 1910 inclusive, in following the plan of the former Index, has made special efforts to secure this information and has succeeded in obtaining the full names of nearly all the authors mentioned in the recent volumes and has also secured about 130 of those which were incomplete in the former Index.

Some 46 names are still needed—about nine for the recent volumes and about 37 for the earlier ones—as shown by the following list. In order to facilitate the search for the desired data each author's name is followed by the name of the State from which the note was written or that of the author's last known address and a reference to the volume and page of 'The Auk' in which the article appeared.

Allen, Charles N.	'81, 145	Lane, Ambrose A. (Engl.)	'97, 417
Atkins, John W. (Mich.)	'99, 272	Lee, Oswin A. J. (Engl.)	'97, 106
Banks, James W. (N. B.)	'84, 95	Lewis, Lillian W. (N. Y.)	'05, 314
Batty, Joseph H. (Mass.)	'06, 356	Livermore, John R. (R. I.)	'94, 177
Berry, Mabel C. (N. H.)	'96, 342	Mitchell, Robert H. (Tenn.)	'94, 327
Bulley, Reginald H. (Ohio)	'86, 277	Moran, Daniel E. (N. Y.)	'82, 52
Buri, Dr. Rudolph O. (Switz)	'01, 286	Nowotny, Dr. (Austria)	'98, 28
Burton, William R. (Fla.)	'04, 125	Palmer, E. DeL. (Calif.)	'94, 78
Collins, W. H. (Mich.)	'80, 61	Park, J. T. (Tenn.)	'93, 205
Doan, William D. (Penn.)	'90, 197	Pitcairn, William G. (Penn.)	'08, 232
Downer, E. D. (N. Y.)	'99, 355	Pollard, Evelyn H. (Engl.)	'01, 207
Emmet, R. T. (N. Y.)	'88, 108	Reagan, Albert B. (Utah)	'08, 462
Fowler, H. Gilbert (N. Y.)	'78, 85	Sargent, Harry B. (N. Y.)	'93, 369
Fraser, J. T. (N. Y.)	'84, 293	Schenckling-Prevot, C. (Ger.)	'95, 186
F., W.	'03, 94	Smith, G. S. (Mass.)	'81, 56
Gormley, M. H. (Wash.)	'88, 424	Swallow, C. W. (Ore.)	'91, 396
Harris, George E. (N. Y.)	'88, 320	Sweiger, Mrs. Jacob L. (Conn.)	'08, 105
Howley, James P. (Nfd.)	'84, 309	Taylor, W. Edgar (Neb.)	'89, 332
Ingraham, D. P. (Colo.)	'97, 403	Walker, Mary L. (Scotl.)	'90, 198
Johnson, Lorenzo N. (Ill.)	'89, 275	Welsh, Frank R. (Penn.)	'84, 391
Kermode, Philip M. C. (Engl.)	'83, 229	Whitlock, F. B. (Engl.)	'97, 422
Kinnison, George W. (Fla.)	'99, 57	Wilson, Bertha L. (Minn.)	'98, 100
Koumly, Pirmine M. (Kans.)	'93, 367	Wilson, Dr. Thomas J. (N. Y.)	'78, 85

As it is desirable to have the full names of all contributors to 'The Auk,' readers who can furnish any of the missing names or can suggest how they may be obtained are requested to notify the editor or to communicate with the undersigned.

T. S. PALMER.

1939 Biltmore St., Washington, D. C.

MR. Louis Agassiz Fuertes, at the request of the Council of the A. O. U., and with the advice of a committee appointed by the President, kindly prepared a new cover design for 'The Auk' which appeared for the first time on the number for January, 1913. As to the accuracy of drawings of extinct species the poet has written:

"This we have for comfort sweet
Should doctors disagree,
Nobody lives who knew the beast,
And there are no more to see.
So if they do not like its looks,
What can they do about it?
Our guess is just as good as their's
So if they scoff, we'll scout it!"

Notwithstanding the logic of this statement, the Council at the last meeting appointed a new committee to confer with Mr. Fuertes in regard to preparing another design, which should follow more closely the general style of the original vignette. Mr. Fuertes has generously complied with the request and the result appears on the cover of the present number. Which drawing is the better portrait of the Great Auk as it appeared in life, we are, like the poet, unable to say; but the present one is both artistic, and accurate in detail, while it conforms more nearly to the conventional idea of the famous bird.

A NEW edition of the Naturalists' Directory has just been published by S. E. Cassino, Salem, Mass. This directory is invaluable to naturalists since it is the means of bringing together students and collectors in all parts of the world through correspondence. The directory contains an alphabetical list of English speaking professional and amateur naturalists in all parts of the world, also a list of scientific societies and periodicals. The price of the Directory is \$2.50 in Cloth Binding and \$2.00 in Paper Binding; sent postpaid. As only a limited edition has been printed it is advisable for any one wishing a copy to order at once.

THERE will be an exhibit of pictures of our common birds at the American Museum of Natural History, New York City, January 15th to 29th inclusive followed by a sale exhibition at the Katz Gallery, 103 West 74th St. These pictures show the Robin, Blue Jay, Oriole, Wood Thrush and other birds we see about our homes and that we all know and have come to love. The birds are pictured life size, singly and in family groups, sometimes nesting or courting, often surrounded by apple bloom, golden rod, or wood lilies, flowers they might be found among, or the bright leaves of April or October, or the snow of winter. Seventy-five or more water colors large and small will be shown, all exhibited for the first time. The purpose of the pictures is to present the beauty of just our commonest home and dooryard birds.

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Code of Nomenclature. Revised edition, 1908. Paper, 8vo, pp. lxxxv. 50 cents.
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CONTENTS

	PAGE
THE CLASSIFICATION OF THE FAMILY DENDROCOLAPTIDÆ. By Dr. Herman von Ihering. (Plates XI-XII)	145
THE OKALOACOCHEE SLOUGH. By Frederic H. Kennard. (Plates XIII-XV)	154
CABOT'S TYPES OF YUCATAN BIRDS. By Outram Bangs	166
THE ATLANTIC RANGE OF LEACH'S PETREL (<i>Oceanodroma leucorhoa</i> (VIEILLOT)). By Robert Cushman Murphy	170
SOME SUGGESTIONS FOR BETTER METHODS OF RECORDING AND STUDYING BIRD SONGS. By Aretas A. Saunders	173
LIST OF THE BIRDS OF LOUISIANA. PART VII. By H. H. Kopman	183
PHAËTHON CATESBYI BRANDT. By Gregory M. Mathews	195
SIMULTANEOUS ACTION OF BIRDS: A SUGGESTION. By Winsor M. Tyler, M. D.	198
THE OLD NEW ENGLAND BOB-WHITE. By John C. Phillips. (Plate XVI)	204
EARLY RECORDS OF THE WILD TURKEY. IV. By Albert Hazen Wright	207
 GENERAL NOTES.— The Red-throated Loon (<i>Gavia stellata</i>) at Berwyn, Pa., 225; Mallards Wintering in Saskatchewan, 225; European Widgeon in Washington, 225; Harlequin Duck in the Glacier National Park, Montana, 225; The Blue Goose (<i>Chen carulescens</i>) in Rhode Island, 226; Occurrence of the Pectoral Sandpiper (<i>Pisobia maculata</i>) near Salem, N. J., 226; The Wimbrel, Ruff, Buff-breasted Sandpiper, and Eskimo Curlew on Long Island, N. Y., 226; The Diving Instinct in Shore birds, 227; The Little Black Rail on Long Island, N. Y., 227; Richardson's Owl and Other Owls in Franklin County, New York, 228; Lewis's Woodpecker taken in Saskatchewan, 228; Prairie Horned Lark in Rhode Island in Summer, 229; Crows Nesting on the Ground, 229; The Bermuda Crow, 229; The Orange-crowned Warbler in Cambridge, Mass., in December, 230; A Winter Record for the Palm Warbler on Long Island, N. Y., 230; The Blackburnian and Bay-breasted Warblers at Martha's Vineyard, Mass., 230; The Cape May Warbler (<i>Dendroica tigrina</i>) as an Abundant Autumnal Migrant and as a Destructive Grape Juice Consumer at Berwyn, Pa., 231; Cape May Warbler Eating Grapes, 233; Addendum, 234; The Rock Wren at National, Iowa, 234; Corthylio — A Valid Genus for the Ruby-crowned Kinglet, 234; A Note on the Migration at Sea of Shore Birds and Swallows, 236; Rare Birds near Waynesburg, Pa., 236; Some New York City Notes, 237; Notes from Wisconsin, 237; Changes and Additions to the 'List of the Birds of Gallatin County, Montana, 238; What Bird Lovers Owe to the Late Professor King, 239; Morning Awakening Notes at Jefferson Highland, N. H., 240.	
 RECENT LITERATURE.— 'The Auk' Index, 1901-1910, 242; The New B. O. U. List, 243; Hankin on Animal Flight, 245; Snehlagé's 'Catalogue of the Birds of Amazonia,' 247; Hornaday's 'Wild Life Conservation in Theory and Practice,' 248; Hartert's 'Die Vögel der palaarktischen Fauna,' 248; Phillips on Experimental Studies of Hybridization among Ducks and Pheasants, 249; Allen on Pattern Development in Mammals and Birds, 249; Shufeldt on the Skeleton of the Ocellated Turkey, 250; Smith's 'Handbook of the Rocky Mountains Park Museum, 250; Mearns on New African Birds, 251; Von Ihering on Brazilian Birds, 251; Allen's 'Birds in their Relation to Agriculture in New York State, 251; Simpson's 'Pheasant Farming,' 252; Recent Biological Survey Publications, 252; Economic Ornithology in Recent Entomological Publications, 253; Two Recent Papers on Bird Food by Collinge, 254; First Report of the Brush Hill Bird Club, 255; Recent Reports on Game and Bird Protection, 255; The Ornithological Journals, 256; Ornithological Articles in Other Journals, 261; Publications Received, 263.	
 CORRESPONDENCE.— A Bird Census of the United States, 267.	
 NOTES AND NEWS.— Louis di Zerega Mearns, 268; 'The Auk' Review of Ornithological Journals, 269; The Delaware Valley Ornithological Club's Quarter-century, 269; Systematists and Experimental Biologists, 270; S. N. Rhoads' Expedition to Guatemala, 271; The A. O. U. California Meeting, 271.	

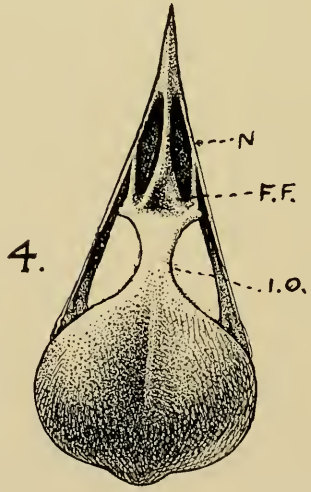
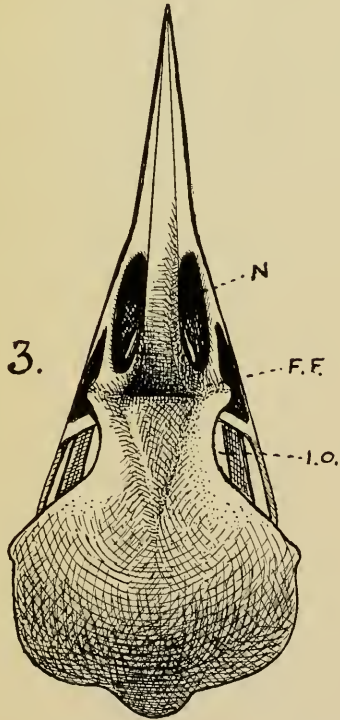
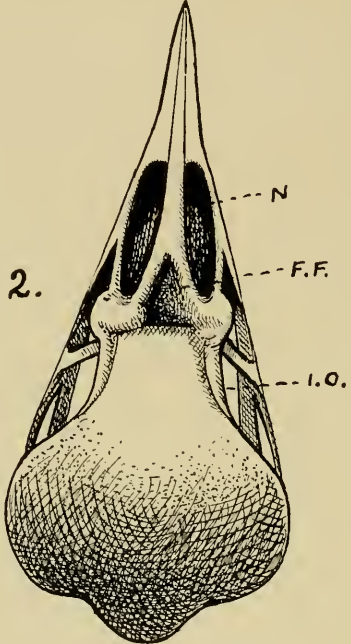
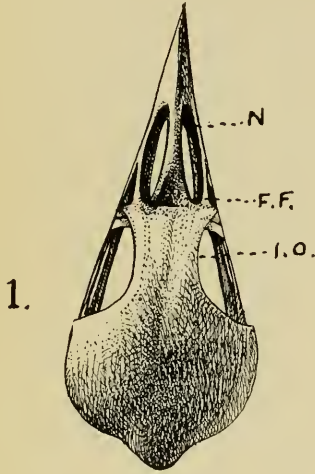
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SKULLS OF DENDROCOLAPTIDÆ.

THE AUK:

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APRIL, 1915.

No. 2.

THE CLASSIFICATION OF THE FAMILY DENDROCOLAPTIDÆ.

BY DR. HERMAN V. IHERING.

PLATES XI-XII.

IN a paper just published in the 'Revista do Museu Paulista,' Vol. IX, 1914, I was able to show that the life histories of the birds composing the several subfamilies of Dendrocolaptidæ exhibit important differences well calculated to aid in the proper systematic arrangement of the various genera. More recently I have studied the craniological characters of the different genera and it is the purpose of the present paper to set forth the results of these studies.

I have already shown that biological conditions in the family Tyrannidæ furnished excellent indications of the proper systematic arrangement of the genera, and lately I have been able to complete my former work especially with regard to the genera *Onychorhynchus* and *Myiobius*. My investigations inspire my admiration for the accuracy of the systematic arrangement proposed by R. Ridgway who on morphological characters has already divided the genus *Myiobius* exactly in the same manner as my observations on the nidification of the species demand.

I am of the opinion that the family Dendrocolaptidæ of Sclater is also in need of further study and in this connection biological

observations furnish valuable hints on the systematic arrangement of the genera. According to their manner of life these birds form three natural groups. Those allied to *Furnarius* are inhabitants of the open country and low lands. They construct their nests in the ground with subterranean burrows leading to them, sometimes of considerable length. The custom of the Ovenbirds of constructing their nests in trees is evidently a secondary adaptation and the material employed in their construction — mud — indicates that their ancestors nested in the ground.

The second group contains the genus *Synallaxis* and related forms. They live like many other small birds upon trees and bushes and construct big dome-shaped nests, either of grass, moss and other soft materials or of sticks.

The birds of the last section comprising the Dendrocolaptinæ and part of the Philydorinæ, live in the forest like the woodpeckers and nest in holes in trees.

The eggs of all the members of the family are white or whitish green except in a few genera of Synallaxinæ in which they assume a uniform blue-green coloration.

If we compare the above facts with the classification given by Sclater in the 'Catalogue of Birds of the British Museum' we find a general correspondence and are inclined to adopt his subfamilies with some modification. The removal of the genus *Anumbius* from the Synallaxinæ cannot be approved. The Philydorinæ with the exception of a few genera approach the Dendrocolaptinæ but are easily distinguished by morphological characters.

Radically opposed to our views, however, is the classification adopted by Ridgway in his admirable work 'The Birds of North and Middle America,' Vol. V, where the birds under consideration are distributed in two distinct families,—Furnariidæ and Dendrocolaptidæ. The reason for distinguishing two families is stated to rest chiefly on differences in the structure of the skull. I have studied the skulls of a great number of genera and shall explain the results of my researches.

In accordance with Garrod, Beddard and other authors, Ridgway places the genera with a holorrhinal skull in the family Dendrocolaptidæ, and those with a schizorrhinal skull in the Furnariidæ. In the latter group the osseous nostril reaches the posterior end of

the premaxilla or passes above it, but does not extend to this point in the holorhinal skull. It must however be observed that the term schizorhinal cannot properly be applied to the members of the Furnariidæ because the posterior end of the nostril does not end in a gap but has always a rounded extremity. For this very reason Fürbringer rejects the term schizorhinal in this connection, substituting for it the new term pseudo-schizorhinal, and adds that both terms probably only refer to different modifications of the same anatomical condition.

We shall see this opinion amply confirmed by my studies.

The Synallaxinæ are without exception schizorhinal as are also the Furnariinæ, although *Geobates* has the nasal foramen somewhat shortened, its posterior end being situated somewhat before that of the intermaxillary.

Pronounced holorhiny is found only among the Dendrocolaptinæ of which, however, some genera — *Sittasomus*, *Dendrocincla* and probably others — are typically schizorhinal.

The Philydorinæ (*Philydor*, *Xenicopsis*, *Xenops*, etc.) form a transition group leading up to the Dendrocolaptinæ and the species are schizorhinal with the exception of *Automolus* and *Anabazenops* which have the nasal foramen shortened.

When we seek to explain the phylogenetic developments here set forth, it is evident that the forms which present the greatest modification are the Dendrocolaptinæ, which are completely adapted for climbing after the manner of the Woodpeckers. The extraordinarily lengthened exterior rectrices and the protruding shaft points are peculiarities which characterize them as terminal members of a developmental series issuing from the Philydorinæ.

We are able to distinguish among the Dendrocolaptinæ two groups of genera. One of these, beginning with the schizorhinal genera, *Sittasomus* and *Dendrocincla* leads by way of *Dendroplex*, to *Dendrocolaptes* and *Xiphocolaptes* the most powerful forms of the family with the heaviest beaks. The other group beginning with *Picolaptes* leads to forms with extremely long, curved beaks such as *Nasica* and *Campylorhynchus*. *Xiphocolaptes* as well as *Drymornis*, *Nasica*, etc., are extremely modified members of the family, of considerable size, and their peculiarities can be easily explained by comparison with the structure of the smaller, less specialized, forms.

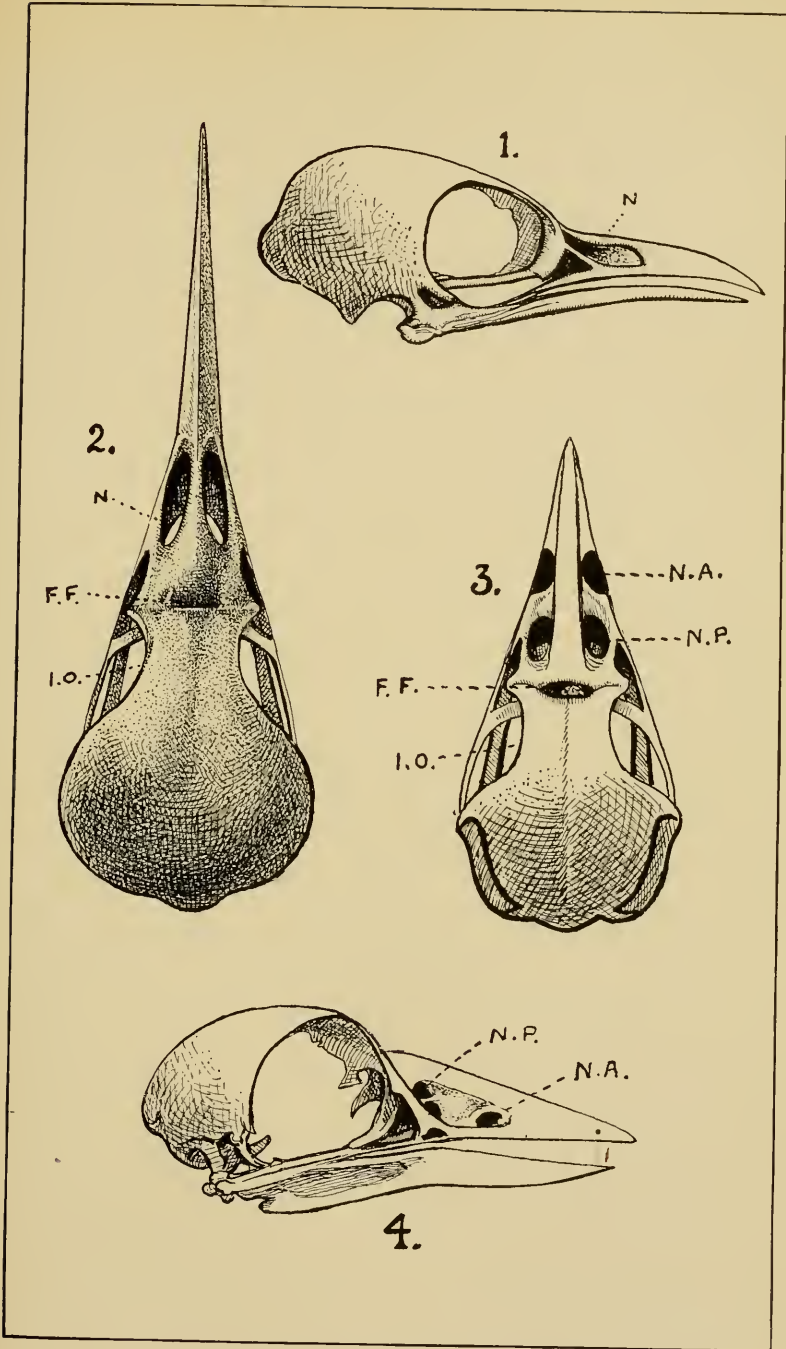
Corresponding with the two groups above indicated we find modifications in the structure of the skull. In both series the strongly modified forms have the frontal bone exceedingly large and the nasal foramen relatively small — the extreme reduction being reached in *Campylorhynchus* and allied genera. By this means the basal bridge between the nostril and frontal bone becomes extraordinarily large and strong, an adaptation corresponding to the increased demand in these birds for strength and resistance at the base of the beak. While the precursors of *Picolaptes* seem to be extinct the line of evolution originating from *Sittasomus* is nearly uninterrupted. The skull of *Sittasomus* differs but little from that of *Automolus* and to this the skull of *Sclerurus*, seems closely related.

With regard to skull structure the Synallaxinæ may be considered as a more or less uniform group in which the genera *Thriposphaga* and *Phacellodomus* are somewhat differentiated by the strongly convex base of the beak, prolonged posteriorly in two divergent ridges, surrounding a deep pit.

A peculiarity of the species of *Synallaxis* and *Septornis* is the large, deep median furrow of the frontal bone with a corresponding projecting ridge on the inner side of the skull. There is also a deep pit at the posterior end of the intermaxillary near the anterior end of the frontal. We meet with the same conformation in *Lochmias nematura* where the lateral parts of the frontal bone are extraordinarily convex and separated by a deep median furrow. *Cincludes* presents the same condition while *Upucerthia* differs somewhat in the more projecting nasals which surround the posterior part of the intermaxillary. The skull of *Upucerthia* resembles that of *Thriposphaga* and *Phacellodomus* while *Lochmias* agrees with *Synallaxis*.

Of the subfamilies of the Dendrocolaptidæ proposed by Selater the least natural one seems to be the Furnariinæ.

There are in general no great differences between the skulls of *Furnarius* and *Synallaxis*. In the former, however, the frontal fontanelle, so well marked in *Synallaxis* is absent, while the frontal bone in *Synallaxis* and allied genera is much narrower than in *Furnarius*. *Anumbius* agrees in cranial characters with *Synallaxis*; and *Pseudoseisura* with *Phacellodomus*. If, therefore, we place *Lochmias* in the Synallaxinæ on the basis of skull structure



SKULLS OF DENDROCOLAPTIDÆ AND FORMICARIIDÆ.

we should be able to find other characters to support our action and these, I believe, exist.

The true Furnariinæ have the tail truncated while in the genera *Lochmias*, *Upucerthia* and other Cinclodinæ the exterior rectrices are successively shortened. If we consider that this latter condition prevails in general throughout the Dendrocolaptidæ we must realize that the tail structure in the true Furnariinæ is quite a remarkable peculiarity.

The Furnariinæ have probably originated through localization in the vast prairies of the La Plata states and the adjacent parts of Brazil and Bolivia, while the origin of the Cinclodinæ has been in Patagonia and the Andes.

It is not easy to trace the lines of dispersal which have brought about the present distribution of the South American Dendrocolaptidæ but some light is thrown upon the matter by the study of ornithological literature. Of special interest in this connection is the history of *Furnarius*, the Ovenbird, one of the characteristic species of the central Brazilian and Argentine fauna which seems to be still extending its range. When Natterer in the years 1818-1823 explored the state of São Paulo, he did not meet with it although at the present time it is common in the valley of the Parahyba river and appeared some fifteen years ago at Campinas where it nests.

We may also infer that the genus *Cinclodes* in eastern Brazil is a relatively recent immigrant, as also the few species of Pterotochidæ, a family of Patagonian-Andean origin.

Of several genera of the Dendrocolaptidæ the skull is unknown to me, such as *Margarornis* and *Glyphorhynchus*, so that I cannot form an opinion upon their relationships from cranial characters. It is not, however, my intention to propose here a new system of classification for the family, my aim being rather to furnish new facts based upon biological and anatomical observations which may eventually be of value in the construction of such a system.

As in the Furnariinæ two lines of development have been demonstrated we can presume that the Dendrocolaptinæ sprang from two different groups of the Philydorinæ. Probably the case is more or less the same with respect to the somewhat aberrant genera *Sclerurus*, *Glyphorhynchus* and *Margarornis*.

It follows therefore, as already suggested by Fürbringer (p. 1419), that the supposed difference between pseudoschizorhinal and holorhinal skulls in the Dendrocolaptidæ does not exist in fact, but that they are modifications of little importance which serve only in a limited degree in the characterization of genera, and not at all in the differentiation of families.

Most families which are related to the Dendrocolaptidæ have the skull holorhinal. We find in them, however, similar modifications to those existing in the Dendrocolaptidæ. For example in the Formicariidæ some species of *Myrmotherula* and *Drymophila* show prolongation of the narrow posterior portion of the nasal foramen almost up to the intermaxillary and it is probable that further studies based upon richer material will demonstrate that among the *Formicariidæ* too there are species with pseudoschizorhinal as well as holorhinal skulls. Of greater importance however is the modification in the bony nostril of the Formicariidæ. In *Batará cinerea* (Plate XII, figs. 3-4) it is closed for nearly its entire length (14 mm.) by a thin vertical osseous membrane, the anterior portion of which is perforated by a nostril 4 mm. in diameter, while the posterior part contains a second nostril communicating with the buccal cavity. I have found the same structure in *Thamnophilus* and *Conopophaga lineata*, the aspect of the several skulls being quite different but the structure essentially the same, except for the fact that the membrane of the nasal cavity remains soft in some and becomes ossified in others.

This style of skull structure in which instead of one large bony nostril we have two, a posterior and anterior one, I propose to call *amphirhinal*.

In the Dendrocolaptidæ, therefore, while the type of structure is always the same and there are no essential anatomical differences, the dimensions and proportions of the different bones and foramina vary to a degree rarely found in one family. The enormous variation in the form of the beak is seen in such genera as *Xenops*, *Synallaxis*, *Philydor* and *Campylorhamphus*. In connection with the differences in form we find variation in the condition of the nostrils which are in some genera holorhinal, in others pseudoschizorhinal. The base of the beak is also differentiated variously, sometimes provided with an intermaxillary frontal fontanelle, sometimes not; while between the two parietal bones in some

genera a profound median sulcus is developed. The configuration of the skull depends in a great measure upon the breadth of the interorbital part of the frontal bone and the proportion of this to the greatest breadth of the skull (considered as 100) varies from 16 to 50, the absolute measure being in *Synallaxis spixi* 2.4:14.3 mm. and in *Campylorhamphus trochilirostris* 8.8:17.2 mm. As already suggested by Fürbringer the study of the variations in the nostrils of the Dendrocolaptidæ has shown that this is a character of secondary value.

The importance which is given in ornithological literature to such terms as holorhinal and schizognathous represents an inheritance from the past century. When Huxley in 1867 published his classic treatise on the classification of birds it seemed as if the skull was to attain the same importance in the classification of birds as it had already reached in the mammalian system.

Six years later Garrod gave to the structure of the nostrils the same importance in avian classification as Huxley had given to the palate structure. And now we ask what is the situation to-day?

The results set forth in this paper with reference to the schizorhiny of the Dendrocolaptidæ confirm the opinion of Fürbringer as stated above; who also (l. c. p. 1034) rejects Huxley's groups based on palate structure. Beddard (l. c. p. 140) also points out that the maxillo-palatine classification is not really satisfactory from a systematic point of view and adds that it is rendered harmless by the fact that the groups are really not as hard and fast as might be supposed from text books in general.

In this, however, I cannot agree with Beddard as generalizations of this sort, rejected by the most competent morphologists, often persist with tenacity in our systematic literature and in many instances hinder the zoölogist from following his own inclination. If in studying any family in the zoölogical system we take one anatomical character as a basis for the arrangement of the genera or species we construct a system which is entirely changed if we make use of some other character. Skull or pelvis, sternum or syrinx, pterylosis or muscles — in nearly every case we obtain a different arrangement.

The result of the exclusive application of certain anatomical characters is seen in Garrod's classification of the Psittaci, which has been accepted by Beddard, in which the South American

Conurinae are distributed in three different subfamilies, the Arainae, Pyrrhurinae and Platycercinae!

The same process of development of a certain organ is repeated many times independently in different subfamilies and genera and therefore can be applied only to a limited extent in classification.

No single organ is of such importance that we can attribute to it absolute preference and it is never possible to determine à priori whether this or that character will be of most importance in systematic work. It happens sometimes that a relatively insignificant character will prove of great value, as for example the loss of a remex, which serves as a distinction between the large groups of quincubital and aquincubital birds. The quincubital condition is the archaic one and the loss of the fifth remex although representing a higher phylogenetic degree, must be considered as a process of degeneration, for which it would be stupid to make natural selection responsible.

What we learn from ornithological studies is that the wide range of variation which leads, or can lead to the origin of new groups, is on the definite lines of evolution which influence also the less important characters but which do not raise any question of survival since both the primitive and modified types succeed equally well in the struggle for existence.

In more than forty years of uninterrupted biological research I have been unable to discover any facts among free living animals which tend to prove the existence of natural selection, or even to elevate it to the rank of an indispensable or necessary factor in the origin of species. So long as we do not have at our disposal a complete series of morphological and paleontological observations, which would furnish a systematic arrangement of genera on the ground of actual phylogenetic experience, our classifications are more or less a question of our ability to accurately judge the importance of morphological characters for systematic use. Barriers erected by anatomists, however celebrated, during the past three decades should no longer be allowed to present difficulties in our ornithological work.

From the preceding discussion I reach the following conclusions.

1. The assumed difference between schizorhinal and holorhinal skulls does not exist in the *Dendrocolaptidæ*. The species in which

the nasal foramen is prolonged posteriorly present only a modification of the common holorhinal type, and this condition should be named pseudoschizorhinal according to Fürbringer.

The variations in the palatine structure, moreover, are of no more importance than those of the nasal foramen.

2. The family Dendrocolaptidæ is an entirely uniform and natural one and there are no sufficient reasons for its subdivision into two families.

3. The morphological and biological characters to which I have alluded offer useful data for the systematic disposition of the subfamilies and genera of the Dendrocolaptidæ.

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EXPLANATION OF PLATES.

PLATE XI.

- FIG. 1. *Sittasomus sylviellus* (Temm.). $\times 2$.
FIG. 2. *Anabazenops fuscus* Vieill. $\times 2$.
FIG. 3. *Dendroplex picus* (Gm.). $\times 2$.
FIG. 4. *Synallaxis spixi* Scl. Nat. size.

PLATE XII.

- FIG. 1. *Synallaxis spixi* Scl. Nat. size.
FIG. 2. *Picolaptes falcinellus* (Cab. & Heine). $\times 2$.
FIGS. 3 & 4. *Batara cinerea* (Vieill.). Nat. size.
N = nostril, A = anterior, P = posterior.
F.F. = frontal fontanelle.
I.O. = interorbital part of frontal bone.

THE OKALOACOOCHEE SLOUGH.¹

BY FREDERIC H. KENNARD.

Plates XIII-XV.

WE camped on the nights of March 13 and 14, 1914, about three miles north of the "main strand" of the Big Cypress, close beside the trail, in an open glade among the cypress heads; and both nights the wind blew so that I was glad to crawl into the lee of a neighboring tree.

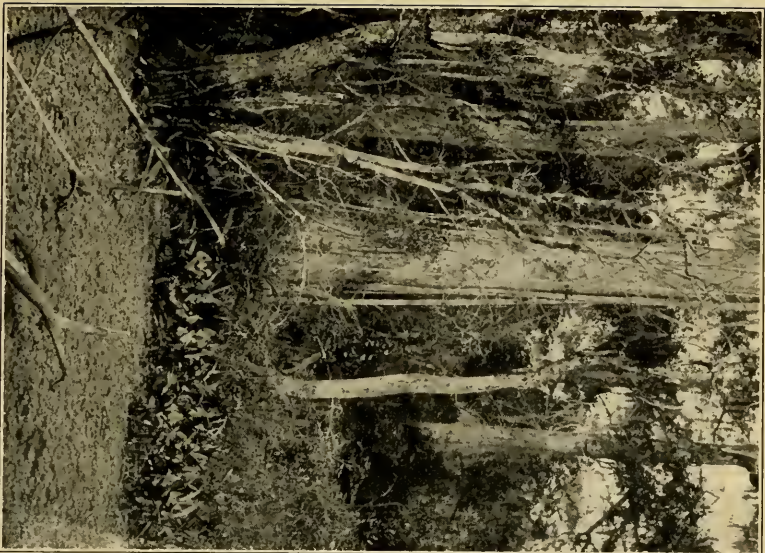
Here we hunted turkeys, obtaining some of both sexes, and collecting several Swallow-tailed Kites, whose nesting season was just beginning, and which I think are, with the exception of the Roseate Spoonbill, the most beautiful birds I have ever shot.

On the 15th we traveled north, along the Immokalee trail for about eight miles, and then struck out across the prairie, skirting the edge of the cypress swamp and pine woods in a northeasterly direction for about seven miles, until we came to a little pine island near the edge of the Okaloacoochee Slough, where we camped for several days.

During the trip I discovered a Swallow-tailed Kite building its nest in the top of a tall, slim pine, near the edge of some pine woods, and close by a cypress swamp. The nest was about sixty-five feet up, and instead of being built against the trunk of the tree, as is so often the case with raptors, was built at the end of an upreaching limb, and from the ground, looked like a rather flimsy structure of sticks, to which the old bird was now adding moss. In shooting this bird I broke his right wing at the pinion joint, and he continued to fly screaming above my head, with the pinion flapping, until I brought him down with another shot. Their powers of flight are certainly marvellous.

En route we saw numbers of cattle, poor scrawny beasts, scattered about the prairie, most of them pretty wild, and every once in

¹ Cf. Auk, Jan., 1915, p. 1, for details of this expedition through southern Florida.



1. SWAMP BENEATH THE WOOD IBIS ROOKERY.



2. NESTS OF THE WOOD IBIS.

a while a group of buzzards marked the spot where one had died. We heard but few Sandhill Cranes, until we neared the Okaloacoochee, when we began to see them, often two or three at a time, and flushed one flock of five and then another of seven that flew off "hollering" at our approach. Here also we saw our first Florida Burrowing Owls, and discovered one of their burrows only a short distance from where we were to camp.

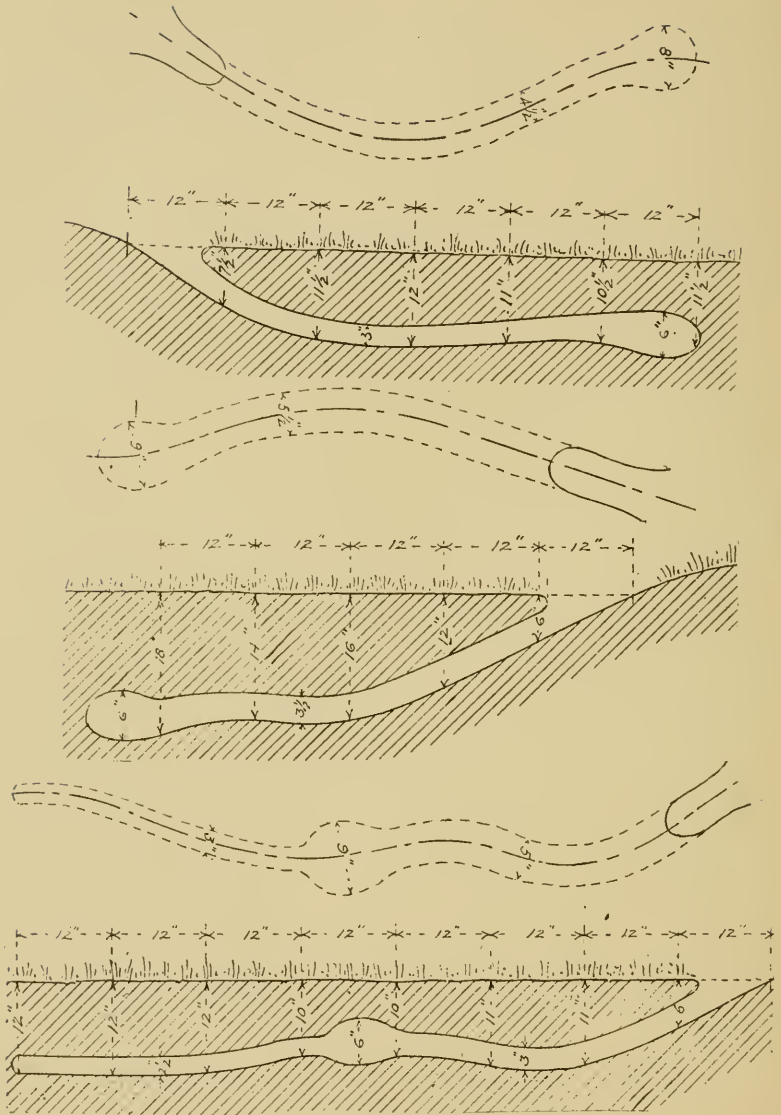
The Okaloacoochee Slough, where we proposed spending the next couple of weeks, is a waterway extending from a few miles south of Fort Thompson, on the Caloosahatchee River, in a southerly direction into the Big Cypress, and from thence to the Gulf. It is bordered by a series of prairies, sloughs, marshes and swamps; most of which are wet throughout the entire year; and seems to be a "fly-way" for all the water birds in that part of the State that do not go up the Gulf coast.

Our first camp was near the southerly end of a large cypress swamp, through which the waters of the slough took their way. The prairie here is dotted with sloughs, the haunt of Sandhill Cranes, the Florida Black Duck, and of countless Herons and Ibises; and east of the swamp it stretches away to the horizon, where the sky line is broken only by an occasional pine island, and by an easterly strand of the Big Cypress, which from here can just be seen.

Here we hunted Cranes and Black Ducks, and I spent much time on the prairie watching the Burrowing Owls. Peter told me they were not nearly so numerous as formerly, when colonies of twenty and twenty-five together were not uncommon; and this was the only location he knew of in Lee County in which these interesting birds still bred.

They build their nests out in the sandy soil of the open prairie, on the higher places, from which the floods have receded, and which here had been burned over earlier in the season. We found numbers of their little mounds scattered about, but hardly thick enough to be called a colony.

On approaching an inhabited burrow, if one or both of the owners were not already in sight, they very quickly appeared; and standing bolt upright on their little mound of sand at the mouth of the burrow, would courtesy gravely to me, until on my nearer



Three Burrows of the Florida Burrowing Owl. Horizontal and vertical sections.

approach, they would fly off onto the prairie, perhaps fifty or a hundred feet, where they would continue their courtesies, uttering at the same time their calls, *Whit, whit-whit*, a long and two short notes: or *Whit-whit, who-who-who-who-whit*, two short notes followed by a stutter, a little lower in tone but ending with a short sharp *whit* at the end; or *Whit-whit, who-who-who-who-who*, two short *whits*, followed by the stutter. Often instead of flying they would run over the prairie, reminding me of the Robins one sees on the lawn, which after standing upright and still, suddenly bend forward and run.

I dug up a number of their burrows, but it was apparently too early to find eggs, though some of the nests appeared to be completed. These burrows, several of which I measured carefully, seemed to run in any direction, east, west, north or south, just as the birds happen to choose, for a distance of from four and a half to eight feet, with the floor of the burrow usually averaging from ten to twelve inches below the surface of the prairie, though we found one that ran as deep as eighteen inches.

The tunnels, which were usually from three to three and a half inches high and from four to five and half wide, ran down grade until about two feet from the entrance, and then nearly on a level, until just before the nest was reached, when there would be a slight rise in the grade, apparently to keep the nest a little above any water that might, in spite of the natural drainage of the soil, gather in the hole in time of storm. The nest chambers, which were oval, were about six inches high and from eight to nine inches in diameter, with a slight depression in the bottom; and those that were nearing completion were rather carefully lined with weeds and grasses, but in no case with cow dung (see article by S. N. Rhoads in 'The Auk' for January, 1892). In several of the burrows we found a small tunnel about two and a half by three inches in diameter, extending for distances varying from eight or ten inches to nearly four feet and ending abruptly. What these tunnels were built for, I am unable to explain, or how the bird managed to make them so small. Of one thing only am I certain, and that is that they were built before the nest was lined.

The little piles of sand at the mouth of the burrows necessarily varied in size according to the amount of excavation. The

largest that we saw measured forty by forty-four inches across, and was only three inches in height. Some of them were very conspicuous, while others were partly overgrown with grasses, and we found one that was in the side of one of those "bull holes" which here dot the prairie—holes pawed in the earth by bellicose bulls.

When the owls flew, they flew softly as all owls do, but rapidly when they so desired, and frequently with high undulations and succeeding dives. They never went a hundred yards from their nests, and we could not drive them away from the vicinity. As soon as we were through investigating their nests, the little birds at once flew back to them, and showed a distress to which I was only reconciled by the knowledge that they would doubtless soon begin to rehabilitate some old burrow, of which there were plenty in the vicinity. Once Tom and I discovered in the distance a burrow from which little jets of sand were issuing with great frequency and regularity, about three to the second, onto the mound in front. One of the birds was just inside the mouth of the burrow, apparently throwing the sand out backwards with his feet.

The owls never seemed to sleep, day or night, at least I never caught them at it, and once I went out on the prairie on a pitch dark night at 3 A.M., in an effort to see if one particular pair was at home, and blocked up the mouth of the burrow, only to find them a few yards away, apparently as well able to take care of themselves in the dark as in the daytime.

On the 18th we found a slough at one end of which was a little willow island, in which there were ten nests of Ward's Heron; seven of them contained well grown young, and three had well incubated eggs. Numbers of Boat-tailed Grackles were building here, some of their nests two or three feet above the water among the vines that hung pendant from the willows, while others were fifteen feet high on the out-reaching branches of the willows themselves. Most of the nests were in process of construction, though a few held an egg apiece, while one contained two eggs and another three. There was a flock of "Curlew" or White Ibises here, together with Louisiana and Little Blue Herons, and a number of Yellow-crowned Night Herons.

We were still in the turkey country and succeeded in picking up



1. FLORIDA BURROWING OWLS AT HOME.



2. NESTS OF WARD HERON.

another fine specimen of the much wanted hen; and gobblers could be heard every morning among the neighboring pine islands. We saw several hawks flying low and hunting over the prairie, that Tom declared were Everglade Kites, but which I never got near enough to shoot, and was unable to identify. I did, however, see several Marsh Hawks. There were also Killdeer and a few Snipe in some of the marshes, and we saw one bunch of about a dozen Greater Yellow-legs.

On March 20th when I had gone out early to see what the Burrowing Owls were up to, I took the following notes, which may be of interest as an account of the early morning bird life that immediately surrounded us.

"3 A.M. Awoke to find the moon about an hour high, and two Horned Owls hooting in the pine woods to the southwest. Do they always hoot as the moon rises, or is it that that is the only time I ever happen to hear them?"

"3.40 Black Ducks calling from slough to the eastward."

"4.20 As I was walking over the prairie the Sandhill Cranes began calling from all directions. Whether or not some of them were first aroused by me I am unable to say."

"4.35 A Chuck-will's-widow made a few calls."

"4.40 A Whip-poor-will after two or three preliminary throat clearers, started in with seventy-six calls, as against one hundred and eighty-eight I heard one make successively yesterday A.M."

"4.45 I can hear two Horned Owls, one Barred Owl, which has been hooting at intervals ever since I awoke, two Whip-poor-wills and one Chuck-will's-widow, all calling at once. The Horned Owls' notes sound thus: *Who, who-who-who, whoo whoo*; or *Who, who-who-who, who-who-who, whoo whoo*; a far deeper tone than those of the Barred Owl."

"4.50 Black Ducks again set up a squawking, Cranes are 'hollering' all over the prairies, and it is beginning to get light in the east. A Barred Owl is hooting close by, another in the middle distance. and a third far off."

"4.55 Night Herons quawking, Florida Yellow-throats singing in the nearby clumps of saw palmettos, and two Chuck-will's-widows and one Whip-poor-will are apparently trying to sing each other down."

"4.58 Boat-tails are beginning to call, and Jorees (Towhees) are everywhere in the palmettos about us."

"4.59 Black Ducks again squawking, Meadowlarks, Shrikes, Florida Yellow-throats everywhere, and Herons of some kind, either Louisiana or Little Blues calling from the swamp."

"5.03 A Turkey gobbling away off the southwest."

"5.04 Turkey gobbling frequently."

"5.05 More quawking of Herons, Barred Owls continue performance, but Horned Owls seem to have quit. The Okaloacoochee with its low lying fog looks like a huge lake."

"5.06 Jorees and Florida Yellow-throats are calling continuously in every direction. I thought I heard a Song Sparrow in the distance, though it may have been a Savannah."

"5.08 That gobbler is trying for a record."

"5.09 A Cardinal is singing nearby. He may well have sung before, and escaped notice."

"5.16 Quail are beginning to call, the gobbler is calling again, and apparently replying to another that has just started gobbling south of us."

"5.17 Crows are cawing; a little late it seems to me."

"5.19 Red-bellied Woodpeckers and Florida Grackles are beginning to arrive in our grove."

"5.20 A Flicker is calling in the distance, and a big gobbler is gobbling just a short piece up the trail."

"5.32 Pine Warblers, Red-winged Blackbirds and Downy Woodpeckers in the pines about us."

We succeeded in collecting four Florida Black Ducks while at this camp — three drakes and a duck. I forgot to measure the duck before skinning, but the three drakes when laid out on my operating table, each measured twenty-three inches in length, which is considerably longer than the measurements usually given for this species, and I was very much interested in finding that they all, both sexes, had bright coral red legs. The bills of the drakes were very highly colored, and looked to me like the bills of the freshly killed specimens of the northern species. Some, at least, of these birds were beginning to breed, for although we found no nests ourselves, I was later lucky enough to secure a beautiful set of eleven fresh eggs, taken by a friend of Tom's on March 20, in a slough near Immokalee.



A BONNET LAKE ON THE OKALOACOCHEE.³¹



NEST OF THE SAND HILL CRANE.

On the morning of March 20 our long search for an occupied Crane's nest was rewarded by finding one that contained two well incubated eggs, in a slough away out in the prairie. The old bird, which we jumped directly from her nest, near the middle of the slough, flew off "hollering" and lit out on the prairie, from which point of vantage she could watch the proceedings. The nest was a huge affair about four feet by six in extent, and eight inches above the level of the surrounding water, with a depression about two inches deep, and was constructed principally of the dried stems of what looked to me like the pickerel weed with which most of these sloughs are filled.

In the afternoon we broke camp and traveled northeast across the prairie, around the cypress swamp, at the southerly end of which we had been camping, to a place known as the Widow McLean's Crossing, where a trail from Immokalee to the Seminole reservation crosses the Okaloacoochee.

Here in a sort of glade surrounded on three sides by a wonderful cypress swamp, someone had years ago built a shack, long since in ruins, planted a small grove of grapefruit, oranges and guavas, and cultivated the ground about them. "Lightwood" for our fires, and pasturage, were both in plenty; and we were out of reach of the bothersome prairie winds. There was plenty of good water that actually *ran* through the stream just back of camp; and, wonder of wonders, a place where I could bathe. The air was redolent with the odor of orange blossoms, the place fairly alive with birds, a delightful change after our strenuous experience of the last few weeks.

Late in the afternoon, while putting our camp to rights, the air was full of birds, thousands upon thousands of them flying over us, south to the adjoining cypress swamp. "Flint Heads" (Wood Ibis) in companies and the swift flying "Curlew" (White Ibis) in battalions and regiments, Louisiana and Little Blue Herons by the hundreds, with here and there a sprinkling of "Long Whites" (Egret), all in one continuous stream. Right in the middle of it we were startled by yells from Tom, and on rushing out into the open to see what the matter was, espied two "Pink Curlew" (Roseate Spoonbills) flying rapidly south with the other species.

From all the signs we were led to believe that there must be a

large rookery in the cypress swamp just south of us. The next morning, after making skins of a couple of Limpkins that Tom had collected the night before, we started for the middle of the swamp, above which we could see a number of "Flint Heads" soaring and wheeling high up in the air, very much after the manner of the Black Buzzards. We crossed the slough and coming out onto the prairie, which here stretched away to the easterly horizon, skirted the swamp for a short distance until we came to a trail used by the Seminoles, who come here from all over southern Florida for the huge cypress trees from which they make their dugouts.

En route we saw several Turkeys, and after a short walk came to the edge of one of the prettiest of Florida lakes, perhaps one hundred and fifty to two hundred yards long and from thirty to sixty yards wide, completely surrounded by a growth of wonderful moss-covered old cypress, that seemed fairly alive with birds. Anhingas, in larger numbers than I have ever seen assembled in so small a space, were flying rapidly about or craning their necks as they perched on overhanging boughs. There were Herons of various sorts about the edges of the lake, and numbers of wise looking old "Flint Heads" sitting solemnly among the tree tops. Wood Ducks were swimming among the buttressed trunks of the cypress trees at the border of the lake, and several huge alligators, as we came in sight, were seen to sink slowly beneath the surface of a pool at the southerly end.

I had crawled out on a prostrate stump to take a photograph of the beautiful scene, when suddenly a wonderful "Pink Curlew" came shooting out from one of the side aisles, across the lake in front of me. I must have been seized with something akin to buck fever, for I simply stood there open mouthed and staring, until at a yell from Tom about a dozen more flew out, and I managed to wake up sufficiently to secure three of them. Later we saw several more "Pinks," thirty or forty of them in all.

Of the Spoonbills collected, one was an adult female with egg in the oviduct; while the other two were immature — a male, and a female with ovaries undeveloped. The irides of the immature specimens, instead of being bright carmine, like their elders, were, to quote my notes, "of a nondescript color at first glance blue, but on closer examination a sort of dark hazel."

On Sunday, March 22, we rested and put in most of our time making up skins. The day was overcast and inclined to be rainy, but not enough so to discourage the birds. Cardinals, Mocking-birds, Tufted Titmice and White-eyed Vireos were singing in the trees about us, the occasional scream of Florida Bluejays could be heard, and once in a while the rattle of a Kingfisher flying overhead. Pileated Woodpeckers and Barred Owls called frequently from the slough behind us, and occasionally the squeak of Wood Ducks could be heard in the stream, which fairly teemed with them.

Right in front of my tent were several depressions in the dirt made by Turkeys when "dusting." A pair of Swallow-tailed Kites frequented the nearby pine wood, and the "hollering" of Sandhill Cranes could be heard in the distance. Chipping Sparrows, Florida Meadowlarks, Great Crested Flycatchers, Florida Grackles, Florida Red-wings, Buzzards, Florida Red-shouldered Hawks, Florida Crows, and Fish Crows, were nearly always about camp, and Ruby-throated Hummingbirds were flitting among the grapefruit blossoms overhead. I heard one Blue-headed Vireo. "Flint Heads," White Ibises, and Herons of various sorts were generally in sight, and every once in a while a yell from Tom proclaimed a "Pink" going by.

Some few "Flint Heads" were always on the move, flying back and forth from their rookery. The prairie was often dotted with them, seeking insects, I suppose; and on moonlight nights numbers of them could be seen feeding in the sloughs. About daylight they begin to come out of the swamp in numbers, flying over camp with loud rhythmic whistle of wings, mostly in a northerly direction; straggling along in small companies; perhaps a couple, three, five, seven, or nine at a time, and in one extreme case, twenty-two. In flight they remind me of Brown Pelicans, a few flaps of the wings and then a soar, but their company drill is not nearly so good as that of the Pelicans, who follow their leader with such remarkable regularity.

Every once in a while in the early morning, or late in the afternoon, one hears a great rushing sound like that of a closely approaching wind storm, and a huge flock of beautiful White Ibises goes rushing overhead. In flight they are much more rapid than the Wood Ibis, and seem to set their wings to soar only when swooping down to alight or when turning in their flight.

After breakfast on March 23, Tom and I again started for the "Flint Head" rookery, from which we had been diverted by the Spoonbills two days before. We struck south from the alligator lake through about the worst bit of swamp it has ever been my lot to traverse, wading up to our armpits in water covered with a skim of "lettuce," or climbing six or eight feet in the air over prostrate trees, balancing ourselves on logs, crawling through vines or almost impenetrable jungle, and always dodging moccasins, until we came to the rookery, perhaps a half a mile from the lake. The cypresses here were magnificent, huge trees four, five, six or seven feet in diameter above the buttresses, and in one case over nine; growing well apart so that most of them had spreading tops.

Here in a strip from one hundred to two hundred yards wide and extending for a mile or so, was the rookery. Not all of the trees were occupied, but most of the good ones held from four or five to twenty nests apiece, clear out on the ends of upreaching branches. At the northerly end of the rookery the nests contained vociferous young. A little farther south most of them appeared to contain eggs, while at the southerly end the nests were still in process of construction. Apparently they had started to build at the northerly end first, and then as the newcomers took up their parental duties from day to day, extended the rookery south.

Here hour after hour there was a constant stream of birds flying back and forth from a clump of willows at the border of the swamp, that was being rapidly denuded of twigs and sticks, which the big birds broke off with their powerful bills and carried to their nests. Tom watched them for some time and reported that when a bird flew up to a willow and lit, it would perhaps grasp several twigs at once with its feet, apparently in order to get a better hold, and then seizing a twig with its bill, would pull and jerk until it broke off, or, if unsuccessful, get hold of some other twig, break it off, and then fly away.

Tom was also lucky enough to get a view at close range of several "Flint Heads" feeding in an open place in the water beneath some "pop ash" trees. He described them as walking solemnly back and forth in water about up to their knees, with tails erect; and when feeding dragging their bills beside them, upside down like a Flamingo, opening and shutting them rapidly

and apparently sifting the mud through them. When meeting, they would often throw their heads back, puffing out their feathers at the base of their necks, and, if quarrelsome, would snap their bills loudly at each other. In the rookery the continual clatter of snapping bills can be heard quite a distance.

We found a number of Spoonbills which were apparently just beginning their nesting season, and saw several standing on what I supposed to be their nests at the top of tall cypresses, while another was engaged in fixing up the lining of its nest.

Tom and I tried to make an approximate estimate of the number of birds in the rookery, but were unable to arrive at any satisfactory conclusion. The traveling was so difficult that we could not undertake to block off the swamp into small areas in which we could count the nests, and we had to content ourselves with guessing. Tom, after further explorations the next day, thought there were at least ten thousand nests of the "Flint Heads," while I felt sure there were more than five thousand. At any rate, there were a great many, and among them a few Spoonbills' nests.

The other birds, White Ibises, Herons, Anhingas, etc., appeared not to have begun breeding, and apparently the first two only used the swamp as a roost. There must have been several thousand White Ibises and perhaps a hundred Egrets that used the swamp, and countless Little Blue, Louisiana and Night Herons of both species. None of these had apparently begun to breed. The season appeared late, and Tom thought that when they did breed they would probably build their nests out among the sloughs and willow islands somewhere on the prairie.

Just east of camp, only a few hundred yards up the slough, was a very lovely "bonnet" lake, a feeding ground for many of these birds, and at its outlet I collected several Wood Ducks of both sexes, adults in full breeding plumage. As Florida Wood Ducks are thought, by some of the gunners there, to be rather smaller than our northern species, I took pretty careful measurements and found them to be identical as to wings, tail, tarsus and bill. In length four birds measured seventeen and one half inches when stretched to their utmost immediately after killing, and one reached seventeen and three quarters.

On March 26 we broke camp, yoked up our oxen, and left this

pleasantest of camp sites for the Burnt Pens, ten miles away on the trail to Fort Myers.

On the way to the Burnt Pens we had a very interesting experience with a pair of Sandhill Cranes, whose young we discovered "*peeping*" out on the prairie. Its *peeps* were to us absolutely indistinguishable from the calls of the numerous Jorees in the surrounding saw palmetto, and the solicitude of its parents was almost human.

We spent the night at the Burnt Pens and the next day, March 27, Tom and I left for Fort Myers in the automobile, leaving Peter to follow with the schooner.

I am glad to report that Tom Hand returned later to the Okaloa-coochee as warden, under the auspices of the National Association of Audubon Societies. There are still a few "crackers" who have not yet been educated against plume hunting, and as we had, while camping there, seen suspicious tracks in the swamp, Mr. T. Gilbert Pearson very gladly complied with the suggestion that someone be sent there to watch the rookery and its vicinity until the end of the breeding season.

CABOT'S TYPES OF YUCATAN BIRDS.

BY OUTRAM BANGS.

DURING the early days of the Boston Society of Natural History, in the "fortys," Dr. Samuel Cabot, Jr., was for a short period an active ornithologist. He collected birds vigorously himself and exchanged with many European naturalists and dealers. He also accompanied Stephens on his second expedition to Yucatan, and remained in that country from October, 1841, until June, 1842, visiting Cozumel Island at some time during that period. He made a collection of birds, which, judged by the rather informal list published in the appendix to 'Incidents of Travel in Yucatan' by John L. Stephens (Vol. II, p. 469), must have been fairly representative, and was certainly the first collection of any size to come out of the region.

Altogether Dr. Cabot amassed a collection of the birds of the world that at the time must have been a very fair working collection. He followed the custom, unfortunately too prevalent among naturalists of his day, of keeping very insufficient data — or none at all — attached to his skins. Soon after his death in 1885 his birds were presented to the Boston Society of Natural History. At that time the collection had dwindled sadly from its former numbers, largely, I have been told, on account of the depredations of the cloths moth, and partly, I feel sure, from specimens having been mounted with no record of whence they came then put on exhibition, and finally lost sight of.

Last year the collection was again transferred, this time to the Museum of Comparative Zoölogy, where I have carefully gone over it all.

A charming little account of the bird work of Dr. Cabot and his two brothers can be found in Brewster's 'Birds of the Cambridge Region,' beginning on page 81. A still more intimate acquaintance with Dr. Cabot's activities can be had from a large portfolio, preserved in the library of the Boston Society of Natural History and containing manuscripts of his various papers, many unpublished anatomical discussions often accompanied by fine original drawings, lists of exchanges and letters from most of the ornithologists of his day, both European and American.

Dr. Cabot during his short career as an ornithologist described no new birds except those collected by himself in Yucatan. The types of all except two of these I have found.

Besides the types listed below there still exist specimens of the following species, that for one reason or another I am certain were collected by Cabot himself in Yucatan.—*Agriocharis ocellata* (Cuv.); *Eupsychortyx nigrigularis* (Gould); *Columba leucocephala* Linn.; *C. flavirostris* Wagl.; *Melopelia asiatica trudeaui* (Audubon); *Colymbus dominicus brachypterus* Chapman; *Asarcia spinosa* (Linn.); *Ajaja ajaja* (Linn.); *Florida œrulea* (Linn.); *Dichromanassa rufa* (Bodd.); *Leucophoyx candidissima candidissima* (Gml.); *Polyborus cheriway* (Jacq.); *Buteo borealis calurus* Cass.; *Asturina plagiata* Schl.; *Rupornis magnirostris conspecta* Peters; *Urubitinga anthracina* (Licht.); *Herpetotheres cahinnans* (Linn.); *Glaucidium brasilianum ridgwayi* Sharpe; *Amizilis rutila rutila* (Delattre);

Chlorostilbon canivetii canivetii (Lesson); *Thamnophilus doliatus yucatanensis* Ridg.; *Platyptaris aglaia yucatanensis* Ridg.; *Tityra semifasciata personata* (Jard. & Selby); *Mimus gilvus gracilis* (Cabanis); *Planesticus grayi tamaulipensis* (Nelson); *Cyclarhis flaviventris yucatanensis* Ridg.; *Dendroica bryanti bryanti* (Ridg.); *Guiraca caerulea caerulea* (Linn.); *Arremonops verticalis* (Ridg.) and *Icterus gularis yucatanensis* Berlepsch. Some others I suspect were really collected by Dr. Cabot in Yucatan but there is now no way of proving the fact.

Following is a list of the Yucatan birds described as new by Cabot with an account of such of the types as remain.

Sterna sandvicensis acuflavida Cabot. *Sterna acuflavida* Cabot, Proc. Bost. Soc. N. H., Vol. II, p. 257, 1847. Taneah, coast of Yucatan, April 25, 1842.

One specimen only, mentioned.

TYPE now, M. C. Z. no. 72571.

Micrastur melanoleucus (Vieill.). *Falco percontator* Cabot, Boston Jour. of N. H., Vol. IV, p. 462, Jan. 1844. Edge of the great cenote at Chichen Itza, Yucatan.

Two specimens, ♂ and ♀ adult.

COTYPES now ♂ M. C. Z. 72572; ♀ M. C. Z. 72573.

Eumomota superciliosa superciliosa (Sandbach). *Momotus yucatanensis* Cabot, Proc. Bost. Soc. N. H., Vol. I, p. 156, 1843. Boston Journal, of N. H., Vol. IV, No. 4, p. 466, Jan. 1844. "Throughout Yucatan, particularly at Chichen Itza."

The number of specimens preserved was not stated by Cabot. One example still exists. This TYPE is now M. C. Z. no. 72575.

Centurus dubius dubius (Cabot). *Picus dubius* Cabot, Proc. Bost. Soc. N. H., Vol. I, p. 164, 1844. Boston Journal of N. H., Vol. V, p. 91, 1845. Uxmal, Yucatan, Nov., 1841.

One specimen an adult ♂.

TYPE now, M. C. Z. no. 71785.

Chloronerpes rubiginosus yucatanensis (Cabot). *Picus yucatanensis* Cabot, Proc. Bost. Soc. N. H., Vol. I, p. 164, 1844. Boston Journal of N. H., Vol. V, pt. I, p. 92, 1845. Road from Chemax to Yalahao, Yucatan, March, 1842.

One specimen, ♂.

This cannot now be found.

Dryobates scalaris parvus (Cabot). *Picus parvus* Cabot, Proc. Bost. Soc. N. H., Vol. I, p. 164, 1844. Boston Journal of N. H., Vol. V, p. 92, 1845.¹ Ticul, Yucatan, December, 1841.

¹ Original reference cited in error in Ridgway, 'Birds of North and Middle America.' Part VI, p. 249, as Jour. Ac. Nat. Sci. Phila, V, 1845, 90.

One specimen, ♂.

This specimen also appears to be lost.

Amizilis yucatanensis yucatanensis (Cabot). *Trochilus yucatanensis* Cabot, Proc. Bost. Soc. N. H., Vol. II, p. 74, 1845. "The most common hummingbird in Yucatan." The "specimens" from which it was described were taken "about the acacias which grew upon the tops of the ruined buildings."

One of the TYPES still exists; now no. 72512 M. C. Z.

Thryomanes albinucha (Cabot). *Troglodytes albinucha* Cabot, Proc. Bost. Soc. N. H., Vol. II, p. 258, 1847. Near Yalahao, Yucatan, April 6, 1842.

One specimen, TYPE now M. C. Z. no. 72514.

Psilorhinus mexicanus vociferus (Cabot). *Corvus vociferus* Cabot. Proc. Bost. Soc. N. H., Vol. I, p. 155, 1843. Boston Journal of N. H., Vol. IV, p. 464, 1844.

Casa del Gobernador; Yturbide and Izamal, Yucatan.

Three specimens, ♂ ♂ ♀.

One of these, I learn from Dr. Witmer Stone, is preserved in the collection of the Academy of Natural Sciences of Philadelphia. It was presented by Prof. S. F. Baird who apparently obtained it from Dr. Cabot and is marked as the TYPE (No. 3096 A. N. S. Phila.).

Icterus mesomelas mesomelas (Wagler). *Oriolus musicus* Cabot. Proc. Bost. Soc. N. H., Vol. I, p. 155, 1843. Boston Journal of N. H., Vol. IV, p. 465, 1844.

Ticul and Macoba, Yucatan.

Three specimens, ♂ ♂ ♀.

One of the TYPES still exists; now M. C. Z. no. 72515.

Piranga roseo-gularis roseo-gularis Cabot. *Pyranga roseo-gularis* Cabot. Proc. Bost. Soc. N. H., Vol. II, p. 187, 1846. Boston Journal of N. H., Vol. V, p. 416, 1846. On the road from Chemax to Yalahao, April 5, 1842.

One specimen ♂, TYPE now M. C. Z. no. 72518.

Saltator atriceps raptor (Cabot). *Pyrhula raptor* Cabot, Boston Journal of N. H., Vol. V, p. 90, pl. 12, 1844. "Very numerous throughout Yucatan."

Apparently but two specimens ♂ and ♀.

COTYPES now, ♂ M. C. Z. no. 72574; ♀ M. C. Z. no. 72520.

Under this name Cabot confused two species, describing and figuring as the male the Yucatan form of *Saltator atriceps* and as the female the Yucatan subspecies of *Saltator grandis*.

In his Revision des Tanagriden, Berlin 1910, page 1114, Von Berlepsch described as a new subspecies the Yucatan form of *Saltator grandis*, as *Saltator grandis yucatanensis*, and Peters (Auk, 1913, p. 380), set up Cabot's name for the Yucatan form of *Saltator atriceps* — *Saltator atriceps raptor*.

Besides the Yucatan birds described by himself, Cabot collected in Cozumel Island, two specimens of a yellow honey creeper, that was after-

wards named by Prof. Baird. One of these was mounted and put on exhibition in the Boston Society (it is now M. C. Z. no. 72580) and probably Baird did not have it. The other, still a skin, bears a label on which "type" is marked, in, I think, Baird's handwriting.

Cœreba caboti (Baird). *Certhiola caboti* Baird, Am. Nat., Vol. VII, p. 612, Oct. 1873, Cozumel Isl. 1842. TYPE now, M. C. Z. no. 72525.

The only other type — so far as I have been able to ascertain — in the Cabot collection was,

Tragopan caboti (Gould). *Ceriornis caboti* Gould, P. Z. S. 1857, p. 161. Figured in Birds of Asia, VII, pl. 48. This specimen, is now M. C. Z. no. 73213. It was mounted and had been somewhat battered, during its many changes of abode, but has been remade into a very good skin by Mr. George Nelson.

THE ATLANTIC RANGE OF LEACH'S PETREL (*OCEANODROMA LEUCORHOA* (VIEILLOT)).

BY ROBERT CUSHMAN MURPHY.

ACCORDING to the A. O. U. Check-List, 1910, the western Atlantic range of Leach's Petrel extends from breeding grounds in southern Greenland south casually to Virginia. In the eastern Atlantic the species is known, either as a regular visitor or as a wanderer, at the Azores, Madeira (Nov.), Canary Islands (Nov.), Cape Verdes (Jan.), and the coasts of Sierra Leone and Liberia (Bannerman, Ibis, Vol. II, 1914, pp. 450, 451). Specimens have also been taken in January and March between the Equator and 5° N. latitude, in the longitude of the Cape Verdes, or in approximately the geographical center of the tropical Atlantic Ocean (Salvin, Cat. B. Brit. Mus., Vol. XXV, 1896, p. 350).

During the cruise of the whaler *Daisy*, 1912-1913, I observed and collected *O. leucorhoa* over an area which extends farther to the west and south in the equatorial Atlantic than the previously known range of the species.

RECORDS OF COLLECTION.

September 9, 1912, 28° 36' N., 31° 45' W. (Latitude of the Canary Islands; west of the meridian of the westernmost Azores.) The calmest day I have ever seen, and excessively hot. The glare of the mirroring sea was blinding. The water was dotted with the tiny, translucent sails of sallee-men (*Telella*); pelagic insects (*Halobates*), so rarely visible, left long wakes in the flat, impressionable sea; and large areas of the substance which whalers call "tallow drops" drifted slowly past the brig. Early in the forenoon small dark petrels were seen flying about erratically in the distance, and, lowering the dory, I collected the first example of *Oceanodroma leucorhoa*. I remained in the boat about an hour, "chumming" for the birds with grease, but none other came near.

September 27, 10° 46' N., 24° 38' W. (South of Fogo, Cape Verde Islands.) Calm, with a heavy swell; overcast; northerly breeze toward evening. Among a flock of *Oceanites oceanicus* which fed about us on this day were eight Leach's Petrels. The latter could be readily distinguished by their slightly larger size, longer wings, and notably different style of flight. *Oceanodroma* flies with rapid, "leaping" strokes, quite unlike the alternations of gliding and synchronous flutters which characterize the flight of *Oceanites*. An observer who has once had the good fortune of watching the two species together can thereafter distinguish them almost as far away as the birds can be seen.

I lowered the dory and shot three of the Leach's Petrels.

On September 30, I saw another *Oceanodroma*, but could not lower.

October 3, 6° 46' N., 24° 35' W. At nine o'clock in the evening the crew was engaged in boiling sperm whale blubber, the cresset over the try-works casting a red glare against the limp sails, when a dazzled petrel tumbled onto the deck. It fluttered about, bewildered, but managed to escape. Two others were caught during the night, however, and both proved to be *O. leucorhoa*. One of them I banded and freed.

April 18, 1913, 3° 40' S., 33° 35' W. (Between Rocas Reef and

Fernando Noronha). Fair, with light easterly winds. We passed close enough to Rocas Reef so that the signal and buildings could be seen from the masthead. One *Oceanodroma*, among the *Oceanites*, flew about our stern for a few minutes.

April 19, 3° 15' S., 33° 40' W. Flat calm all day and well into the night. I lowered the dory and collected a dozen petrels, three of which were *Oceanodroma leucorhoa*. One of these had lost a leg above the tarso-metatarsal joint, but it seemed to obtain its food as well as the others. The "springy" flight again struck me as quite distinctive. Unlike Wilson's Petrel the Leach's Petrels settled frequently into the water, holding the tips of their wings high while they swam.

April 23, 1° 34' S., 34° 18' W. Calm; showers. One *Oceanodroma* seen.

May 4, 13° 16' N., 51° 34' W. (Due east of Barbados, W. I.) Moderate trade winds. An *Oceanodroma* flew about us for a while during the morning. I was enabled to watch it very closely, and there can be no doubt whatever regarding the identification. The record is particularly interesting, partly because the locality is almost within the Lesser Antillean region, and also because the date is about the beginning of the normal breeding season for this species in the temperate North Atlantic.

NOTES ON THE SKINS.

All the specimens collected in the tropical Atlantic are indistinguishable from birds taken at Grand Manan and elsewhere near the North American breeding grounds. It is perhaps needless to say that I have avoided a possible confusion with *O. castro*.

The sequence of the plumages is interesting. The specimen taken on September 9, an adult female, is moulting its worn and much faded feathers, a few new, gray scapularies and half-grown rectrices contrasting strongly with the dingy brown of the adjacent plumage. Two September 27 specimens have a completely new garb with the exception of the three outermost primaries which are frayed. The birds collected on April 19 have new quills, and contour plumage which is nowhere greatly worn.

CONCLUSIONS.

Oceanodroma leucorhoa occurs regularly in the tropical Atlantic from September to April or May. It has been taken on and south of the Equator in March and April. The range of the species should be restated in part as follows:—Breeds from southern Greenland and the Faeroes south to Maine and the Hebrides; south in migration to the Equator and the vicinity of Cape San Roque, Brazil.

SOME SUGGESTIONS FOR BETTER METHODS OF
RECORDING AND STUDYING BIRD SONGS.

BY ARETAS A. SAUNDERS.

UP to the present time our methods of recording bird songs have been lacking in uniformity. We realize the fact that bird songs are a great help in field identification of species, when once learned. We admit that a knowledge of these songs is as much to be desired as a knowledge of plumage or migration, that it should occupy as prominent a place in the science of ornithology. But if we search through various writings for records of the song of a given species, we find a heterogeneous and uncertain mixture of data that do not give us any satisfactory impression of the song. Various methods have been used to describe and record bird songs, but so far, only one method, that of musical notation, has been possessed of any scientific accuracy.

Musical notation, as a method of recording bird songs, has been subject to a great deal of adverse criticism. It has been made primarily for the recording and rendering of human music and birds do not usually sing according to such standards. The musical scale gives no place for the recording of notes that are slightly sharp or flat. Its standards of time do not allow the record of a song that does not follow the rhythmic beat of its measures. Do

birds sing in any given key? Do they recognize any fundamental notes? Can one beat time to a bird's song? In the majority of cases these questions must be answered in the negative. Only a few individuals of certain species approach these standards of music. The great majority of birds sing in a free, non-mechanical, natural manner that cannot be recorded on the musical scale with the exactness that it deserves. If we have no better method we must resort to musical notation, but if we can find a better method, one which discards the mechanical rules of human music, without losing any of its scientific accuracy, we can take a long step in advance toward the true scientific study of bird song.

Before discussing the possibilities of such a method, it is first essential to have a definite classification of the points concerning which we desire information to make our knowledge of a given song complete. These points appear to me to be five in number. They are pitch, duration, intensity, pronunciation and quality. Concerning quality I have no suggestions to offer farther than those already made by others. Sound qualities are baffling and difficult to describe with accuracy, and, until we can have a definite and practical classification of them, they will continue to be so.

Our records of pitch, duration and intensity must be first comparative, for the different notes or parts of a given song, and second absolute, for a comparison of the song with other songs of the same or another species. A pitch pipe, together with a good musical ear, are necessary to obtain the comparative and absolute pitch in the field. A stop watch is probably the best instrument with which to get records of duration. Comparative intensity can be recorded with reasonable accuracy by ear, but absolute intensity is more difficult to measure. The intensity of a song must necessarily vary with the weather conditions, the temperature, the pressure of the air, and above all the direction and velocity of the wind. We know, however, that the intensity of sound varies inversely as the square of the distance from its source, and this gives us something tangible to go by. If then, our bird will remain in one spot singing, on a day when there is no wind, while we find the farthest point at which the softest and loudest parts of its song are audible, we will have a definite measure of intensity. This process seems destined to try to the utmost the patience and perseverance of the future student of bird song.

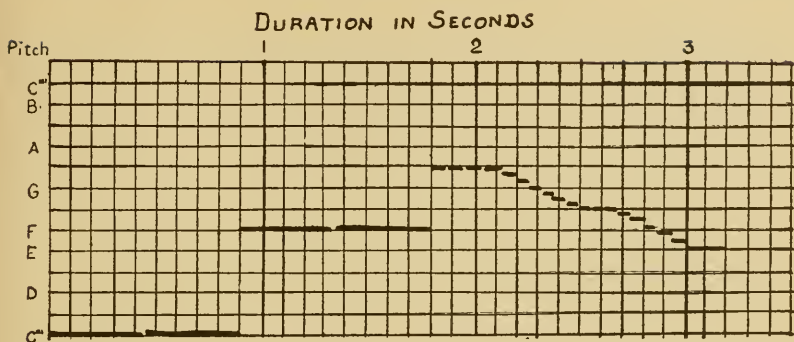


Fig. 1. Song of the Vesper Sparrow. West Haven, Conn., April 23, 1914, 6 A. M.

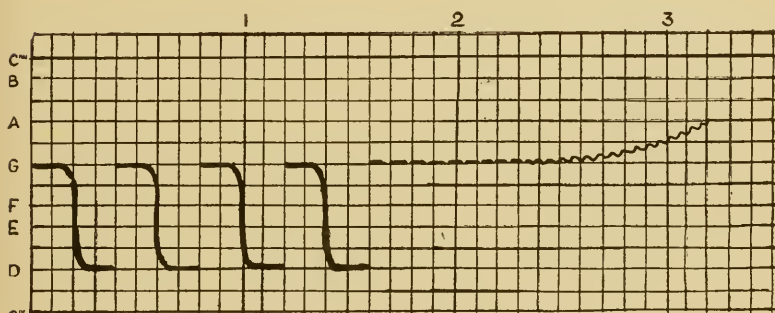


Fig. 2. Song of the Field Sparrow. West Haven, Conn., April 18, 1914, 9 A. M.

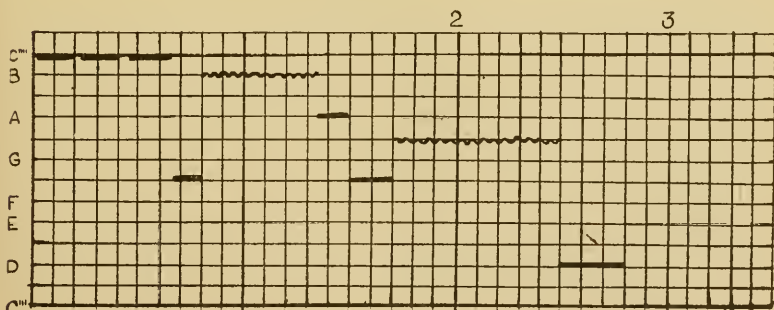


Fig. 3. Song of the Song Sparrow. Gunhill Road, N. Y. City, April 3, 1914, 9.15 A. M.

The following method has occurred to me by which the pitch and duration of a song may be represented graphically, when once it is determined. This method is to represent the song by lines on ordinary coördinate paper, plotting the pitch along the ordinate, that is in a vertical direction, and the duration along the abscissa in a horizontal direction. In order to see whether this method was practical, I tested it in the field during the spring of 1914, recording 104 different songs and call-notes, representing 18 different species. The species included both birds with simple songs, such as the Junco and Phœbe, and others with more complicated songs such as the Song Sparrow (fig. 3) and Purple Finch (fig. 4). It also included some bird sounds not properly classed as songs, such as certain call-notes of the Flicker and the scream of the Red-shouldered Hawk.

Of course this method is not without its difficulties. It is usually impossible, even with the simplest songs, to record them after one hearing only, and with a long continued song, it is only possible to catch and record phrases here and there. Such difficulties, however, would be just as great, or even greater in using musical notation. I have tried several times to record bird songs by musical notation, and am certain that this graphic method is much simpler, and much more easily used and mastered than is the other. In the matter of pitch, one does not have to ascertain whether the bird is singing in three flats, five sharps or something else. If the bird flats a little, or uses an interval not strictly a fifth, seventh, or some other known to human music, this fact may be shown and need not be modified to fit the human standard. In the matter of time the same things are true. Notes need not be reduced to quarters and eighths when they really have no such definite relations to each other, but may be represented in their actual true duration. In short, the method, like the bird's song itself, is natural, and does not follow any fixed rule of either pitch or time.

The unit of measurement of pitch is of course the octave, but this is not divided into eight parts as on the musical scale, but into twelve parts, representing the twelve half-tones. Thus B and C, and E and F are shown in their true relations, half a tone apart, and not, as on the musical scale, spaced the same distance apart as

notes that are separated by a whole tone. The unit of time is not the measure, further modified by the addition of *adagios*, *allegros* or numbers signifying beats per minute, but is the second, a unit that is uniform and unchanging, and thoroughly understood both by musicians and by the uninitiated. The second may be further divided into fifths, the smallest unit that can be recorded by an ordinary stop watch. I have found that in practise it is still better to divide it into tenths, so that short, rapidly repeated notes may be easily represented, and lengths of songs may be expressed in decimals.

In putting this method into practise, I have found a few modifications from the definite rules necessary in order to record the characters of all songs clearly. A rest, or pause in a song would of course be represented by a break in the horizontal continuity of the lines representing it. Many bird songs, particularly those of the sparrows, contain series of short, rapidly repeated notes all on the same pitch, without a pause between them. If the method were rigidly adhered to, these would be represented by a continuous straight line, and the separate notes could not be distinguished. In order to avoid this I have written such songs with a slight break in the horizontal lines to keep the distinct notes separate, although there is really no pause in the song. When such notes become so rapid that the number cannot be counted, the note becomes a trill. I have represented trills by continuous, slightly wavy lines, the wave not representing any variation in pitch, but the pitch of the note being recorded by the central axis of the wavy line. These conditions are shown in the illustrations of songs of the Song and Field Sparrows.

The illustrations will suffice to make more clear the graphic method of recording songs. I have used the letters C' , C'' , C''' , etc., to indicate middle C and the octaves above it. Where notes on different pitches are slurred together, I have represented this fact by connecting them by an almost vertical line. Such slurs are characteristic of the Meadowlark's song (fig. 7) and are also found in the introductory notes of the Field Sparrow record (fig. 2). One criticism of my method that has been made is that all notes are not connected by these vertical lines, to give the songs more continuity of appearance. This would make it diffi-

DURATION IN SECONDS

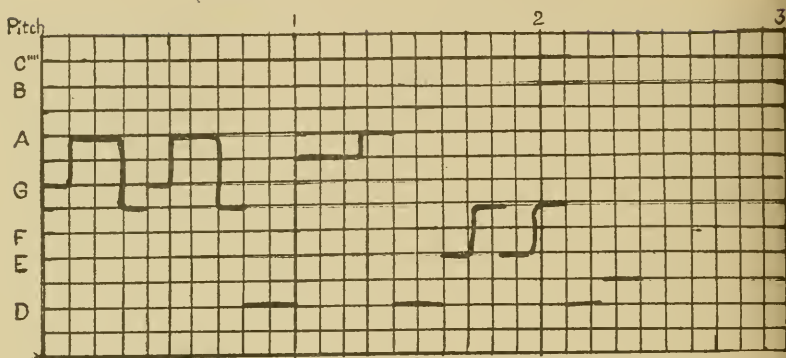


Fig. 4. Song of the Purple Finch. West Haven, Conn., April 28, 1914, 5.30 P. M.

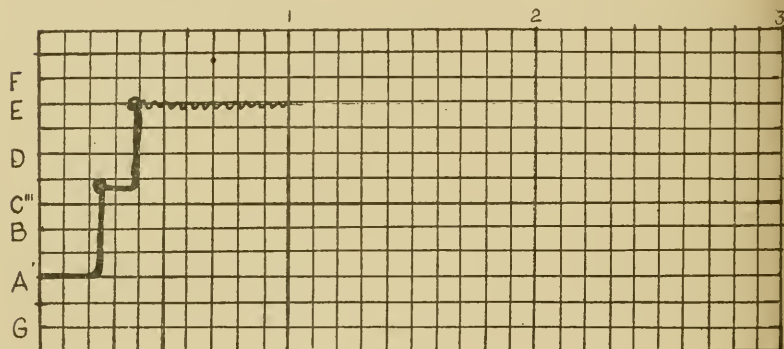


Fig. 5. Song of the Red-winged Blackbird. Gunhill Road, New York City, April 3, 1914, 8.30 A. M.

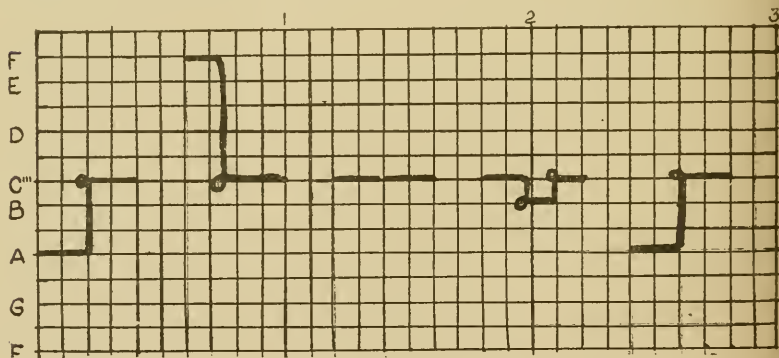


Fig. 6. Song of the Robin. West Haven, Conn., April 17, 1914, 5.30 P. M.

cult to distinguish between notes that are slurred together by the bird and those that are clearly separate. This difficulty is at best a slight one. The disconnected appearance of the songs may seem great at first glance, but becomes insignificant as one becomes accustomed to the method.

By this same method it is also possible to represent the variations in intensity of a bird song. This could be done by variation in the breadth or heaviness of the lines, making heavy lines for the loud notes, and light lines for the softer ones. I have not yet attempted to measure the intensity of bird songs in the field so have omitted this factor from the illustrations.

The factor of pronunciation is one that presents some difficulties. To just what extent birds produce recognizable vowel or consonant sounds in their songs it is hard to say. It is probably true that a purely musical note has no real vowel sound and that the only difference in such notes is that of quality and not pronunciation. Consonant sounds, however, may be occasionally recognized in bird songs and call notes. The "k" sound in the call note of the crow, for instance, is universally recognized. In true songs I believe that the explosive consonants, such as "p," "k," "t" etc., are rare. The commonest consonant sounds are liquid ones, such as "l" and "r", connecting different notes. In the songs I have studied and recorded, the liquid "l" is the only consonant I have recognized. This sound is quite common in the songs of many species and is evidently an important distinguishing character. I have represented the presence of this sound by a loop, at the beginning of the note introduced by it, as shown in the songs of the Robin (fig. 6) and Redwinged Blackbird (fig. 5).

One of the first things that one notes after studying songs for a time in the field is that even the simplest and commonest songs are tremendously variable. This variation extends not only to different individuals, but also to different songs by the same individual. The song of the Meadowlark is one that is quite simple and easy to record, and yet shows enough variation to make a very interesting study (fig. 7). I have recorded thirty different songs of the Meadowlark by the graphic method, and believe that with time and opportunity I could record three or four times as many. Seven of these songs were sung by the same bird during an hour's time.

DURATION IN SECONDS

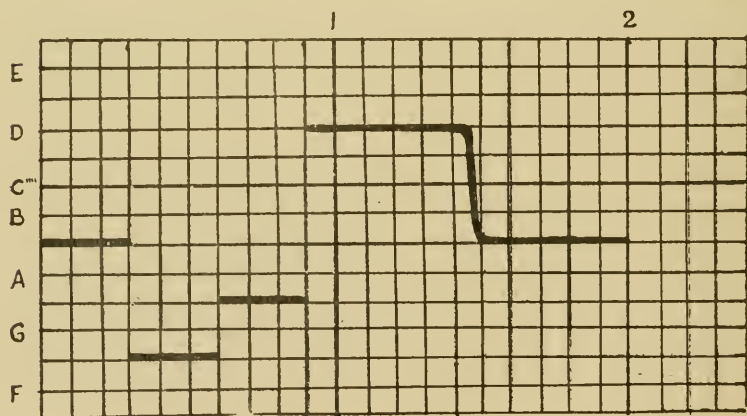
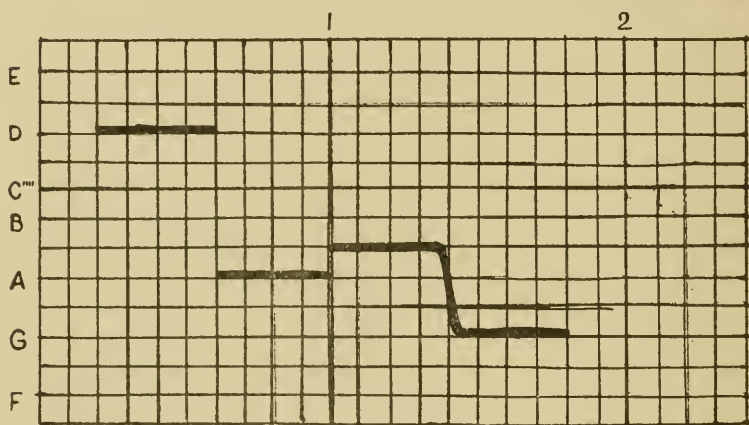
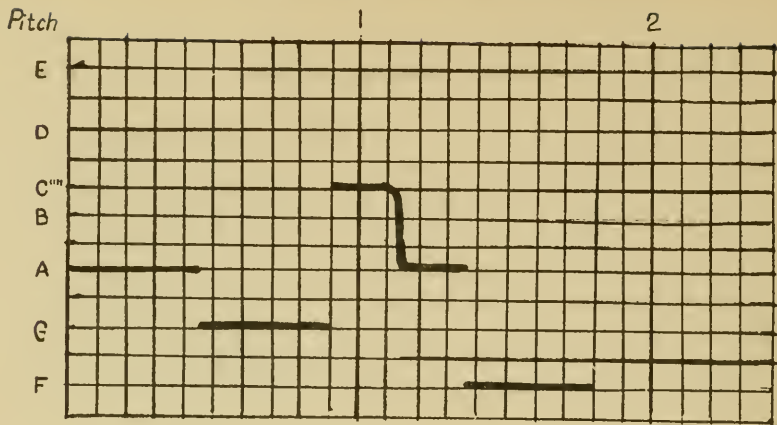


Fig. 7. Three Songs of the Meadowlark. No. 1. West Haven, Conn., October 18, 1914, 3 P. M. No. 2. Mt. Vernon, N. Y., April 7, 1914, 5 P. M. No. 3. West Haven, Conn., April 21, 1914, 5.30 A. M.

The song of the Song Sparrow is even more variable. Not only does each individual have two or more totally different songs, but I have yet to find two individuals whose songs are at all alike. It seems probable that the number of variations of the Song Sparrow's song is greater than the number of individual Song Sparrows.

Since the variations in the song of a single species are so great, a question arises as to what are the factors in which these variations resemble each other. The songs of both the Meadowlark and the Song Sparrow, except in unusual instances, are easily recognized in the field. What characters then are specific? Quality undoubtedly is one. But quality is not the only one, for songs of different species may often have the same quality and yet be easily distinguished. To determine the others it becomes necessary to record a large number of songs of the same species. By comparison of these the points of similarity may be determined, and the amount of variation to which the song is subject may be shown.

I have not yet recorded enough songs of any one species to make a complete study of the song of that species, or to make any statements concerning it that are general in application. As an illustration of how this may be done, however, I have figured out some results from twenty-seven records of the Song Sparrow's song that are interesting though not conclusive. The longest duration of any of these songs is 3.2 seconds, the shortest 1.8 seconds. The average duration is 2.79 seconds. The highest note in any record is D''' and the lowest D'', giving a range for the species of two octaves. The greatest range of any one song is twelve half-tones or exactly one octave. The least range is four half-tones. The average range is 8.7 half-tones. All but one of the songs contain one or more trilled notes, and this one contains a series of rapidly repeated notes on the same pitch, differing from a trill only in the fact that the single notes are distinct and slow enough to be counted. This arrangement of notes is also a common character and occurs in fourteen of the songs. Most of the songs begin in a more or less characteristic manner and two such types of beginning are recognizable. The first of these consists of three notes on the same pitch varying from two to three tenths of a second in length. Twelve of the songs, including the one in the illustration show this type of beginning. The second consists of one or two long notes,

followed by four to six rapidly repeated ones, all on the same pitch. Seven of the songs have this type of beginning. The remaining eight songs are irregular and show no definite types. None of the songs show enough similarity in termination to draw any general conclusions.

In this manner, from a large number of records of a single species, one should be able to draw fairly definite conclusions concerning the song even when it is extremely variable. Many other interesting facts concerning bird songs may be deduced by studying and recording them in the field. Thus two Field Sparrows, singing alternately and within hearing of each other, produced songs that were exactly alike in every respect, while two Song Sparrows singing under similar conditions had songs that were dissimilar except for the last three notes which were exactly alike.

Field work in studying and recording bird songs is more or less difficult according to the qualities of the person attempting the work. A good musical ear is absolutely essential. Records made by a person not possessed of such an ear for music would be of no more value than descriptions of plumages made by one who is color blind. A knowledge of music is essential also, but it need not be great. In fact I believe that very little musical knowledge is necessary to use or understand the graphic method of recording songs.

In the absence of a stop watch it is possible to use an ordinary watch provided it is a good one, though its use is more difficult. An ordinary, good watch ticks five times to the second, so that fifths of a second may be measured by listening to the ticks. In making records of songs in the field it is of value to record the date, locality and time of day with the record. These points may serve to show important facts concerning the variation of songs due to these factors.

It is also possible to add the factor of quality to the record by writing a statement of this at the top of the record, as suggested by Mr. Robert T. Moore in his paper on musical notation at the A. O. U. meeting of 1913. I have not done this on my records as I feel that the statements would be too inexact to be of much value. All of the songs I have used in illustration are to my mind of a whistled quality, and I am of the opinion that the differences in

them are largely, if not wholly due to pitch, intensity or the presence of liquid consonants.

Thus, all five of the factors, pitch, duration, intensity, pronunciation and quality, may be recorded on a single sheet by this graphic method. The results, I believe, will be intelligible to musicians, and a little less "like Greek" to those whose knowledge of written music is slight.

LIST OF THE BIRDS OF LOUISIANA. PART VII.

BY H. H. KOPMAN.

(Concluded from p. 29.)

247. WESTERN Tanager (*Piranga ludoviciana*). The only known record of the occurrence of this bird in Louisiana is a specimen taken on March 19, 1898, by Mr. Andrew Allison in Jefferson parish, on the opposite bank of the Mississippi river from New Orleans. It was a parti-colored male, with yellow predominating.

248. SCARLET Tanager (*Piranga erythromelas*). This bird is seldom very common in Louisiana except for a few days at a time. It is most apt to occur at New Orleans about April 20 and in the early part of October. The earliest date of arrival at the latitude of New Orleans is April 8, 1900, at Bay St. Louis, Miss., and the latest date in spring is May 9, 1903, at Lobdell, La. Considerable waves are sometimes present the latter part of April, and about Oct. 10, 1896, I saw an unusual number in the suburbs of New Orleans. The latest date of departure is Oct. 20, 1897, at Ariel, Miss.

249. SUMMER Tanager (*Piranga rubra rubra*). Common summer visitor, especially in the higher sections of the State. In the swampy region in the southeastern part it shows a disposition to frequent particular neighborhoods, especially those which are better drained. The earliest date of arrival in the latitude of New Orleans is March 31, 1902, at Bay St. Louis, Miss. The latest date of departure is Oct. 27, 1899 and 1900, at Covington, La. It is sometimes remarkably abundant at New Orleans during waves in the latter part of April and early part of October.

250. PURPLE MARTIN (*Progne subis subis*). Common summer visitor, arriving usually about Feb. 15, becoming common about March 10, and disappearing more or less completely from the southern part of the State about Sept. 15. A large southward flight is usually noted at the Gulf

coast about August 22. The earliest record of arrival at New Orleans is Feb. 7, 1897, and the latest recorded departure is Oct. 22, 1894.

251. CLIFF SWALLOW (*Petrochelidon lunifrons lunifrons*). A rather rare bird in the southern and eastern parts of the State at least. Has been noted in Plaquemines and St. James parishes, along the Mississippi river, in September. Noted also at Bay St. Louis, Miss., in September.

252. BARN SWALLOW (*Hirundo erythrogaster*). Common transient. The earliest date of arrival in spring at New Orleans is March 20, 1894. Usually arrives about April 1, and is commonest the last week or ten days of April, and the first few days of May. Has been noted at New Orleans as late as May 25. Returns usually about August 1, but one was seen at Bay St. Louis, Miss., July 8, 1899. Is more or less common until the early part of October and sometimes later. Was noted at Gulfport, Miss., Nov. 6, 1910, and a few may usually be seen until about Nov. 1.

253. TREE SWALLOW (*Iridoprocne bicolor*). Abundant as a transient; irregularly present and sometimes even common, near the coast, in winter; present through much of the summer, though not known to breed anywhere in the State. Usually becomes common in spring about March 20; remains more or less common until about the 10th or 15th of May. Has been noted in abundance near New Orleans the first week in July. Is most abundant in October, especially after the 10th or 15th, and remains very common until decidedly cold weather in November, about Nov. 15 or 20. Sometimes fairly common at intervals throughout open winters; other seasons rare or entirely absent.

254. BANK SWALLOW (*Riparia riparia*). Apparently not very common anywhere in the State except possibly in the most northern sections, where it may perhaps breed. Noted in the southern part of the State chiefly at the seasons when other swallows are commonest, from the latter part of March to the early part of May, and from August to the latter part of October.

255. ROUGH-WINGED SWALLOW (*Stelgidopteryx serripennis*). Common summer visitor, but apparently not breeding in the extreme southeastern part of the State. Arrives the latter part of March and departs about Nov. 1.

256. CEDAR WAXWING (*Bombycilla cedrorum*). Common chiefly in the latter part of winter, and throughout the spring, even to the last of May or first days of June. It has been seen on several occasions at Bay St. Louis, Miss., however, in October; once on Oct. 13, 1898, when two were seen. At New Orleans, little is seen of it until about Feb. 1, when it arrives to feed on the fruit of hackberry and Japan privet, and the flowers of the elm, It later feeds on the blossoms of the pecan, and finally on the fruit of the mulberry. The latest date of departure at New Orleans is May 19, 1900; at Bay St. Louis, Miss., May 27, 1902, and at Pass Christian, Miss., June 2, 1906.

257. LOGGERHEAD SHRIKE (*Lanius ludovicianus ludovicianus*). The true Loggerhead is a bird of the pineries and other dry locations in Louisiana,

none of this species being found during the breeding season in the fertile alluvial and prairie regions of the southern part of the State. About August 20, however, the Shrike appears at New Orleans, and is fairly common thereafter in the lowland section until the middle or latter part of March. It seems probable, however, that a majority if not all of the birds seen in these localities are Migrant Shrikes (*L. ludovicianus migrans*).

258. RED-EYED VIREO (*Vireosylva olivacea*). Abundant summer visitor wherever there are deciduous trees, though seldom found in the cypress. Generally arrives at New Orleans about March 22, becoming common the last week in the month. Earliest dates of arrival March 18, 1894, and March 19, 1899. Transient movement in fall begins in August, and continues to be heavy until Oct. 10 or 15. Last one is usually seen about Oct. 20. Feeds extensively in fall on the seeds of the Magnolias (*M. foetida* and *M. virginiana*).

259. PHILADELPHIA VIREO (*Vireosylva philadelphia*). A rather rare transient; spring records lacking; numerous in August, 1893, in heavy growth of willow, hackberry, cottonwood, deciduous holly, and other low trees on the batture of the Mississippi river in St. James parish; the first noted August 2. Noted also in October: Oct. 10, 1896, at New Orleans; Oct. 17, 1897, at Ariel, Miss.; Oct. 15, 1901, at Bay St. Louis, Miss.

260. WARBLING VIREO (*Vireosylva gilva gilva*). Fairly common summer visitor in the southern part of the State, occurring chiefly in shade trees in suburban sections of New Orleans, and in willows along the river and edges of pastures. Arrives the latter part of March; earliest arrival, March 27, 1897. Disappears early in the fall; sings occasionally as late as the early part of September.

261. YELLOW-THROATED VIREO (*Lanivireo flavifrons*). Fairly common summer visitor except in the coastal section. Noted during the breeding season, however, in a suburban locality in New Orleans in 1912, 1913, and 1914. Seldom nesting south of about latitude 31°. Arrives about March 25. Latest date of departure, Oct. 21, 1897, at Ariel, Miss.

262. BLUE-HEADED VIREO (*Lanivireo solitarius solitarius*). Fairly common in midwinter in the fertile alluvial region of the southeast. Appears to arrive usually in October: Oct. 25, 1901, Bay St. Louis, Miss.; Oct. 6, 1905, Biloxi, Miss.; but a single specimen was taken at Diamond, La., Aug. 4, 1893. Latest date of departure, March 24, 1904, New Orleans.

263. WHITE-EYED VIREO (*Vireo griseus griseus*). An abundant summer visitor in all moist or swampy woodland; may be seen occasionally in the coastal section in winter, even singing on mild days in December and January. Becomes common from March 15 to 20, and remains so until about Nov. 1.

264. BLACK-AND-WHITE WARBLER (*Mniotilta varia*). Common transient, especially in the fall, and probably breeds sparingly in the northern part of the State. Usually arrives at the coast about March 20; earliest date of arrival, March 15, 1902, at Bay St. Louis, Miss. Remains until

about May 1. Returns very early; recorded July 4, 1906, at Bay St. Louis, Miss.; commonest in August and September. Last at New Orleans, Oct. 25, 1914.

265. PROTHONOTARY WARBLER (*Protonotaria citrea*). Common summer visitor in river bottoms and swampy regions, especially about sloughs and along sluggish streams. Usually arrives by March 20; earliest arrival at New Orleans, March 15, 1894. Leaves about the end of September. The arrival in the immediate coast section, where it is most abundant, is decidedly earlier than in moist bottoms in the higher parts of the State, where the first are usually seen early in April.

266. SWAINSON'S WARBLER (*Helinaia swainsoni*). Occurs chiefly in wild cane brakes in low woods or along streams. Occurs rather commonly as a spring transient in one of the former of such locations near New Orleans. I found it surprisingly common not only in the cane brakes but throughout a considerable section of rich swampy woods in the same general locality on April 14, 1905. At least twenty-five or thirty were noted in covering a distance of probably ten miles. There was a good deal of water in the swamps at the time. Earliest arrival at New Orleans, March 30, 1905. Have never noted it in fall. May breed sparingly at New Orleans.

267. WORM-EATING WARBLER (*Helmitheros vermivorus*). A transient only in the more southern part of the State, seldom very common, and usually seen only for brief periods. Prefers deep, moist woods. The earliest in spring was noted at Bay St. Louis, Miss., April 5, 1902; the earliest arrival in fall near the coast is August 11, 1897, at Beauvoir, Miss. Latest date of departure in fall, Sept. 30, 1897, at Ariel, Miss.

268. BACHMAN'S WARBLER (*Vermivora bachmani*). In the more southern parts of Louisiana and Mississippi at least, this species is undoubtedly only a transient. Besides the previously published records of its capture on the northern shore of Lake Pontchartrain in Louisiana by Mr. Charles Galbraith (Auk, Vols. 4 and 5), it has been noted by Mr. Andrew Allison in Mississippi on the following occasions: March 26, 1902, Bay St. Louis, Miss.; March 24, 1906, Ellisville, Miss.; July 4, 1906, Bay St. Louis, Miss.

269. BLUE-WINGED WARBLER (*Vermivora pinus*). May breed in the northern part of the State; a rather rare transient in all localities where I have made observations. Earliest date of arrival in spring, March 13, 1902, Bay St. Louis, Miss.: earliest arrival in fall, July 23, 1898, Bay St. Louis, Miss.

270. GOLDEN-WINGED WARBLER (*Vermivora chrysoptera*). A rather rare transient. Appears to migrate rather late in spring and early in fall: August 12, 1897, Beauvoir, Miss.

[NASHVILLE WARBLER (*Vermivora rubricapilla rubricapilla*). This species does not appear to have ever been recorded in the State, though it has been noted at Bay St. Louis, Miss., in September, and I am practically sure of having seen it at Beauvoir, Miss., at the same season.]

271. ORANGE-CROWNED WARBLER (*Vermivora celata celata*). A common winter visitor in the alluvial region of the central southern and south-

eastern portions of the State. Earliest date of arrival, Nov. 19, 1901, New Iberia, La., and latest date of departure, April 3, 1909, New Orleans, Usually commonest from about Dec. 15 to Feb. 15. Often seen in live oaks.

272. TENNESSEE WARBLER (*Vermivora peregrina*). An abundant transient in fall, especially in the alluvial section of the southeast, irregular in spring but sometimes common late in April or early in May. In fall, it usually arrives Sept. 22 or 23, and becomes very abundant in October, especially in weedy fields and about the edges of the woods, often in company with the Indigo Bunting. Departs usually about Nov. 1; latest, Nov. 8, 1913. Earliest arrival in spring, March 12, 1900; latest departure in spring, May 9, 1903.

273. NORTHERN PARULA WARBLER (*Compsothlypis american ausneae*). An abundant summer visitor, especially in the southeastern part of the State, though found practically everywhere in mixed forest growth on more or less moist ground. Arrives at New Orleans early in March (earliest Feb. 22, 1893) and is sometimes common by March 10 or 12, seldom later than March 15. Nests invariably in the Spanish moss (*Tillandsia*) in the southeastern part of the State. Nesting begins early in April. Prefers the live oak as a nesting tree. Feeds indiscriminately in deciduous trees, however, especially the pecan, elm, maple, locust, tupelo, ash and cypress. Remains common until at least Oct. 20; latest date of departure, Oct. 26, 1899, Covington, La.

274. CAPE MAY WARBLER (*Dendroica tigrina*). A record of its occurrence (New Orleans, April, 1890) noted by Prof. Beyer in his list of the Birds of Louisiana is the only one of which I have any knowledge.

275. YELLOW WARBLER (*Dendroica aestiva aestiva*). Abundant transient, especially in the late summer and fall; breeds occasionally except in the extreme southernmost section of the State. Has been noted as a breeder at Baton Rouge by Mr. Andrew Allison and in Pointe Coupee parish by Mr. A. B. Blakemore. Usually arrives at the Gulf Coast the first week in April — earliest, March 30, 1904, and is commonest usually from about April 15 to April 25. Latest date in spring at New Orleans, May 4, 1897. Reappears usually in the latitude of New Orleans about July 15 — earliest, Bay St. Louis, Miss., July 7, 1899; and becomes very common by the end of July. Remains common in August and throughout the greater part of September, though there are periods of increased abundance from time to time. Latest date of departure at New Orleans, Oct. 15, 1903.

[BLACK-THROATED BLUE WARBLER (*Dendroica caerulescens*). Though reputed to occur in the State, I have never seen it, have no knowledge of any specimens being taken in Louisiana, and am unable to find any well authenticated record of its occurrence. I saw what I thought was an individual of this species at New Orleans March 26, 1897, but did not observe it satisfactorily and was by no means convinced of its identity.]

276. MYRTLE WARBLER (*Dendroica coronata*). Abundant winter visitor. Arrives in southern Louisiana about Oct. 15: Oct. 11, 1905, at Biloxi, Miss. Departs from the coast about April 22. Latest at New

Orleans, April 27, 1897 and 1903. More or less continuously abundant throughout some winters, but almost rare in occasional seasons. A decided transient movement is observable usually at the end of winter and in the early spring. In 1906, I noted increases at Biloxi, Miss., on the following dates: Jan. 6, 20, 29; Feb. 1; March 10, 19, 24. Specimens in very good plumage are seen as early as April 1, and singing usually begins at this time or a little earlier and continues until the time of departure. While the singing is not infrequent, it cannot be called general.

277. **MAGNOLIA WARBLER** (*Dendroica magnolia*). Abundant fall transient; decidedly rare in spring in localities where I have made observations. Earliest arrival in fall, Sept. 13, 1899, Bay St. Louis, Miss.; usually arrives about Sept. 20; common at Covington, La., Oct. 1, 1899. Latest date of departure, Oct. 28, 1899, Covington. Usually common until about Oct. 20. In spring this species is more apt to be seen in the latter part of the season: May 5, 1897, New Orleans; May 11, 1902, Bay St. Louis, Miss.

278. **CERULEAN WARBLER** (*Dendroica cerulea*). May breed in the northern part of the State, but apparently only a transient in most localities. Seldom common, though small companies may sometimes be seen for a period of a few days in the migrations. Commoner in the mixed upland woods than in the southeastern section. Migrates very early in fall: July 12, 1897, Beauvoir, Miss., where small flocks were seen on this and succeeding days in pine, oak, magnolia, beech and hickory woods. Latest date in fall, Sept. 30, 1897, Ariel, Miss. Arrives at Gulf coast latitude about April 10; earliest, April 8, 1898, New Orleans.

279. **CHESTNUT-SIDED WARBLER** (*Dendroica pensylvanica*). In the southeastern part of the State, this is one of the rarer transients, especially in spring. Most apt to be seen in the latter part of the season (April 21, 1905, New Orleans). Sometimes common for a few days in fall. Noted many near New Orleans on Oct. 10, 1896, during a remarkable wave of transients, principally warblers, tanagers, and vireos. The earliest date of arrival in fall is Sept. 12, 1899, Bay St. Louis, Miss., and the latest date in fall is Oct. 19, 1897, Ariel, Miss.

280. **BAY-BREASTED WARBLER** (*Dendroica castanea*). Occasionally present for a day or so in fall, occurring singly or in small flocks. Earliest date of arrival, Sept. 23, 1896, Bay St. Louis, Miss. Latest date in fall, Oct. 18, 1897, Ariel, Miss. In spring it is rarer than in fall. Have noted it the first week in May at New Orleans, and at New Iberia: May 15, 1902.

281. **BLACK-POLL WARBLER** (*Dendroica striata*). A decidedly rare transient, though occasionally occurring in considerable numbers for a day or so at a time. Mr. W. B. Allison noted a good many at Bay St. Louis, Miss., May 13, 1906. I noted one at New Orleans, Sept. 21, 1897.

282. **BLACKBURNIAN WARBLER** (*Dendroica fusca*). While never very common, this is a species of rather more regular occurrence in fall than the several preceding. It is considerably rarer in spring. The earliest date of

arrival is April 8, 1900, Bay St. Louis, Miss. A specimen was noted by Mr. Andrew Allison, and, in fact, taken, at Bay St. Louis, Miss. on August 11, 1898. The next earliest record of arrival is Sept. 13, 1897, Ariel, Miss. The latest date of departure is Oct. 18, 1901, Bay St. Louis, Miss. As with most other warblers of this group, this species occurs more freely in mixed upland woods than in the fertile alluvial region of south-eastern Louisiana.

283. SYCAMORE WARBLER (*Dendroica dominica albilora*). Fairly common summer visitor, especially in brakes of tall cypress. Earliest arrival, Feb. 27, 1897, New Orleans. Usually arrives about March 10. Latest date of departure, Sept. 20, 1901, Bay St. Louis, Miss. Confined more or less closely to swampy woods in the breeding season.

284. BLACK-THROATED GREEN WARBLER (*Dendroica virens*). Fairly common in the lowlands during fall waves; common throughout much of the fall migration in pine and other upland growths. Rarer in all sections in spring. I took a specimen at Beauvoir, Miss., July 30, 1897, and I am sure of having seen it the latter part of July in Madison Parish! Excluding these abnormally early transients, the earliest date of arrival is Sept. 18, 1897, Ariel, Miss. It was common at New Orleans, Oct. 20, 1896, and became common at Biloxi, Miss., Oct. 22, 1906. The last was seen at Covington, Oct. 28, 1899. In spring it occurs chiefly in the latter part of the season: April 14, 1902, Bay St. Louis, Miss., and May 9, 1903, Lobdell, La.

285. PINE WARBLER (*Dendroica vigorsii*). Abundant resident in pine forests; elsewhere a winter visitor only. Individuals wintering in regions of deciduous woodland do not appear in such localities until the early part of the winter as a rule, and they do not remain much after the middle of March, at least in the southern part of the State. In the pine woods, this warbler begins to sing with the first mild weather of January.

286. PALM WARBLER (*Dendroica palmarum*). A fairly common winter visitor, sometimes rather abundant, in open places in the lowlands and in flat pineries. I have been unable to trace the relation between the movements of this species and the Yellow Palm Warbler (*Dendroica palmarum hypochrysea*), and have assumed all data to refer to the Palm Warbler. Arrives about the middle of October and becomes common about Nov. 1. Remains until the early part of April: April 11, 1896, New Orleans.

[PRAIRIE WARBLER (*Dendroica discolor*). Though undoubtedly occurring in localities in the piney sections of the State similar to those frequented by it in southern Mississippi, this species has not been recorded by any observer in Louisiana so far as I know. While it does not appear to breed on the coast of Mississippi, it arrives there by the latter part of July, and is rather common in scrubby growths of pine and oak. I have no data on its movements in southern Mississippi in spring, and no record of its departure in fall.]

287. OVENBIRD (*Seiurus aurocapillus*). Fairly common transient for brief and occasional periods, found chiefly in mixed woodland undergrowth,

especially in moist localities. Earliest arrival, April 5, 1902, Bay St. Louis, Miss. Usually commonest about April 15. Latest date in spring, May 9, 1903, Lobdell, La. Earliest arrival in fall, August 28, 1899, Bay St. Louis, Miss. Latest departure, October 19, 1897, Ariel, Miss.

288. WATER-THRUSH (*Seiurus noveboracensis noveboracensis*). In southeastern Louisiana, except in the pine woods, this species greatly outnumbered the following, which, in fact, is rather rare in the fertile alluvial section. In the pine woods the two species are about equally common in migration, the present species preferring the occasional sloughs and swampy strips among the pines, the Louisiana Water-Thrush frequenting sandy ravines and creek and small river banks, and on the Mississippi coast occurring even on the sandy shore. The Water-Thrush reaches Gulf coast latitude in fall the middle or latter part of August, remaining until Oct. 10 or 15 — latest, Oct. 17, 1896, New Orleans. In spring it arrives early in April, but is more apt to be common late in the season. Latest date of departure, May 7, 1897, New Orleans.

289. LOUISIANA WATER-THRUSH (*Seiurus motacilla*). Those sections of the State where the streams flow over sharp sandy beds are the pre-eminent habitat of this species, both as breeder and transient. As a breeder, it is found chiefly in the northern part of the State, but it reaches the latitude of the coast very early, having been noted at Bay St. Louis, Miss., July 4, 1906, and always commonly after the middle or latter part of July. As previously explained, it is not very common in the southeastern part of Louisiana; the earliest date of arrival in spring is March 19, 1904, at New Orleans. Records of the departure in fall are lacking.

290. KENTUCKY WARBLER (*Oporornis formosus*). Common summer visitor in undergrowth of flat, moist woods, such as the better swamps in the lowlands and the bottoms of the more elevated sections of the State. Arrives at Gulf coast latitude the last of March: earliest, 1905. Inconspicuous in fall; appears to leave about the end of the month.

[CONNECTICUT WARBLER (*Oporornis agilis*). Has never been noted for Louisiana. I noted either this species or the Connecticut Warbler at Biloxi, Miss., on August 27, 1906.]

291. MOURNING WARBLER (*Oporornis phoeniceus*). I have not found this bird in the State, but Mr. Andrew A. Wetmore, who is reasonably sure was a specimen of this species early in the year. New Orleans. I have noted either this species or the Connecticut Warbler at Biloxi, Miss. (August 27, 1906). In any event, it is abundant in all sections of both States.

292. MARYLAND YELLOW-THROAT (*Geothlypis trichas trichas*). Common winter visitor, all breeding birds being doubtless referable to this form. At the Gulf coast, there is always a decided influx of Yellow-throats about Sept. 1, but whether this form alone is represented in this influx, I am unable to say.

293. FLORIDA YELLOW-THROAT (*Geothlypis trichas ignota*). An abundant resident in all suitable locations.

294. YELLOW-BREASTED CHAT (*Icteria virens virens*). Abundant summer visitor, at least in the lowlands, occurring in tangled growths in old fields, etc. More or less common in such situations throughout the State. Arrives about April 15. Earliest, April 11 — Lobdell, 1903; New Orleans, 1905. Usually becomes common April 20 or shortly after. Disappears more or less completely in the fall: Sept. 24, 1897, Ariel, Miss.: Sept. 26, 1898, Bay St. Louis, Miss. Appears to avoid the fertile alluvial lands of southeastern Louisiana entirely in fall.

295. HOODED WARBLER (*Wilsonia citrina*). Common summer visitor in all swampy localities, especially the southeastern section, where, in fact, it is extremely abundant. Arrives usually March 12–15. Earliest, March 8, 1896, and March 9, 1897. Becomes common about March 20. It should be observed, however, that these dates refer to the fertile alluvial section of the southeastern part of the State. In the river bottoms of the more elevated part of the State it is seldom seen before April. Remains at least until the latter part of October. Latest, Nov. 2, 1902, New Iberia, La.

[WILSON'S WARBLER (*Wilsonia pusilla pusilla*). Not yet recorded for Louisiana.]

[CANADIAN WARBLER (*Sylvania canadensis*). Although noted in southern Mississippi — Amite county: Ariel; Hancock county: Bay St. Louis — this species has never been noted in Louisiana by any of the observers with whom I have compared records.]

296. AMERICAN REDSTART (*Setophaga ruticilla*). Abundant fall transient in all sections, less common in spring, especially in the southeastern part of the State, where, on the whole, it is decidedly rare at this season. Possibly breeds in the northern part of the State. Returns from the north very early: July 30, 1897, Beauvoir, Miss.; July 21, 1899, Bay St. Louis, Miss.; becomes common early in August. Latest date of departure, Oct. 27, 1899, Covington, La. Earliest in spring, April 1, 1899, Bay St. Louis, Miss.; latest, May 15, 1902, New Iberia, La.

297. AMERICAN PIPIT (*Anthus rubescens*). Common winter visitor in all suitable locations, especially abundant in the southeastern part of the State, occurring in great flocks on the plantations and other cleared land. Usually arrives shortly after Oct. 20; earliest, Oct. 19, Ellisville, Miss. Becomes common early in November. Remains common until April 15 or 20, and the last has been seen May 2 in southern Louisiana on several occasions.

298. SPRAGUE'S PIPIT (*Anthus spraguei*). Said to be rather common in winter in western Louisiana; rather uncommon and irregular in the southeastern part of the State. Earliest, Nov. 5, 1902, Lobdell; latest, April 19, 1902, New Orleans.

299. MOCKINGBIRD (*Mimus polyglottos polyglottos*). Uniformly abundant resident throughout the State.

300. CATBIRD (*Dumetella carolinensis*). Most abundant as a fall transient. Reaches the southern part of the State about Sept. 10, and

becomes abundant shortly after Sept. 20. Disappears more or less completely by the early part of November, though seen occasionally in winter near the coast. Transients appear near the coast the latter part of March, and continue present until about the middle of May. Breeds in the northern part of the State.

301. BROWN THRASHER (*Toxostoma rufum*). Rare as a breeder, fairly common in winter and common transient in the southern part of State. Common breeder in the central and northern parts. In migration in the southern part of the State, it occurs chiefly at the same time as the Catbird.

302. CAROLINA WREN (*Thryothorus ludovicianus ludovicianus*). Abundant resident in all wooded or shrubby localities except those within reach of the tide. Sings throughout the year, and nests from March to July.

303. BEWICK'S WREN (*Thryomanes bewicki bewicki*). Chiefly a winter visitor, but may breed occasionally north of the extreme southern part of the State. Movements rather irregular; sometimes seen rather early in the fall. Commoner in upland localities than in the coastal section even in winter. Begins singing in the latter part of the winter or early in the spring.

304. HOUSE WREN (*Troglodytes aëdon aëdon*). Common winter visitor. Reaches the coast the last week in September (earliest, Sept. 21, 1899, Bay St. Louis, Miss.). Leaves the southern part of the State about April 18; latest, April 23, 1898, New Orleans. Sings more or less freely for three weeks or more preceding its departure.

305. WINTER WREN (*Nannus hiemalis hiemalis*). Winter visitor; not very common at least in the southern part of the State. Earliest arrival in fall, Oct. 15, 1901, New Iberia. Departs in March.

306. SHORT-BILLED MARSH WREN (*Cistothorus stellaris*). Winter visitor, not common. Arrives Oct. 10-15; earliest, Oct. 8, 1905, Biloxi, Miss. Remains late: April 19, 1902, Bay St. Louis, Miss.; May 12, 1903, Lobdell, La. Found usually in wet weedy places.

307. LONG-BILLED MARSH WREN (*Telmatodytes palustris palustris*). Resident; abundant in the coast marshes, especially in summer. Usually found along the bayous and the more protected shores.

308. BROWN CREEPER (*Certhia familiaris americana*). Fairly common winter visitor, except in the coast section, where it is decidedly uncommon. The time of its arrival, however, is very regular, the first having been noted on three occasions in southern Louisiana on Oct. 14, and once on Oct. 15. The only date of departure recorded is March 18, 1902, Bay St. Louis, Miss.

309. WHITE-BREASTED NUTHATCH (*Sitta carolinensis carolinensis*). Resident in pineries and regions of mixed upland woods. Unknown in prairie and fertile alluvial regions. The Florida White-breasted Nuthatch is no doubt the regular breeding form in the more southern part of the State. Rather commoner in winter in most localities where it occurs.

[RED-BREASTED NUTHATCH (*Sitta canadensis*). While there is no record, so far as I know, of the occurrence of this species in Louisiana, it has been

noted by Mr. Andrew Allison in Mississippi (Bay St. Louis, April 1, 1902), and no doubt it occurs occasionally in Louisiana.]

310. BROWN-HEADED NUTHATCH (*Sitta pusilla*). Confined apparently to the pine flats and long-leaved pine hill regions, where it is an abundant resident.

311. TUFTED TITMOUSE (*Baeolophus bicolor*). Common resident in all wooded localities.

312. CAROLINA CHICKADEE (*Penthestes carolinensis carolinensis*). Common resident throughout the State. Starts nesting early in March in the southern part of the State.

313. GOLDEN-CROWNED KINGLET (*Regulus satrapa satrapa*). Common winter visitor, showing a decided preference for evergreen growths. In the fertile alluvial region of the southeastern part of the State it frequents live oaks almost exclusively. It arrives at Gulf coast latitude about Oct. 15-20. Latest date of departure, April 5, 1906, Biloxi, Miss.

314. RUBY-CROWNED KINGLET (*Regulus calendula calendula*). Common winter visitor in all mixed woods, as well as in groves and high shrubbery. Earliest date of arrival, Oct. 6, 1897, Ariel, Miss. Becomes common Oct. 20 or shortly after. Becomes very abundant with first cold weather in November. Usually departs about April 10. Latest date of departure, April 25, 1903, Lobdell. Sings rather freely for a few weeks before its departure.

315. BLUE-GRAY GNATCATCHER (*Polioptila caerulea caerulea*). Common summer visitor in all more or less wooded localities. May be noted occasionally in winter near the Gulf coast and I saw one at Shreveport, La., Feb. 23, 1915. First migrant usually seen March 12-15. Usually common March 20-22. Disappears more or less completely by the middle or latter part of August.

316. WOOD THRUSH (*Hylocichla mustelina*). Common summer visitor, though breeding only sparingly in the immediate vicinity of the coast, being found in close, moist woods, but never in the heavy swamps. Commonest as a fall transient, from about Sept. 15 to Oct. 15. Arrives the last week in March near the coast; earliest, March 25, 1900, Covington. Becomes common April 5-10. Latest date in fall, Oct. 19, 1897, Ariel, Miss. Prefers shady bottoms in the higher parts of the State.

317. VEERY (*Hylocichla fuscescens fuscescens*). Fairly common transient, frequenting mixed woodland generally. Spring migration performed chiefly between April 15 and May 15. May be heard in night migration almost to the end of May; latest, May 25, 1911. On June 4, 1907, I saw one of this species on Last Island, and noted that it was "obviously off its reckoning and showing signs of fear to the point of confused stupidity. It made short nervous flights among the "mangle" bushes (*Avicennia nitida*) and about the sand on the spit. Earliest date of arrival in fall, Sept. 7, 1900, Bay St. Louis, Miss.; latest date of departure, Oct. 24, 1914, New Orleans.

318. GRAY-CHEEKED THRUSH (*Hylocichla aliciae aliciae*). Common transient at times in spring, especially in the latter part of the season; less

common in fall, occurring chiefly in the early part of October. Recorded somewhat doubtfully at New Orleans, March 27, 1897; earliest authentic arrival, April 14, 1902, Bay St. Louis, Miss. Latest, May 9, 1903, Lobdell. Noted in remarkable abundance at New Orleans the first week in May, 1897, occurring in situations of practically every character, but seen mostly in weedy fields. Earliest arrival in fall, Sept. 22, 1897, Ariel, Miss.

319. OLIVE-BACKED THRUSH (*Hylocichla ustulata swainsoni*). Common transient, especially in fall. Earliest arrival in spring, April 5, 1903, Covington; latest in spring, May 4, 1897, New Orleans. Waves of this species, with Gray-cheeked Thrushes and Veeries, are most apt to be present shortly before and after May 1. Earliest arrival in fall, Sept. 12, 1897, Ariel, Miss. Usually becomes common about Sept. 22. Latest in fall, Oct. 31, 1900, Bay St. Louis, Miss.

320. HERMIT THRUSH (*Hylocichla guttata pallasi*). Common winter visitor. Earliest, Oct. 10, 1912, New Orleans; average arrival in southern Louisiana and Mississippi, Oct. 15. Latest date of departure, April 13, 1895, New Orleans. Usually leaves first week in April.

321. AMERICAN ROBIN (*Planesticus migratorius migratorius*). Numbers vary decidedly from year to year, especially in the coastal section. Earliest arrival, Oct. 9, 1897, Ariel, Miss.; earliest at New Orleans, Oct. 12, 1913. Average date of the first at the coast, Oct. 15. Usually becomes common with first cold weather in November. Few remain at coast latitude after March 15, and the last is usually seen the last week in March. Latest fully authenticated date of departure, April 4, 1906, Biloxi, Miss.

322. WHEATEAR (*Saxicola ananthe*). The capture of a specimen in the outskirts of New Orleans, Sept. 12, 1888, is recorded by Prof. Geo. E. Beyer, in a list of the birds of Louisiana published in the "Proceedings of the Louisiana Society of Naturalists."

323. BLUEBIRD (*Sialia sialis sialis*). Common resident except in the fertile alluvial region of the southeastern section of the State, where it is commonest in winter, and where its occurrence in the breeding season is limited principally to its presence in occasional colonies about the sugar plantations.

PHAËTHON CATESBYI BRANDT.

BY GREGORY M. MATHEWS.

INVESTIGATION of the forms of the family Phaëthontidæ for the purpose of my 'Birds of Australia' compelled the determination of the above name with the result that I find it must displace *Phaëthon americanus* Ogilvie-Grant. This latter name is accepted in the Amer. Ornith. Union's Check-List, 3d Ed., p. 59, 1910, so that I must give reasons for its rejection.

When Ogilvie-Grant monographed the family in the 'Catalogue of the Birds in the British Museum,' Vol. XXVI, he was enabled, through a recent discovery of Mr. C. D. Sherborn, to follow strictly the law of priority and displace the well-known *Phaëthon candidus*, by the hitherto unheard of *Phaëthon lepturus* of Lacepède and Daudin. He was also able to indicate that *Phaëthon flavirostris* Brandt had been misapplied to the American bird, which differed from the Mauritius species, of which Brandt's name became a synonym. For the American species, he therefore proposed *Phaëthon americanus* and this name has been admitted for seventeen years.

This provides another of those strange anomalies which have been constantly noted by myself while engaged in the determination of Australian birds. I refer to the acceptance of names utilised in the 'Catalogue of the Birds in the British Museum' by American ornithologists when a very little investigation would have proved their inapplicability. In the 'Catalogue of Birds of the British Museum,' Vol. XXVI, p. 456, 1898, where *Phaëthon americanus* is catalogued the very first reference reads:

"Tropick Bird, Catesb. Car. II App. pl. 14 (1743) (Bermuda; Porto Rico)."

The following is the gist of the account there given: "Mr. Willughby's description . . . differs somewhat from ours, which was made from the living Bird. The legs in his, by long keeping, had lost their red colour, which all that I have seen, while living, have. This Bird is about the size of a Partridge, and has very long wings.

The bill is red, with an angle under the lower mandible like those of the Gull kind, of which it is a species. The eyes are encompassed with black, which ends in a point towards the back of the head. Three or four of the larger quill feathers, towards their ends, are black, tipped with white; all the rest of the Bird is white, except the back which is variegated with curved lines of black. The legs and feet are of a vermilion red. The toes are webbed. The tail consists of two long straight narrow feathers, almost of equal breadth from their quills to their points. These Birds are rarely seen but between the Tropicks, at the remotest distance from land . . . yet one of their breeding-places is almost nine degrees from the northern Tropic, viz. at Bermudas, where from the high rocks that environ those Islands, I have shot them at the time of their breeding . . . they breed also in great numbers on some little Islands at the east end of Porto Rico."

For the time when this article was written, 1743, this is a most accurate and complete description of the Bermuda bird, and the figure given is a splendid one of the species known as the Yellow-billed Tropic-bird.

As a synonym of *Phaëthon athercus*, Ogilvie-Grant ranged:

"*Phaëton catesbyi*, Brandt, Mem. Acad. St. Petersb. (6) v, pt. II, p. 270 (1840) (Bermuda: Rico)."

I trace this determination through Gray (Handl. Gen. Sp. Birds, pt. III, p. 124, 1871) to Bonaparte (Consp. Gen. Av. II, p. 183, 1857). Reference, however, to Brandt's paper shows that he gave this name to the "Avis Tropicorum, Catesby, Nat. Hist. of Carol I., II. Ed. Edwards, p. 114, t. 14." This is simply a reprint of the account given by Catesby as quoted above, with the same plate reproduced.

If Catesby's name be applicable to *Phaëthon americanus* Grant then Brandt's name must be and it has 57 years' priority. In Catesby's description three debatable points may be noticed. First, the bill is given as red. This species is known as the Yellow-billed Tropic Bird and in the 'Water Birds of North America,' Vol. II, p. 186, 1884, the bill is described as deep chrome or wax yellow and a footnote reads: "Audubon describes the bill of the male as "orange-red," and that of the female as yellow: but he

seems to have had *P. aëthereus* in mind in the former case, though his description otherwise applies exclusively to *P. flavirostris*."

In 'The Ibis,' 1914, Karl Plath has written about the Bermuda *Phaëthon* and on p. 554 observes: "I had noticed that the birds flying about seemed to have orange red bills rather than the yellow to which they owe their name, and this bird certainly had a red bill. I called the attention of my companion to it, and we agreed that it could be best described as bright orange-red, inclining to vermilion on the upper ridge."

This confirms the accuracy of Catesby's observation with regard to the bill-colouration, but Karl Plath's legs and feet colouration does not coincide with that given by Catesby. The other points are the omission of the black band along the wing and the scapular colouration while the back is said to be variegated with curved lines of black. The figure given shows these black lines to be practically coincident with the black scapulars while if the figured or described bird were slightly immature it might show black lines on the back. The description as a whole is quite inapplicable to *P. aëthereus* and seems quite good enough for acceptance. As far as I can trace only one species of *Phaëthon* breeds at Bermuda where Catesby procured specimens himself. I designate Bermuda as the type-locality of *Phaëthon catesbyi* Brandt and recommend its usage for the American Tropic Bird, known as the Yellow-billed Tropic Bird. As this is a misnomer, why not replace it by "Catesby's Tropic Bird" and thus honour the writer of one of the most interesting books on American natural history?

I would remark that for the small Tropic Birds I use the generic name *Leptophaëthon* which I introduced in the 'Austral Avian Record,' Vol. II, p. 56, 1913, with type *Phaëthon lepturus* Daudin. These have only twelve tail-feathers as against the fourteen of *P. aëthereus* or the sixteen of *P. rubricauda*. They are smaller, more delicately formed birds and the tail is of a different nature. The elongated central tail-feathers have comparatively wide webs, and the tail otherwise is strongly wedge-shaped, the two feathers adjacent to the central ones being twice as long as the outside feathers.

To be consistent with their general usage as regards genera American ornithologists must accept my genus *Leptophaëthon*.

SIMULTANEOUS ACTION OF BIRDS: A SUGGESTION.

BY WINSOR M. TYLER, M. D.

THE House Sparrow (*Passer domesticus*) affords a good example of a habit common among Fringilline birds when gathered in flocks, the habit of all starting up as one bird from their feeding ground and returning almost immediately from perches near by, singly or a few birds at a time. On any day between November and March, in town centres where House Sparrows congregate, large numbers of these birds may be watched going through this interesting manoeuvre.

At sunrise on the morning of December 29, 1912, more than a hundred Sparrows were feeding in the snow-covered street which passes through the centre of Lexington, Mass. Over the space of an acre or two, the birds were collected in half a dozen flocks at points in the street where food was plenty. Although busy filling their crops after a fifteen-hour fast, they remained on the ground scarcely a full minute at a time; without apparent reason, and with no warning note that I could detect, a flock whirred away into the elm branches overhead and within a few seconds the birds began gradually to re-assemble at the place they had just left. Other flocks did precisely the same thing. The instant departure of a large flock is impressive; there is no frightened start of one bird, the others trailing on behind; the birds rise with the suddenness of a rifle's crack.

The birds fly back and forth between the street and some near cover so frequently that they spend perhaps no more than two-thirds of the time in feeding. When they rise in a body it happens rarely that one or two birds do not leave with the others, but feed on, undisturbed by the precipitous flight of the majority. Individual action is occasionally shown also by a single bird, who flies off to join another flock. This flying off of one of their number has apparently no effect on the remainder. Individual action, although occurring in members of a flock of feeding Sparrows, is the exception; as a rule the flock moves as a unit.

As one watches the Sparrows leave their feeding ground time

after time, apparently without cause, but of their accord, one cannot help believing that some purpose, perhaps unknown to the birds themselves, underlies these interruptions. But more mysterious than the purpose of these sudden risings, is the means by which a large number of Sparrows decide, with the unanimity of a single bird, to fly up.

One's first thought is that the birds in a flock start in response to a note of warning given by one of their number. It is not necessary to suppose a leader; any bird perceiving danger, or fancying that he perceives it, might sound a warning which would arouse his companions to retreat. That a man, even although he stands very near a flock of birds, seldom, if ever, hears an alarm note,—or indeed any note at all,—is no proof of the absence of a signal. However, one feels a little skeptical when he considers the almost incredibly rapid response to a hypothetical signal inaudible to human ears. I believe also that the Sparrows themselves give more positive indication that in their concerted actions they do not, or need not, depend on signals. It is a common habit of the House Sparrow when gathered together, often in large companies, to chatter or scold. Each bird repeats for minutes at a time his "chape" or "chillip" note, adding his voice to the din of the chorus. These choruses often end on the instant. No orchestra leader could more quickly silence the instruments under his control on one beat, yet, in the case of the Sparrow, it is unbelievable that an alarm note could be heard above the general uproar.

There is another point which counts against the practicability of a signal. It is chiefly when large numbers of Sparrows are assembled in a flock that the sudden uprisings are conspicuous. One might almost say that the unanimity was directly in proportion to the number of birds present. That this proportion would *appear* to hold is self evident,—for the larger the rising flock, the greater the impression on the eye; but a little observation will show that a small flock of Sparrows acts in a very different way. A small flock of House Sparrows will generally remain feeding in the street until they are frightened away, and then they will leave the feeding ground severally, a few birds at a time. Those nearest the approaching danger, or the most timid, start first, to be followed successively by the remainder. Here are the very conditions under

which a signal could best be heard,— very few birds make up the flock and all could hear the signal, but instead of simultaneous action there is individual alarm.

It is possible that fear may be communicated throughout a large flock by any one of their number starting up in alarm, but that this explanation is always, or even often, responsible for the uprisings is improbable on account of the regularity of the retreats to cover.

The behavior of the individuals composing a flock of Sparrows, as opposed to their movements "en masse" is well seen if one slowly approaches a flock at rest in shrubbery. Now, the birds gradually withdraw; each bird as he feels himself in danger, retreats. He at first hops deeper into the bushes and later, perhaps, flies. One bolder than the others, may remain alone near the danger even after the others have flown. Under these circumstances the birds act just as one would expect any company of individuals to act at the approach of danger;— when threatened each individual seeks safety. It is true that in the movements as a body, each individual may be seeking safety, but here there is a difference; each bird in a large flock starts at the same instant and, until perched, acts exactly as his companions do. It is possible that sometimes the birds are really frightened away, but, in that case, they act as if they all perceived the danger and reacted to it as a unit. This instant response is clearly distinct from the straggling retreat from a passing carriage.

I was interested to note, some time ago, the behavior of a large flock of birds collected in an open field with no cover near. Although the birds were not House Sparrows, they belonged to species in which the habit under consideration is well marked. The note indicates that the proximity of shelter, which might act as a stimulus to retreat, is not responsible for the interruptions while feeding. "Feb. 7, 1911. Twenty Goldfinches and more than twice as many Redpolls are feeding on the snow upon weed-seeds. This large flock of nearly a hundred birds is spread out over half an acre of meadow land where the weed stalks, sticking thickly through the snow, afford abundant food. In spite of the plentiful supply of food, the birds are restless and keep starting up and alighting at once near by, but there is not, as noted previously, a general movement of the flock in one direction; the flock as a whole is stationary.

Also, until I make the birds apprehensive by coming near them, there is no flying off to cover and back as I have noted in Juncos and Tree Sparrows. However, in this case there is no cover near." These birds showed the same uneasiness, the same tendency to fly in numbers from their feeding ground as noted in the House Sparrow, but here, with no cover to retreat to, they merely started into the air and at once settled quietly among the weeds.

When House Sparrows and certain other birds of similar feeding habits are assembled in flocks, they may act in two ways,—individually and as a unit. When they act individually, we understand their behavior well enough; they act much as we should under the same circumstances; they are quite human. But when we see a hundred birds acting as one, and watch them as, without warning, they start on the instant and whir away like leaves in a gust of wind, we must needs believe that some superhuman force is at work among them. Can it be that, for a time, each of the hundred little brains forms a part of a common mind which, ever watchful for danger, only recognises it in the abstract and periodically drives the flock to seek shelter? This hypothesis is consistent with the facts; it would explain otherwise meaningless interruptions of feeding as well as the instantaneous flights, without signal, of busily occupied birds.

If such is the case,—if a subconsciousness of danger hangs over each large flock while feeding,—the birds are, or seem to be, uninfluenced by it and unaware of it until, like an explosion, it throws them all into the air; as if the common mind governed a single body instead of a hundred.

In addition to the sudden risings from their feeding grounds, birds often display unanimity of behavior on other occasions. The simultaneous action of birds in rapid motion is well illustrated by closely-packed companies of flying Sandpipers. Each bird, when the flock changes its direction, escapes collision with its neighbors by turning at the same moment, in its tracks, so to speak. If a flock of Sandpipers changed its direction as a train of cars rounds a curve (each car swinging to one side only when it reaches the curved portion of the track) simultaneous action in the birds would not be required; each bird in that case would *follow the example* of the bird immediately in front of him. Flocks of Sandpipers, however, do not wheel in this way, or they do not always do so. Any

one can satisfy himself on this point by watching a flock of *Ereunetes pusillus*, for example, flying past in bright sunlight. At first, if you are between the sun and the birds, their white underparts shine out as the light strikes under the raised wing; later, in the distance, the birds appear as a group of flickering bright spots,—until the flock turns. Then, in an instant, every bird disappears; each has turned away at the same moment and presents to the eye only the narrow edge of the wings and the smallest diameter of the body,—invisible in the distance.

One advantage of maintaining a food-shelf is that the birds which visit it, after they have fed, often remain near and afford excellent opportunities for study at close range, while the birds are entirely at ease and wholly unconscious of being observed. At such times they sometimes display traits and habits which under other circumstances, even after long acquaintance, they will not have shown. For example, in the winter, after a little band of Chickadees have satisfied their hunger at my food-shelf, they often spend half an hour or so in the shrubbery and arbor-vitæ trees eight or ten feet from the window. As a rule, they call cheerily to each other; sometimes, however, there comes a sudden hush,—every bird has become silent and perfectly motionless. For minute after minute, by the watch, the birds hold their quiet, and seemingly rigid, attitudes. I have timed them thus for eight minutes. It is difficult to find them as they sit as if frozen to the twigs; they are perched here and there, widely separated, some half-hidden in the evergreens, others exposed on bare branches. At last the stiff pose gradually gives way; one bird begins to move his head,—to look about a little from side to side. Every other bird is acting in the same way; now all are hitching slightly on their perches, some of them uttering their conversational notes in an undertone; now one or two give a rapid jingling call and hop from their perches; the spell is broken; the frozen statues are once again living, active, wide-awake Chickadees.

The point of especial interest here is the identical behavior of the birds,—their prolonged immobility, their silence, their quick passage from death-like stillness to activity. Although, to be sure, the transition occupies several seconds, the birds pass through it simultaneously (as nearly as the eye can follow their movements)

and not one after another. Naturally the commencement of the stillness is rarely observed,—I can only say that it takes place quickly,—but the period of immobility and the liberation from it I have seen often. Not a bird moves until the spell is broken, and when the release comes, it comes at once to every bird.

These Chickadees, very likely, are resting while they digest their recent meal, but that the necessity for rest should come to each bird at the same instant and persist for exactly the same time implies something more than chance; it suggests a relationship between the members of the flock, similar to that which, binding together a flock of Sparrows, enables them to start into the air in a body. The life of a bird is made up of cycles; in the great yearly cycle, which includes the breeding period and moult, preceded and followed by migration, birds over wide areas of country act (owing probably to physiological reasons) in fairly close unison. But how much closer must be the relationship between the members of a flock of birds in the daily cycle, during the winter months, when, with sexual jealousies dormant, they roam about amicably in search of food! Is it not possible that the need of food, the desirability of rest and the necessity for a safe night's shelter is perceived by the flock as a whole; that, acting as a unit, the sum of the intelligence of all the members of a flock keeps the company together, provides it with food and maintains a continuous watch for danger?

Psychologists recognize in the human race a subconscious power of thought-transference which, although proved beyond a doubt to exist, is rendered uncertain and made difficult to study because it is obscured and held in check by our "objective" mind,—our every-day, reasoning, thinking mind. This psychical power, telepathy, is defined as "the conveyance of thought or feelings from mind to mind by other than ordinary channels of sense." (*Encyclopædia Britannica*, 11th Ed., Vol. XXVI, p. 546).

When we realize that in animals the objective mind,—the barrier to telepathic action,—is, compared to our minds, slightly developed, is it not only possible, but even probable that birds possess greater telepathic power than man (to an extent inversely proportional, perhaps, to the development of their respective reasoning—objective—minds) and that this telepathic power is responsible for their concerted actions?

THE OLD NEW ENGLAND BOB-WHITE.

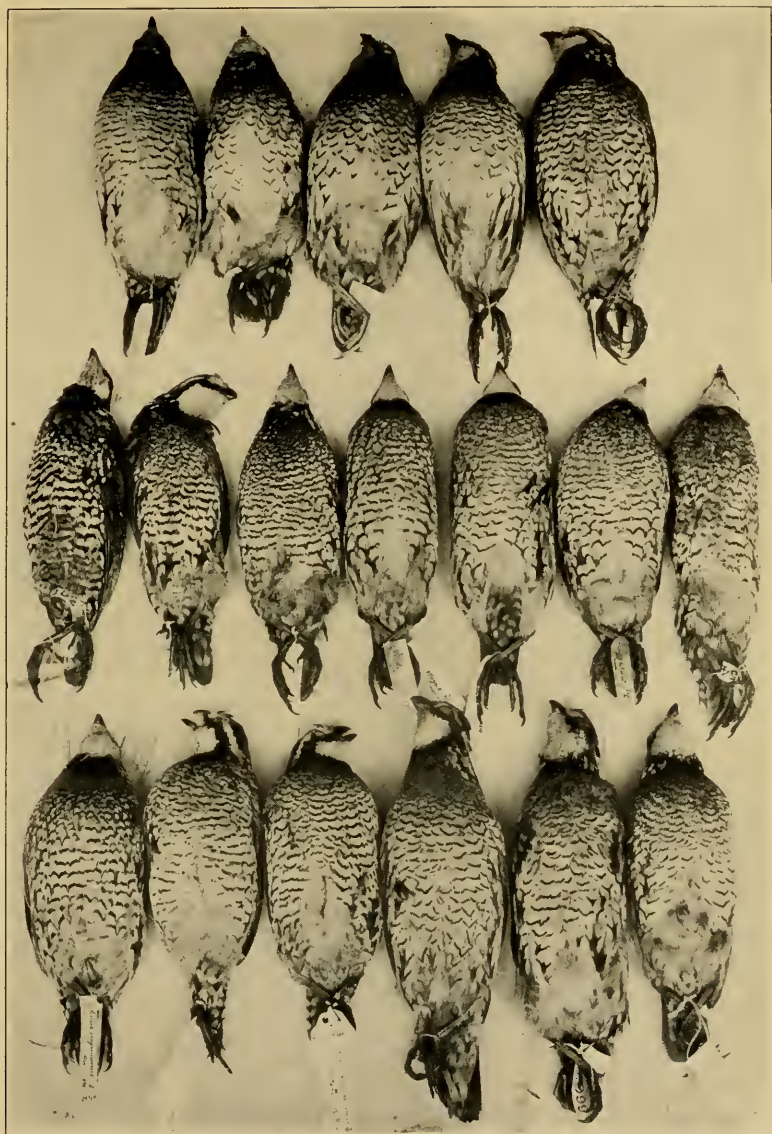
BY JOHN C. PHILLIPS.

Plate XVI.

It has long been remarked both by ornithologists and sportsmen that the Bob-whites of New England and the north central states were somewhat larger than those of the Mid-Atlantic states. The name *Colinus virginianus* was given to the bird by Linnæus, based entirely on Catesby's material, so that the type locality may be fairly placed at South Carolina, probably near the Georgia line, for Catesby's bird collecting was done on the Savannah River. Catesby's plate represents a distinctly dark bird.

The question of a northern form is however somewhat complicated by the zealous efforts of sportsmen in transplanting Bob-whites from more favored to less favored regions, a process which has resulted in the entire or partial replacement of the native stock over most of its northeastward extension. It is interesting to note here that the subject of quail transplants was not thoroughly aired in sportsman's journals before the late seventies. By 1880 quail were advertised from various southern localities, Tennessee, Indian Territory, Texas, etc., at the extremely low figure of \$2.00 a dozen. Between 1880 and 1885 there was great activity along this line and large transplants were effected in southern Vermont and in Massachusetts and probably over the whole of southern New England. Many references to this can be found in the files of 'Forest and Stream' between 1876 and 1885.

It appears however that the traffic in live quail existed a good while before this period for I have a record given to me by Mr. G. A. Peabody, of Danvers, for March, 1870, at which time 184 birds were let out in Essex Co., Mass. They were sent from Greensboro, N. C., but whether actually trapped there is of course uncertain. Mr. Peabody himself kept a few quail in a pen in the sixties and liberated a few at Danvers, Mass. He is certain that other sportsmen were doing the same thing about this time and he says that the planting was done with the utmost secrecy, which may account for the late appearance of reports of these transplants in the journals of the time. It is a fact that on Cape Cod quail were planted very early, for Mr. Peabody informs me that Mr.



BOB-WHITE (*Colinus virginianus*).

Row 1. Old New England Birds.

Row 2. Birds from Southern States (two on left = *C. v. floridanus*).

Row 3. Birds from Illinois, Indian Territory, etc.

Storey Fay brought many quail from his place near Savannah, Ga., and liberated them on the Cape (Falmouth?) in the late fifties. It is well known that at least some of the quail of Cape Cod are small and dark colored, and three male specimens taken at Wareham, Mass. (Bangs Coll. Nos. 4196, 1059, and 3347) between 1882 and 1901 are very heavily barred on the flanks and breast, like birds from Georgia and So. Carolina. On the other hand two specimens from the same collection and locality, nos. 1060 and 11492 are typical northern birds and these bear the dates 1882 and 1904. On measuring these skins I find that the three dark males from Wareham have a wing average of only 110 mm., while the two normal females from the same place average 114.5 mm. In other words there is evidence that the native and imported birds may have existed side by side and kept their identity, for a time at least.

In Mr. Brewster's collection there are some fine specimens taken near Boston between 1871 and 1891. These show no trace of imported blood. The largest specimen has a wing of 120 mm., being far larger than any of the specimens in the collection of the Museum of Comparative Zoölogy, either from New England, the Atlantic States, or the Dakota-Missouri region. In measuring these skins I divided them into three regions: 1st, Old New England, 2nd, Virginia to So. Carolina, 3rd, the western area, including Indian Territory, So. Dakota, Kansas and Missouri, 4th, a series from the Thayer museum at Lancaster representing Maryland, Virginia, and localities near Washington, and lastly another lot from the same collection taken at Sing Sing, New York.

	♂					♀				
	Cul.	Tar-sus	Wing	Tail	No. spec.	Cul.	Tar-sus	Wing	Tail	No. spec.
Old New England	15.8	31	113.7	57	9	14.6	30.6	113	55.6	6
Sing Sing, N. Y.	15.6	31.6	109	55.4	5					
Md. & Va.	16	31.3	111	57	9					
So. Atlantic	15.3	30.1	109.8	53.3	6	15	29	109	52.7	4
Western	15.7	30.7	110.4	57.3	12	15.4	30	109	55.3	10
Mt. Pleasant, S.C.	15.5	31	107.5	53	2	15.5	30	111	56.5	2

Two ♂♂ and two ♀♀ from Mt. Pleasant, S. C., near the type locality are added.

The old New England series is limited to birds collected near Boston in the seventies, mostly in Mr. Brewster's collection, and I am assured that the localities Belmont, Concord, and Brookline, where this series was taken, were not affected by southern quail. The wing measurement is large in both male and female, but the other measurements do not show much size difference. Probably in the flesh the birds were larger and heavier. One of these specimens has a wing of 120 mm., which is maximum for all the quail examined for the combined localities.

The South Atlantic series measures slightly less in both sexes than any other group, but the difference is surprisingly small. The Maryland and Virginia series are pretty well up to the New England standard and taken altogether the regions show far less difference than I had been led to expect.

Now the matter of coloring is not so easily settled as the size question. The spring plumage of Bob-whites is much grayer than the fall plumage, especially on the lower back and rump. The typical and extreme Massachusetts birds have a very light buffy appearance, the top of the head has very little black and the mantle is apt to be plain colored. There is a marked tendency to a more delicate barring on the under parts, and to an absence of barring on the lower breast and abdomen. In females the barring is much less heavy. In typical specimens of New England birds the barring is by no means transverse as in Georgia and South Carolina specimens, but very distinctly V-shaped, the pattern drawing out more and more to a sharp point on the lower flanks. It must be noticed, however, that our series shows no constant color difference between North and South Atlantic birds till one reaches at least the vicinity of Charleston, where specimens show a distinctly heavier and more transverse barring over breast and abdomen. Also the backs, scapulars, and tertials are darker in southern birds as well as the whole top of the head. There is no way that I can see of telling western from New England birds, while the Sing Sing, N. Y., series is identical with the Maryland series. Variation is very considerable, especially in the width of the barring on the lower parts, and in the extent of the barring on the abdomen. There is one

very darkly barred bird from Indian Territory and another from Vermilion, S. D.

In the plate I have arranged male birds in the following order: top row, old New England birds, typical ones on left, darkest individual on right. Second row; from right to left, Va., N. C., S. C. and Ga., with two typical Florida birds, *Colinus v. floridanus* at the left end. The lower row shows a series of western birds, with Illinois birds on the right and a darker Indian Territory bird on the left. The Georgia, Florida and Indian Territory specimens can always be told from those of New England, and the typical old New England bird can with fair certainty be separated from the southwestern bird, but not from that of Virginia.

To sum up: if I were asked to characterize the probable appearance of the New England quail of fifty years ago, I should say — Size large, especially the wing; mantle with a tendency to a plainer appearance and not so heavily speckled. Lower parts less heavily barred, and barring more V-shaped; whole top of head and post-ocular streak more reddish and less black: entire bird more tawny and generally somewhat lighter in tone, especially on the lower back, rump and sides.

EARLY RECORDS OF THE WILD TURKEY. IV.

BY ALBERT HAZEN WRIGHT.

(Continued from p. 81.)

The Carolinas and Georgia.

IN the seventeenth century, we have seven or eight notes of interest. In 1663, a "Report of Commissioners sent from Barbodes to Explore the River Cape Fear" has it that ¹ "The woods (are) stored everywhere with great numbers of deer and turkeys — we never going on shore but we saw of each sort."^v Several excerpts from "A Relation of A Discovery lately made on the Coast of

¹ Hawks, Francis L. History of North Carolina, 1663-1729, Vol. II, p. 31.

Florida,—London, 1664” by William Hilton pertain to this species. In Port Royal Land,¹ “the woods (abounds) with . . . Turkeys, . . .” Along Cape Fear River, “we proceeded down to a place . . . which we called *Turkie-Quarters*, because we killed several Turkeys thereabouts.” “In that time as our business called us up and down the River and Branches, we killed of wild fowl, four Swans, . . . ten Turkeys, . . .” In “A Brief Description of the Province of Carolina, London, 1666” we find that² “The Woods are stored with Deer and Wild Turkeys, of a great magnitude, weighing many times above 50 l. apiece of more tast than in *England*, being in their proper climate.”

In “Mr. Carteret’s Relation of their Planting at Ashley River 1670” occurs³ “Here is alsoe wilde Turke which the Indian brought but is not soe pleasant to eate of as the tame, but very fleshy and farr bigger.” In 1674, Henry Woodward’s “A Faithfull Relation of My Westoe Voiage” appears. While in Carolina, he supped⁴ “*wth* two fatt Turkeys to helpe *wth* parcht corne flower broth.” In another instance, “he carried along a fat Turkey for his better accommodation at night.” In 1682, we have two notes: one by T. Ashe and the other by Samuel Wilson. The former finds the⁵ “Birds for Food, and pleasure of Game, are . . . : In winter huge flights of Wild Turkeys, oftentimes weighing from twenty, thirty to forty pound.” The latter records, “Here are also in the woods, great plenty of Wild Turkeys, . . .” The last note of the century is by Richard Blome (l. c., p. 156). “Their woods and Fields (are) likewise stored with great plenty of *wild Turkeys*, . . . whose flesh is delicate Meat.”

The first note of the next century occurs in the “Journal of John Barnwell.” When 15 miles above Bathtown, he interprets the turkey’s presence as sure evidence that the enemy did not expect them.⁶

Three years later (1714), the celebrated Lawson publishes his “History of Carolina.” On a “Thousand Miles Travel among

¹ Force, P. Vol. IV, pp. 8, 10, 11, 15.

² Carroll, B. R. Hist. Colls. of S. C. New York, 1836, Vol. II, p. 12.

³ Narratives of Early Carolina, 1650–1708. New York, 1911, p. 119.

⁴ *ibid.*, p. 131.

⁵ Carroll, B. R. l. c., Vol. II, pp. 73, 28.

⁶ Va. Mag., Vol. V, No. 4, p. 401; Vol. VI, No. I, p. 44.

the Indians from South to North Carolina" he several times notes the turkey. Near Charlestown,¹ "when we approached nearer the place, we found it to be some Sewee Indians firing the cane swamps which drives out the game, then taking their particular stands, kill great quantities of both bear, deer, turkies" Near Santee River, "The Indians killed fifteen turkeys, this day, there coming out of the swamp, about sun rising, flocks of these fowl, containing several hundred in a gang, who feed upon the acorns, it being most oak that grow in these woods. Early the next morning . . . our guide killed more turkeys. Some of the turkeys which we eat whilst we staid there, I believe weighed no less than forty pounds. At night we killed a possum, being cloy'd with turkey" Later, "our fat turkeys began to be loathsome to us." "At night we lay by a swift current (Sapona), where we saw plenty of turkeys, but perched upon such lofty oaks that our guns would not kill them, though we shot very often, and our guns were very good. Some of our company shot several times at one turkey before he would fly away, the pieces being loaded with large goose shot." Concerning these oaks he speaks at greater length under his account of the wild pigeons. The note follows: "pigeons come down in quest of a small sort of acorns, which in those parts are plentifully found. They are the same we call turkey acorns, because the wild turkies feed very much thereon; and for the same reason those trees that bear them are called turkey oaks."²

In "A Letter from South Carolina, etc. Written by a Swiss Gentleman to his Friend at Bern. 2nd edit. London, 1732" we find (p. 13) that "There are tame Fowls of all sorts, and great Variety of wild Fowl, as Turkeys," "An Extract of the Journal of Mr. Commissary *Von Reck* Who conducted the First Transport of Saltzburgers to Georgia: London 1734" says³ "Night overtaking us, we were obliged to take up our Quarters upon a little Hill, and a Fire with the *Indians*, who brought us a wild Turkey for our supper." About Ebenezer, Savannah River, it holds that³ "As to

¹ Lawson, John. *The History of Carolina*, London, 1714. Reprint Raleigh, N. C., 1860, pp. 25, 50, 51, 79, 92, 231-233.

² In 1737, John Brickell in his "The Natural History of North Carolina . . ." (Dublin, 1737, pp. 181-183) practically repeats the substance of Lawson's accounts.

³ Force, P. Vol. IV, pp. 12, 13, 36.

Game, here are. . . . Wild Turkeys,” “A New and Accurate Account of the Provinces of South Carolina and Georgia, London, 1733” states that ¹ “our people that live in the country plantations procure of them (Carolina Indians) the whole deer’s flesh; and they bring it many miles for the value of six pence sterling, and a wild turkey of forty pound weight for the value of two-pence.” “A Young Gentleman” in “A New Voyage to Georgia 2nd edit. London, 1737” says ² “I met with. . . . plenty of wild turkeys,” “An Account Showing the Progress of the Colony of Georgia in America, London, 1741” finds ² “in the winter season (Savannah River) there is a variety of wild fowl, especially turkeys, some of them weighing thirty pounds,” “An Impartial Inquiry into the State and Utility of the Province of Georgia, 1741” records that ³ “Mr. Harris, who is an expert fowler, sometimes goes out with his gun, and seldom fails of bringing in either wild turkey. . . . or geese. . . .” “A Description of Georgia London 1741” states that ⁴ “There is great plenty of wild fowl, particularly turkeys,”

In 1761, we have “A Description of South Carolina London.” According to it, ⁵ “the sorts of wild fowl that frequent the inland parts of the Country, are Turkeys,” In 1763, G. Milligen writes “A Short Description of the Province of South Carolina: London, 1770.” It states that ⁶ “In the woods and fields are plenty of wild turkeys, of a large size,” “The History of North America London, 1776” claims (p. 225) Georgia affords “wild turkeys from 20 to 30 pounds weight.” Hewatt in 1779 merely mentions wild turkeys are in great numbers.⁷ In 1784, J. F. D. Smyth (l. c., Vol. I, p. 149) reports that in North Carolina “There are also. . . . multitudes of. . . . wild turkeys. . . .” Following him, we have Wm. Bartram. When at Broad River, he remarks (l. c., p. 45). “We at length happily accomplished our live, bringing in plenty of venison and turkeys, we had a plentiful feast at supper.”

¹ Colls. Ga. Hist. Soc. Savannah, 1840, p. 55.

² *ibid.*, Vol. II, Savannah, 1842, pp. 51, 58, 314.

³ *ibid.*, Vol. I, p. 199.

⁴ Force, P. Vol. II, p. 4.

⁵ Carroll, B. R. Vol. II, p. 250.

⁶ *ibid.*, Vol. II, p. 482.

⁷ Hewatt, Alex. An Hist. Account of South Carolina and Georgia. London, 1779, Vol. I, p. 85.

John Davis,¹ at the end of the century, tells how they used "to penetrate the woods in search of wild turkies" at Coosawhatchie.

In the nineteenth century, we have few notes. Gurney, in speaking of North Carolina, notes that ² "The elegant forms of the wild turkeys on the full run, were sometimes seen gliding through the forest" and at Savannah he notices that "Among the birds, the wild turkey is common." The following year, 1842, Buckingham finds ³ "Wild turkeys and wild ducks are in sufficient abundance to furnish game for food."

Florida.

Several of the early 16th century notes pertain to Florida. In the next century, the historical literature of the turkey is scant. In "Virginia richly valued, By the description of the mainland of Florida, her next neighbour . . . London 1609" we find ⁴ "There be many wild Hennes as big as Turkies. . . ." "In a Relation of the Invasion and Conquest of Florida, . . . London, 1686" we have "The Poultry are wild there, as big as Peacocks, and very plentiful."

In the eighteenth century, the roll of records is longer. The first author who mentions it is Wm. Stork who in 1766, writes that ⁵ "In the woods are plenty of wild turkeys, which are better tasted, as well as larger, than our tame ones in England." When in Florida, John Bartram 1766 records the wild turkey.⁶ In 1770, J. H. Wynne practically repeats Stork's statement. "The History of North America London 1776" has it (p. 251) that "With regard to the winged species, here are vast numbers of turkeys, . . ." In 1791 we have the extended notes of Wm. Bartram. Of St. Ille, south of Alatomaha 60 miles, he says⁷ "Turkeys . . . are here to be

¹ Davis, John. *Travels of Four and a Half in the United States of America*; — London, 1803. N. Y., 1909 edition, p. 112.

² Gurney, J. J. *A Journey in North America* Norwich, 1841, pp. 62, 372.

³ Buckingham, J. S. *The Slave States of America*. London, 1842. Vol. I, p. 156.

⁴ Force, P. Vol. IV, p. 131.

⁵ Stork, William. *An Account of East Florida* London, 1766, p. 51.

⁶ Bartram, John. *A Journal kept . . . for the Floridas*; Jan. 14, 1766, p. 18.

In Stork, *vide supra*, 3rd edit., London, 1769.

⁷ Bartram, Wm. *Travels*, pp. 18, 101, 109, 110, 179, 189, 199, 201, 235, 348, 455.

seen; but birds are not numerous in desert forests; they draw near to the habitations of men, as I have constantly observed in all my travels." Of an island in Lake George, San Juan River, he writes "There are no habitations at present on the island, but a great number of deer, turkeys, . . . and turkeys are made extremely fat and delicious from their feeding on the sweet acorns of the Live Oak." Along the San Juan River, "I, observing a flock of turkeys at some distance, on the other, (way) directed my steps towards them, and with great caution, got near them; when singling out a large cock, and being just on the point of firing, I observed that several young cocks were affrighted, and, in their language, warned the rest to be on their guard, against an enemy, whom I plainly perceived was industriously making his subtle approaches towards them, behind the fallen trunk of a tree, about twenty yards from me. This cunning fellow hunter was a large fat wild cat (lynx) he saw me, and at times seemed to watch my motions, as if determined to seize the delicious prey before me. Upon which I changed my object, and levelled my piece at him. At that instant, my companion, at a distance, also discharged his piece at the deer, the report of which alarmed the flock of turkeys and my fellow hunter, the cat, sprang over the log and trotted off." At Halfway Pond (Cuscowilla) "flocks of turkeys (were) walking in the groves around us," On Alachua savanna, he records "flocks of turkeys" and near old Alachua town "on our rout near a long projected point of the coast, we observed a large flock of turkeys; at our approach they hastened to the groves" and again "we frequently saw, . . . turkeys. . . , but they knew their safety here, keeping far enough out of our reach." When 30 miles from St. Marks, he finds "the forests and native meadows (abound) with wild game, as . . . turkeys," At Tanase he "advanced into strawberry plains to regale on the fragrant delicious fruit, welcomed by communities of the splendid meleagris. . . ."

In 1806, Priscilla Wakefield (l. c., p. 92) when at St. Juans, Fla., writes of this species as follows: "Of a morning we have been awakened by the beams of the new-risen sun, and the cheerful crowing of the wild turkey-cocks, calling to each other from the tops of the highest trees. In the spring they begin at break of day, and crow till sunrise, saluting their fellows on the return of light." Twenty-

six years later, 1832 Timothy Flint (l. c., Vol. I, p. 210.) finds at Pensacola that "wild turkeys are constantly offered for sale by the Indians." Five years previous 1827, John Lee Williams records¹ "Wild Turkey-*Meleagris americana* plenty," and in a subsequent work, 1837 he gives it more attention.² "The Wild Turkey, *meleagris Americana*, stands at the head of the festive board, and is abundant in most of the new settlements."

Mississippi, Alabama and Louisiana.

In this region the record begins with the last voyage of La Salle to discover the Mississippi. "The plains lying on one side of it "he says³ "are stored with . . . turkeys; . . ." At Maligne River, "our hunters killed . . . turkeys . . ." On this same journey, when at Bay St. Louis he remarks,⁴ "We had also an infinite Number of Beeves . . . Turkeys . . ." At Le Boucon, they saw turkeys and of the country through which he passed he notices that "There are Abundance of Deer . . . and all Sorts of wild Fowl, and more especially of Turkeys."

Du Pratz in the early part of the eighteenth century was traveling in Louisiana, and in several places in his account of his journey he mentions the turkey.⁵ "The French settlers raise in this province turkies of the same kind with those of France." In another place he notes that "Many of the women wear cloaks of the bark of the mulberry tree or of the feathers of swans, turkies or India ducks." In one instance, he writes of the turkey at some length. "I shall now proceed to speak of the fowls which frequent the woods, and shall begin with the Wild-Turkey, which is very common all over the colony. It is finer, larger, and better than that of France. The feathers of the turkey are duskish grey, edged with a streak of gold colour, near half an inch broad. In the small feathers the gold-coloured streak is not above one tenth of an inch broad.

¹ Williams, John Lee. A View of West Florida, etc. Phila., 1827, p. 31.

² ———. The Territory of Florida, etc. New York, 1837, p. 73.

³ French, B. F. Hist. Colls. of La., Part I. New York, 1846, pp. 176, 136, 121.

⁴ Joutel, M. A Journal of the last Voyage Performed by M. de la Salle to the Gulph of Mexico. Translation London, 1714, pp. 62, 78, v, 82, 87.

⁵ Du Pratz, M. LeP. l. c., pp. 283, 363, 276, 277, 161.

The natives make fans of the tail, and of four tails joined together, the French make an umbrella. The women among the natives weave the feathers as our peruke-makers weave their hair, and fasten them to an old covering of bark, which they likewise line with them, so that it has down on both sides. Its flesh is more delicate — fatter and more juicy than that of ours. They go in flocks, and with a dog one may kill a great many of them. I could never procure any of the turkey's eggs, to try to hatch them, and discover whether they were as difficult to bring up in this country as in France, since the climate of both countries is almost the same. My slave told me, that in his nation they brought up the young turkies as easily as we do chickens."

Schultz (l. c., pp. 182, 184) in 1810 says "Those (birds) which may be considered as local (New Orleans) are, . . . wild turkey. . . ." and 1817 Samuel R. Brown practically repeats (pp. 146, 233) the same observation. Of Mississippi, he says that "The traveller here finds . . . wild turkeys in frequent flocks." In the Nation of the Creek Indians (Ouchee River) Adam Hodgson 1820 (Mar. 20) writes¹ "He (Landlord) gave us a plain substantial fare, which . . . (is) sometimes varied by the introduction of wild venison or wild turkies" killed by the Indians and furnished the landlord at little cost. About the same time, Thos. L. McKinney writes (l. c., p. 159) of the Chickasaw country as follows: "Nearly the whole of the country of Chickasaws, through which I had, so far, passed was poor. Wild turkeys plenty." In his trip up the Alabama River between Montgomery and Mobile, Arfwedson notes that² "Immense quantities of wild ducks and wild turkeys were constantly disturbed by the paddles of the steamboat, but we often passed through flocks of them without causing the least fright." In "Recollections of Pioneer Life in Mississippi" by Miss Mary J. Welsh, we find that³ "turkeys . . . were abundant" in 1833-1836. The last note to be entered in this list is by C. C. Jones. He speaks of the Choctaws who made⁴ "turkey-feather blankets with the

¹ Hodgson, Adam. *Letters from North America*, 2 vols. London, 1824, Vol. I, pp. 118, 125.

² Arfwedson, C. D. *The United States and Canada, in 1832, 1833, and 1834*. 2 vols. London, 1834, Vol. II, p. 41.

³ *Miss. Hist. Soc. Publications*. Vol. IV, p. 349.

⁴ Jones, C. C. *Southern Indians*. 1873, pp. 87, 77, 322.

long feathers of the neck and breast of that fowl. The inner end of the feather was twisted and made fast in a strong double thread of hemp or coarse twine made of the inner bark of the mulberry-tree. These threads were then worked together after the manner of a fine netting. The long and glittering feathers imparted to the outside of the blanket a pleasing appearance. Such fabrics were quite warm."

Kentucky and Tennessee.

In this region we have several interesting notes. John Lederer comments on its¹ "Great variety of excellent Fowl, as wilde Turkeys," In early voyages up and down the Mississippi we find mention of this form. Cavelier's account of La Salle's Voyage remarks² "how the whole nation (of Indians) had greatly honoured them and held them for something more than men, on account of the power of their guns: that they wondered to see them kill . . . several turkeys at a single shot." St. Cosme remarks that they took several turkeys during his voyage (before 1700). In 1700, Gravier alludes to the turkey mantles. "Sometimes they (the men) too, as well as the women, have mantles of turkey feathers . . . well woven and worked." Of the early times in Kentucky (Boone's day) Timothy Flint asserts that³ "in the open woods, . . . turkeys were as plenty as domestic fowls in the old settlements." "In the sheltered glades, turkeys and large wild birds were so abundant, that a hunter could supply himself in an hour for the wants of a week. They would not be found like the lean and tough birds in the old settlements, that lingered around the clearings and stumps of the trees, in the topmost of whose branches the fear of man compelled them to rest, but young and fully fed." "They were never out sight of buffaloes, . . . turkeys." Of the year 1779, Rev. Mr. Davidson of Mercer County, Ky., says⁴ "A winter of un-

¹ Talbot, Sir Wm. *The Discoveries of John Lederer in three several Marches from Virginia to the West of Carolina* London, 1672, p. 25.

² Shea, John G. *Early Voyages Up and Down the Mississippi, etc.* Albany, 1861, pp. 25, 57, 134.

³ Flint, Timothy. *Biographical Memoir of Daniel Boone.* Cincinnati, 1833, pp. 36, 39, 44, 58, 241, 263.

⁴ Collins, Lewis. *Historical Sketches of Kentucky,* Cincinnati, 1847, p. 456.

exampled severity ensued; and numbers of . . . wild turkeys were found frozen to death."

During the early campaigns the turkeys often kept the wounded alive. In the autumn of 1779, Major Rodgers and Capt. Benham when near Harrodsburgh, Kentucky, so sustained themselves.¹ "Fortunately, wild turkeys were abundant in those woods, and his companion would walk around, and drive them towards Benham, who seldom failed to kill two or three of each flock. In this manner, they supported themselves for several weeks, until their wounds had healed so as to enable them to travel." In 1784 John Filson finds² "The land fowls are turkeys, which are very frequent," The same year, 1784, J. F. D. Smyth (*l. c.*, Vol. I, p. 337) speaks in hyperbole. "Wild turkeys, very large and fat, are almost beyond number, sometimes five thousand in a flock, of which a man may kill just as many as he pleases." In 1787-1788, Mrs. Mary Dewee finds³ "The variety of deer, . . . turkeys, . . . , with which this country abounds keeps us always on the lookout, and adds much to the beauty of the scenes around us." In writing of Kentucky in 1794, Thomas Cooper says⁴ "Of wild turkies, however, there are abundance, nearly as tame as those breed in the yard. From their being extremely poor in the summer, they remain unmolested; in the winter they grow very fat, and are reckoned delicious food:" The last note of the 18th century, comes the following year (1795) when Andre Michaux reports it in Tennessee. At Nashville, he says⁵ "Sunday 21st of June 1795 killed and skinned some birds. Birds: . . . a few species of the Genus *Picus*: Wild Turkeys." In Oct., 1795, he writes that on the "17th ascended the River (Cumberland) about ten Miles: there were numbers of Wild Turkeys on the banks; the Rowers and I killed five from the Canoe in passing, without landing." Finally, on Dec. 31 of the same year, he states that "most of (them) went hunting Wild Turkeys," along the Little River.

¹ McClung, John A. *Sketches of Western Adventure*: Phila. 1832, p. 171.

² Filson, J. *The Discovery, Settlement and present State of Kentucke*, Wilmington, 1784, p. 26.

³ *Penn. Mag. Hist. & Biog.*, Vol. XXVIII, p. 195.

⁴ Cooper, T. *Some Information Respecting America, etc.* London, 1794, p. 38. *Early Western Travels*, III, pp. 33, 63, 76, 82.

In 1806, Priscilla Wakefield (l. c., pp. 135, 146) in East Tennessee "Met several flocks of wild turkeys, forty or fifty in a company." In Kentucky she records that "Wild turkeys are numerous and in the uninhabited parts so tame as to be easily shot. In autumn and winter they feed upon acorns and chestnuts. They inhabit the sides of rivers, and perch upon the tops of the highest trees." The same year, Thomas Ashe, reliable or otherwise, observes the turkey at "Kenhaway." "Several flocks of wild turkeys crossed us from the mountains to the water side, we killed two fine young birds, and could have killed forty had we been disposed to enter on the commission of unnecessary carnage." At Louisville, Ky., he writes ¹ "I killed a few young turkeys, which were exquisite in taste and flavor." Near Knoxville, Tenn., Henry Ker finds ² "The woods abound with plenty of game, such as . . . and turkies in abundance through the year." In 1817, S. R. Brown (l. c., p. 110) holds "Wild turkies are still numerous in the unsettled parts" of Kentucky. In the summer of 1818, H. R. Schoolcraft observes that along the Ohio river ³ "The wild turkey, quail and squirrel are daily met on either shore, and we find no difficulty in killing as many as we have occasion for."

In 1822-23, W. H. Blane reports (l. c., p. 260) "there (is) plenty of deer and wild turkeys in the woods" of Kentucky. About eight years later, Withers remarks that ⁴ "The body found in the saltpetre cave of Kentucky, was wrapped in blankets made of linen and interwoven with feathers of the wild turkey, tastefully arranged." The next year, 1832, T. Vigne (l. c., Vol. II, pp. 45, 57, 58) finds "Wild turkeys. . . are found in the barrens," near Glasgow, Ky. Of Mammoth Cave he writes that "In the neighbourhood of the cave, there are a great many wild turkeys, and a tolerable sprinkling of deer, but both were difficult of approach at that season of the year. I was exceedingly anxious for a shot at a wild turkey, but

¹ Ashe, Thomas. *Travels in America Performed in 1806, etc.* London, 1808, pp. 173, 235.

² Ker, Henry. *Travels through the Western Interior of the United States. From the Year 1808 up to the year 1816.* Elizabethtown, N. J., 1816, p. 311. †

³ Schoolcraft, H. R. *A View of the Lead Mines,* New York, 1819, pp. 232, 225.

⁴ Withers, Alexander S. *Chronicles of Border Warfare.* Clarksburg, Va., 1831, p. 37.

committed a great error in loading with ball only: and although I contrived to get three or four fair shots on the ground, and on the wing, yet I confess through eagerness to have missed them. Once I contrived to near a brood, but had the mortification, although close to them, to hear them rising one by one on the other side of a thicket; and when I did pull at the last bird, my gun which was loaded with shot, missed fire through the badness of the copper cap." In the same year T. Flint's "Mississippi Valley" appears. In Tennessee (l. c., p. 340) he credulously says, "A nest of eggs of the wild turkey were dug up in a state of petrification." Finally in the "Sketches and Eccentricities of Colonel David Crockett N. Y. 1835," p. 193, we find that he had a special fondness for shooting the turkey in this region.

Ohio.

In all the United States, no state had more turkeys than Ohio and her neighbors. Most of our records are restricted to the 18th century and the first part of the 19th century. In Morton's "New English Canaan 1637" we find that about¹ "Lake Erocoise" "There are also more abundance of . . . Turkeys breed about the part of that lake, then in any place in all Country of New England." Daniel Coxe in his "Carolina 2nd edit. London, 1726" (pp. 52, 79) finds "Great Companies of Turkeys" all over the country. On a journey to Ohio, Conrad Weiser on Sept. 19, 1748, notes² this form. In 1750 Christopher Gist makes a journey from Oldtown, Md., to the Ohio River. On Nov. 30, he with his men³ "killed twelve turkeys." The following year, Feb. 17, 1751, he records that the country about Little and Big Miami Rivers, "Abounds with turkeys." In the period from 1755-1759, Col. James Smith frequently encounters this form. At Ligoneer,⁴ "we found they had plenty of Turkeys, etc." Along Canesadoo-

¹ Force, P., Vol. II, p. 65.

² Colls. Hist. Soc. Penn., Vol. I, Phila., 1853, p. 33.

³ Pownall, T. A Topographical Description of Such Parts of North America, . . . , London, 1776, Appendix, p. 8, 11.

⁴ Smith, Col. James. An Account of the Remarkable Occurrences in the Life and Travels of Lexington, 1799. Reprint, Cincinnati, 1870, pp. 7, 27-31, 36, 75, 96.

harie River, "turkeys were plenty." Between this last river and Cuyahoga they took a few small turkeys; at Cedar Point, Lake Erie, and at Sandusky they killed a number of Turkeys.

Christian Frederick Post in his journal of a trip from Phila. to Ohio shows how the turkey enters the reply of an Ohio Indian:¹ "Look now, my white brother, the white people think we have no brains in our heads; but that they are great and big, and that makes them war with us: we are a little handful to what you are; but remember, when you look for a wild turkey you cannot always find it, it is so little it hides itself under the bushes." The "Journal of Captain Thomas Morris, . . . Detroit, Sept. 25, 1764" records turkeys towards the Miami country. When he reaches Miami river he says² "We were forced for want of water to stew a turkey in the fat of a raccoon; and I thought I had never eaten any thing so delicious, though salt was wanting; but perhaps it was hunger which made me think so." In 1765, George Croghan makes a journey from Fort Pitt to Vincennes and Detroit. At the mouth of the Little Kanawha River,³ "turkeys . . . are extremely plenty" (May 19) and "turkeys are very plenty on the banks of this (Scioto) River."

On June 5, 1773, Rev. David Jones⁴ "Killed some turkeys" on the Scioto River, and recorded that "This country abounds with an abundance of turkeys, some of which are very large . . ." In 1778, Thomas Hutchins finds that in the Ohio river region⁵ "a great variety of game; . . . as well as . . . turkies . . . abounds in every part of this country." In the region from the mouth of Great Kanawaha to Monogohela River turkies "abound" as also in the Lake Erie country. Of this same country at the same period, Dr. Knight writes that⁶ "In all parts of the country through which I came, the game was very plenty, that is to say, deer, turkies and

¹ Early Western Travels, Vol. I, p. 215.

² *Ibid.*, pp. 310, 311, 321.

³ The Olden Time, Vol. I, 1846, Pittsburgh, pp. 405, 407.

⁴ Cist, Charles. Cincinnati Miscellany. Vol. I, 1845, p. 265; Vol. II, pp. 11, 232.

⁵ Hutchins, Thomas. A Topographical Description of Virginia, Pennsylvania, Maryland, and North Carolina, . . . London, 1778, pp. 4, 12.

⁶ Narratives of the Perils and Sufferings of Dr. Knight and John Slover among the Indians during the Revolutionary War, . . . 1st edit., 1782, Pittsburgh, 3rd. edit., Cincinnati, 1867, p. 30.

pheasants." In the Journal of General Butler (1785) we have at least sixteen references to the abundance of turkeys along the Ohio River. He records them at the mouths of the Muskingum, the Big Hockhocking, the Kanawaha, the Louisa, the Little Miami, and the Licking Rivers and Big Bone Creek. In the Kanawha territory,¹ "we had great sport among the turkeys. . . ." Above Kanawha, "here we having nothing to do but spring from our boats among flocks of turkeys, kill as we please, for sport or gust, I have just stepped from my boat and killed at one shot two fine turkeys, and our whole party feasts on fine venison, bear meat, turkeys. . . . procured by themselves at pleasure." Near Big Hockhocking River, "our hunter . . . killed . . . many fine turkeys, which we distributed among the families and troops with us," and finally he writes, "I cannot help here describing the amazing plenty and variety of this nights supper. We had fine roast buffalo beef, soup of buffalo beef and turkeys, fried turkeys, fried catfish fresh caught, roast ducks, good punch, madeira, claret, grog, toddy and the troops supplied in the most abundant manner."

In 1788, Col. James May reports in nine different instances the wild turkey in this same region. Around Hockhocking, his hunters in three days secures seven turkeys and seven deer.² "He might have killed any quantity but it is the season when they are not fat." In another place, he says "Our luck has been . . . to have good provisions. . . . the best of bread, fine venison and turkeys." The same year, George Henry Loskiel writes of this form as follows:³ "*Wild Turkeys* (*Maleagris gallopavo*) flock together in autumn in great numbers, but disperse in the woods towards spring. They are larger than the tame turkies, and commonly perch so high upon the trees, that they cannot be shot but with a ball. In winter their plumage is of a shining black but changes in summer to a light brown with white spots upon the wings. Their eggs are much

¹ The Olden Time, Vol. II, pp. 441, 443, 444, 445, 447, 448, 452, 454, 462, 492, 495, 496, 497, 505, 507.

² Journal and Letters of Col. James May of Boston, Relative to Two Journeys to the Ohio Country in 1788 and 1789. Cincinnati, 1788, pp. 44, 49, 69, 72, 74, 78, 83, 89, 91.

³ Loskiel, G. H. History of the Mission of the United Brethren among the Indians in North America. In three parts. Translated by C. I. Latrobe. London, 1791. Part I, pp. 91, 48.

sought after, and relished by the Indians. There is a species of wild turkies, which are not eatable their flesh having a most disagreeable flavor." In speaking of the dress of Indian men, he says "Formerly these coverings were made of turkey feathers, woven together with the thread of wild hemp, but these are now seldom seen." Two years later, 1790, Chas. Johnston finds that ¹ "During the whole march (through Sciota country) we subsisted on bears meat, . . . turkeys . . . with which we were abundantly supplied, as the ground over which we passed afforded every species of game in profusion, diminishing however, as we approached their villages." About this same time, George Inlay discovers that ² "The rapidity of the settlement has driven the wild turkey quite out of the middle countries; but they are found in large flocks in all our extensive woods." On Aug. 18, 1793, Andre Michaux ³ "saw several flocks of wild Turkeys" beyond Wheeling.

The "Struggles of Capt. Thomas Keith in America" (p. 16) has it that in 1794 along the Ohio River, "The wild turkies were calling to each other from the lofty branches of the oak." In 1796, Brackenridge ascends the Ohio. In one case he remarks that ⁴ "once, having encamped somewhat later than usual, in the neighborhood of a beautiful grove of sugar-trees, we found, after kindling our fires, that a large flock of turkeys had taken up their night's lodgings over our heads: some ten or twelve of them were soon taken down for our supper and breakfast. But it was not often we were so fortunate." In 1796 and 1797, Francis Baily when at Little Miami River, ⁵ "saw great quantities of wild turkeys; so that we had not any prospect of extreme want whilst we were here." One other party notes it in this century. John Heckewelder with three companions in the summer of 1797 mentions the turkey in his narrative. They encounter it in a trip to Gnadenhuetten on the Muskingum, and say, ⁶

¹ A Narrative of Incidents Attending the Capture, Detention, and Ransom of Charles Johnston, . . . 1790. . . . New York, 1827, p. 46.

² Inlay, George. A Topographical Description of the Western Territory of North America, . . . 2nd edit., London, 1793, pp. 100, 243.

³ Early Western Travels, III, p. 33.

⁴ Brackenridge, H. M. Recollections of Persons and Places in the West. 2nd edit. Phila., 1868, p. 30.

⁵ Baily, Francis. Journal of a Tour in Unsettled Parts of North America in 1796 and 1797. London, 1856, p. 209.

⁶ Penn. Mag. Hist. and Biog., Vol. VI, pp. 138, 142, 144, 146.

"The programme for each day was arranged in the following manner: In the morning at daybreak we were awakened by the cackling of the turkeys. . . ."

Shortly after (1803) the beginning of the nineteenth century, Thaddeus Mason Harris (l. c., p. 51) says, "the vast number of turkeys, . . . we saw upon the shore (Ohio River below Wheeling). . . . afforded us constant amusement." In 1806, T. Ashe (l. c. pp. 160, 111, 113, 130, 134, 135, 144, 145) gives "Wild Turkey Meleagris Gallopavo" in his list of birds, records it at Wheeling and Marietta and writes of it at considerable length when at the latter place, and near Zanesville. His account follows: "The wild turkey is excellent food, and has this remarkable property, that the fat is never offensive to the stomach. When Kentucky was first settled it abounded with turkeys to such a degree that the settlers said the light was often interrupted by them. Though this may be considered a figure, still it is well known that they were extremely numerous, so much so that he was esteemed an indifferent sportsman who could not kill a dozen in a day. Even at this time they are sold in Lexington market for half a dollar a pair. They are, notwithstanding becoming very scarce, and, addicted as all classes of people in that state are to an intemperate predilection for destroying every living aboriginal creature, their total extinction must be near at hand. They yet abound in this Ohio State, and possibly will, for many years; till it becomes more peopled." "I cannot pretend that wild turkeys differ in any striking manner from the domestic ones I have everywhere seen, except the length of their wings; their superior plumage, their attitude and lively expression in walking. The cock too has a beard composed of about one hundred hairs which hangs in a streamer from under the beak. The hair is thicker than a pig's bristle, and the length accords with the age. In the young the beard is hardly perceptible, in the old it descends more than half a foot. I have killed a wild turkey cock which weighed thirty pounds and whose beard was ten inches long: the flesh was execrable, nearly as hard as iron, and as black as jet. The young on the contrary are white and tender, delicate meat, and of exquisite flavor. Wild turkeys are gregarious. The flocks from fifty to sixty. They are migratory. They winter to the southward and return in the spring to the deepest recesses of the woods, where

they construct their nests with such care and concealment, that few instances ever occur of the eggs or young being found. Where eggs have been obtained and hatched under a domestic turkey, the young shew great disposition to thrive and remain about the house very contentedly till their first spring, when they rise, without indicating a previous talent for flying, into the air, take a few circles round the heads of their old friends and make for a wilderness whence they never more return." "As evening approached, I was much pleased to come in view of a flock of wild turkeys. I wished to have an opportunity of observing their action — the one afforded me was of the best it possibly could be: they were travelling before me — therefore occasioned no loss of way. The flock consisted of about thirty-four, on the ground, searching for food: they were not considerably alarmed till I had approached them within sixty yards. They then moved on a kind of long hop and run, stopped, and as we gained on them proceeded in the same way. On a nearer approach, they took short flights, rose above the trees, and lighted upon them at intermediate spaces of about thirty rods. At every rest I instructed Cuff to gobble in their manner. This act appeared to attract their attention and retard their flight; and, what was of more consequence, they made responses, which guided our pursuit when they were obstructed from view by the thick ombrage of the woods, and the fast approach of night. They finally went a more considerable distance; and as I judged, to a favorite place to roost. I still had the good fortune to keep in their track, and to come directly on the spot they had chosen for their rest. They rose up with much perturbation and noise, and again descended to rest. The whole gang occupied four trees, and still they rose, fell and acted with one accord. I resolved to fire on them. I had heard, that whenever wild turkeys settled to roost, there they remained in spite of all opposition. My motive in firing then was to ascertain the fact. On the first shot they all rose with great clamour about thirty yards above the summits of the trees, and as instaneously descended direct upon them. On firing again, similar circumstances occurred, and at a third discharge no variation succeeded, nor did they betray the least disposition to depart effectually and remove their quarters. My first discharge was with a ball, which brought down a very fine bird, the two last merely powder — but I

regard the fact to be ascertained as firmly as if I had killed the whole flock. This dull propensity in these animals must ultimately operate to their destruction. There is no manner of doubt but had such a flock come within reach of a sportsman of the Virginia shore, he would have brought every one of them to the ground."

In 1812, James L. Barton when at Tymoctee Creek, finds that¹ "the wild turkeys began to gobble in the woods (at daylight), and they made nearly as much noise" as the wolves during the night. In the "History of Athens Co., O.," Chas. M. Walker (l. c., p. 486, 479) asserts that in 1810 "turkeys were very plenty" and in 1820 in the fall season the settlers killed "turkeys beyond count for the winter stock." In his "Pedestrious Tour, Concord, N. H. 1819," Estwick Evans says that west of the Connecticut Reserve² "Wild Turkeys too, are here numerous, and they sometimes weigh from 20 to 30 pounds." Two years later, 1821, Schoolcraft when along the banks of Auglaize near Defiance, O., reports that³ "Tracks . . . of the meleagris gallipavo or turkey, were frequently noticed in our path; and these indigenous species of the American forest, are represented to be still abundant in this quarter." In 1822, James Flint on the Ohio river recounts how he⁴ "saw a man fire a shot at a flock of wild turkeys. These fowl were so far from being coy, that they flew only a little way, and alighted again on the trees." When 13 miles from Chillicothe, he says "A few . . . turkeys remain It does not require a thick population to exterminate bears, deer and turkeys." The same year, John Woods when at Troy, O.,⁵ "passed fourteen or fifteen wild turkeys, in a field. As they only gently walked into the woods, I did not suspect they were wild ones; but mentioning them at the cabin, I was told there were no tame turkeys for some miles, but plenty of wild ones." T. Vigne already quoted (l. c., p. 87, reports turkeys for Mansfield, O., in 1832 but asserts that "However, I met with no turkey,"

(*To be concluded.*)

¹ Barton, J. L. *Early Reminiscences of Western New York and the Lake Region Country.* Buffalo, 1848, p. 52.

² *Early Western Travels*, Vol. VIII, p. 195 (orig. p. 96).

³ Schoolcraft, H. R. *Travels in Central Portions of the Mississippi Valley.* New York, 1825, p. 71.

⁴ *Early Western Travels*, Vol. IX, pp. 112 (orig. p. 88) 120, 121 (orig. p. 96).

⁵ *ibid.*, Vol. X, pp. 249, 250 (orig. p. 122).

GENERAL NOTES.

The Red-throated Loon (*Gavia stellata*) at Berwyn, Pa.—A female in winter plumage was taken on a small pond in the vicinity of Berwyn, Pa., by local hunters, November 15, 1911, and presented to me. I believe this is the only record for Chester county.—FRANK L. BURNS, *Berwyn, Pa.*

Mallards Wintering in Saskatchewan.—A number of Mallards have stayed on Wascana Lake, near Regina, all this winter, living in a small space of open water, which is kept open by warm water flowing into the lake from the power house. In December there were 25; on February 7, there were only to be seen 10, and on February 14 only 4. Whether the decrease in numbers was owing to the cold weather or to "poachers" is not yet known. On January 27, it was 48° below zero, the severest cold spell of the winter, and lasted for about four days.—H. H. MITCHELL, *Regina, Sask.*

European Widgeon in Washington.—I have the pleasure of recording the capture of a European Widgeon (*Mareca penelope*), which I think is the first ever recorded from the state of Washington. It is a young male which has not reached the adult plumage, and was taken by Mr. L. W. Brehm, of Tacoma, Wash. Date of capture January 12, 1915. The locality was the Nisqually Flats, Thurston County, Wash. Mr. Brehm informs me that there was a flight of several thousand Baldpates (*Mareca americana*), but that he saw no others resembling *penelope*.—J. H. BOWLES, *Tacoma, Wash.*

Harlequin Duck in the Glacier National Park, Montana.—I was much interested in the note of Mr. Warren on the Harlequin Duck (*Histrionicus histrionicus*) in the Glacier National Park (Auk, XXXI, 535). During the past summer, 1914, I spent two weeks in the Park and also observed this species. Five birds were seen on the Upper Two Medicine Lake, August 4 and 5. The evidence goes to show that this species is a regular though not common summer resident of the lakes and streams, not only in the Park itself, but also in other high mountains in this section of Montana. That the species breeds in the Glacier Park is shown by one of the earliest records. Dr. Elliott Coues saw several broods and secured an adult female and three young on Chief Mountain Lake, August 20–22, 1874 (Birds of Montana and Dakota along the 49th parallel, p. 653). Chief Mountain Lake is now down on the maps as Waterton Lake. The greater part of it lies in the Park, but its northern end crosses the border into Canada.

It is of interest to note that Dr. Coues also found a brood of Barrow's Goldeneye (*Clangula islandica*) at this same time and place and secured young. This species also probably still breeds in the vicinity, but it has not been recently recorded.—ARETAS A. SAUNDERS, *West Haven, Conn.*

The Blue Goose (*Chen caerulescens* (Linn.)) in Rhode Island.—The Boston Society of Natural History has recently acquired the skin of an adult female Blue Goose taken at Dyer's Island, Rhode Island, by Mr. Sinclair Tucker, November 9, 1912.

So far as I am able to ascertain this is the second record for Rhode Island, and the fourth for New England.—W. SPRAGUE BROOKS, *Milton, Mass.*

Occurrence of the Pectoral Sandpiper (*Pisobia maculata*) near Salem, N. J.—The absence of recent records of this species in the Delaware valley moves me to make known at this late date the capture of a male by Dr. H. B. Wharton, September 16, 1905, at Salem county, N. J. The specimen was preserved by me and is in my collection.—FRANK L. BURNS, *Berwyn, Pa.*

The Whimbrel, Ruff, Buff-breasted Sandpiper, and Eskimo Curlew on Long Island, N. Y.—Through the courtesy of Mr. John H. Hendrickson of Jamaica, N. Y., I am able to record the occurrence on Long Island of these four Shorebirds. The specimens of the two European species were brought in the flesh to the American Museum and are now preserved in its mounted collection of local birds.

The Whimbrel (*Numenius phaeopus*), which proved on dissection to be a male, was shot by Mr. S. M. Van Allen, of Jamaica, Long Island, at Gilgo Inlet, Great South Bay, south of Amityville, on Sept. 4, 1912. It was in the company of two Hudsonian Curlews. This appears to be the first record of the Whimbrel for the United States. According to the A. O. U. Check-List, it is of occasional occurrence in Greenland and has been taken once in Nova Scotia.

The Ruff (*Machetes pugnax*), an immature male judging by size and plumage, was collected by Mr. Hendrickson near Freeport on September 26, 1914. It was alone and was attracted to the decoys by imitations of the calls of Yellowlegs and Robin Snipe. There are numerous North American records for this species, including two previous Long Island captures.

Mr. Hendrickson states that during the past half-dozen years he has collected three Buff-breasted Sandpipers (*Tryngites subruficollis*) near Freeport, and could have secured another one the past season.

Regarding the Eskimo Curlew (*Numenius borealis*) Mr. Hendrickson writes: "When I was on the meadows two years ago last September I saw two birds which I believe were Esquimo Curlews. As we were aboard the boat getting it ready to leave, these birds flew within about twenty-five yards of us, and I had a good opportunity to observe them closely. They were not the Hudsonian Curlew, commonly called "Jacks"; they were much smaller and less wary than the latter. I know the Esquimo Curlew, having shot several specimens a number of years ago, and at the time I told my friend that was what I believed these birds were."—W. DE W. MILLER, *American Museum of Natural History, New York City.*

The Diving Instinct in Shore-birds.— In looking over an old notebook I find the following information which seems of considerable interest. On August 4, 1912, while looking for early shore-birds at Toro Point, Panama, I knocked down an immature Spotted Sandpiper (*Actitis macularia*). The beach at that point is a wide coral reef, bare at low tide, and with occasional openings or "wells" connected underneath with the sea. Some of these are of considerable size and the water in all is as clear as crystal to all depths — clear as only those who have seen such tropical "coral water" can imagine.

Upon my approach my crippled bird ran to one of these pools and went over the side, resting on the water surface. As I reached slowly down to take him, he surprised me by diving and swimming under water, using his wings only, to the opposite side of the pool. The action was so sudden and so surprising to me that I could not be sure of the manner of diving but it must have been a "tip-up" and a head first plumage almost straight down.

I had however a perfect view of the bird as he "flew" the ten feet across the pool, through the beautifully clear water which showed white pebbles distinctly on a bottom perhaps twenty feet below. The bird crossed at a uniform depth of eighteen inches to two feet, which he held until he brought up against the opposite wall. The head and neck were extended but not at all stretched while the legs and feet trailed behind with flexed toes, like a heron in flight. The wings seemed to be opened to only perhaps half their full extent — the primaries pointing well backward like wings are trimmed as birds cut down from some height to alight. The wing-beats were slow and even but not labored, and progress was uniform and not at all hurried.

Upon coming up against the opposite wall, the bird rose slowly to the surface, and again rested there as before. The entire performance seemed perfectly natural and unstrained. I tried to have him repeat but he would not, allowing me to lift him from the water without further resistance or effort to escape. Wings and legs were both intact, his wound being in the body, and his body feathers were astonishingly dry after his comparatively long under-water flight.

From what period in his ancestry did he inherit this almost obsolete instinct?— L. L. JEWEL, *Wytheville, Va.*

The Little Black Rail on Long Island, N. Y.— On May 24, 1914, Messrs. J. M. Johnson, S. V. La Dow and I were on Jones' Beach, opposite Amityville, studying the shore-bird migration. We were walking through a grassy marsh, the others slightly ahead, when I saw a little bird running like a mouse behind a tussock some 10 feet ahead of me. Thinking it might be a rail, I rushed forward immediately and was lucky enough to flush the bird, which flew up in front of me about 3 feet away. It fluttered forward feebly a short distance, then turned and flew directly past me, not more than 10 feet away and about 2 feet above the grass, landing in a

dense reed-bed some 30 feet behind. It looked about as large as a Song Sparrow, slate grey all over with black wings and back spotted with small white specks. The iris was bright red. Knowing it to be a Little Black Rail almost as soon as flushed, I shouted to my companions who immediately turned round and saw the bird while it flew past and back of me. They were able with glasses to make out all the color markings except the red eye. I had a pair of prism glasses, but was unable to use them as the bird was too near. The flight is much more feeble than that of any other rail with which I am familiar; the bird seemed barely able to sustain its weight in the air, while its legs dangled down helplessly behind. Unless seen at very close range this species would resemble, I think, a young Sora, though to anyone familiar with the latter species the great difference in size would be striking. Unfortunately I had no means of collecting it, and my last remark would seem to prejudice my case, were it not for the facts that (1) the Sora is a rare summer resident on Long Island, (2) its nest and eggs have never been found so early on Long Island as far as I know, and (3) in any case, it would be impossible for a young Sora to be on the wing by May 24. Finally I have been familiar with the Sora in all plumages for several years. Eaton in his 'Birds of New York' records five specimens of the Black Rail actually taken in the State, three of them from Long Island. It has also been reported as seen at close range on five occasions from the interior of the State. Accordingly this would be the fourth Long Island record and the eleventh for the State.—LUDLOW GRISCOM, *New York City*.

Richardson's Owl and Other Owls in Franklin County, New York.

— A specimen of Richardson's Owl (*Cryptoglaux funerea richardsoni*) in the flesh was recently received by the American Museum from Dr. Wm. N. MacArtney of Fort Covington, Franklin Co., N. Y. The bird was shot on November 14 in a cedar thicket near Fort Covington, in the township of that name, by Wm. N. MacArtney, Jr.

Dr. MacArtney writes that he shot one of these Owls in the nearby township of Dundee, Province of Quebec, within a few rods of the State line in 1879 or 1880; and about 1885 one taken in the same town was brought to him, the latter specimen being now in his collection. All three birds were secured in late fall or early winter.

Eaton, in his recently published 'Birds of New York,' states that there appear to be but two definite records of Richardson's Owl in the State, one from Oneida County, the other from Essex County.

Dr. MacArtney states that during the winter the Snowy Owl is frequently observed, and occasionally the Hawk Owl, Barred Owl and Great Gray Owl. The Long-eared Owl is seen at times, while the Great Horned, Saw-whet and Screech Owls are common, the rufous phase of the last being rather rare.—W. DEW. MILLER, *American Museum of Natural History*.

Lewis's Woodpecker taken in Saskatchewan.— A fine plumage adult male was taken at Herchel, September 24, 1914, and is now mounted in

the Provincial Museum at Regina. I do not know of any record of this species having previously occurred in this Province.—H. H. MITCHELL, *Regina, Sask.*

Prairie Horned Lark in Rhode Island in Summer.—While walking on the morning of June 25, 1914, down a road through some fields bordering Brightman's Pond, near Watch Hill, R. I., two birds were noticed running rapidly ahead of me. Finally they stopped and dusted themselves in the sand, permitting me to approach within close range by careful stalking behind a fence. They proved to be Prairie Horned Larks in fine plumage, the throat and sides of the head being very white. In about five minutes they flew away over a stone fence, uttering the characteristic lark note, but a long search failed to reveal them again. Two days later the whole territory was thoroughly searched, but the birds could not be found, and my hopes of finding some evidence of breeding were frustrated. The Prairie Horned Lark has always been rare in Rhode Island, and I know of no other summer record.—LUDLOW GRISCOM, *New York City.*

Crows Nesting on the Ground.—On a large Island at the head of Lost Mountain Lake, Saskatchewan, June 10, 1913, I found several Crows nesting on the ground. Some of the nests, which mostly contained young, were on the ground between wild rose bushes, others placed on clusters of rose and other low bushes, thus raised a few inches off the ground. I might add that within a radius of twelve feet of one of these Crow's nests was a Mallard's nest containing ten eggs and a Short-eared Owl's with six young, of various sizes.—H. H. MITCHELL, *Regina, Sask.*

The Bermuda Crow.—In 'The Ibis,' April, 1914, p. 189, J. N. Kennedy discusses the Bermuda Crow, alluding to the fact that Bradlee and I were somewhat in doubt as to what the species might really be. He rightly, I think, refers it to *Corvus brachyrhynchos brachyrhynchos* Brehm. Mr. Kennedy had before him one example from the British Museum collection, taken by Capt. H. Edmund, in February, 1875, which must have been very soon after its introduction into the islands. This specimen he says has less violet lustre on the feathers of the back than usual and was possibly an immature bird.

According to D. Webster Prentiss (*Auk*, 1896, p. 237), the Crow was introduced into the Bermudas from the United States, some twenty years before, increased rapidly and became a great nuisance, and in consequence was nearly exterminated. Since that time the crow has continued to exist, though in extremely small numbers in the Bermudas.

We have in the Museum of Comparative Zoölogy one adult (sex not determine) specimen, No. 63727, taken for us by Prof. E. L. Mark, in the autumn of 1912. This differs in no way from autumn killed crows from the eastern United States. It affords the following measurements:—wing, 319; tail feathers, 190; tarsus, 59; culmen, 47.5 mm. This specimen proves that the much discussed Bermuda Crow is *Corvus brachyrhynchos*

brachyrhynchos Brehm, apparently thus far unchanged in the new island home into which it has been introduced by man.—OUTRAM BANGS, *Mus. Comp. Zool., Cambridge, Mass.*

The Orange-crowned Warbler in Cambridge, Mass., in December.

— On Sunday, December 13, 1914, at about 4 o'clock in the afternoon, I noticed a small bird flitting to and fro in a vine which grows on my neighbor's piazza railing about 30 yards from the room in which I was sitting. The actions of this bird at once attracted my attention. While they somewhat resembled a kinglet's, they were not so quick and restless, and were those of a warbler.

The bird was not shy and during the 10 minutes I observed it I got within 4 or 5 feet of it, and had ample opportunity to observe it carefully through field glasses. Its under parts were dull greenish yellow becoming a little darker on the breast, there was a whitish eye-ring and a very faint showing of dull greyish wing-bars. The head was about the same color as the back and tail, a greenish olive brown. It appeared to be feeding on seeds and berries that grow on the vines.

The bird was unquestionably an Orange-crowned Warbler, and its occurrence in December seems worthy of notice. So far as I know, while there have been a number of November records (W. Brewster's 'Birds of the Cambridge Region') and one for Jan. 1, 1875 (Dr. C. W. Townsend's 'Birds of Essex County') this is the first December record for Massachusetts.—HENRY M. SPELMAN, JR., *Cambridge, Mass.*

A Winter Record for the Palm Warbler on Long Island, N. Y.—

In the plains country south of Hicksville, on Dec. 13, 1914, the writers saw an example of *Dendroica palmarum palmarum* (Gmelin), and were enabled to examine it carefully through field glasses at a distance of only a few paces. The bird was first flushed from a pile of brushwood overgrown with brambles. Thence it flew into a cultivated field and skulked among growing cabbage heads, but after being stalked by us for a few minutes it returned to the thicket where we positively identified it.

Eaton's 'Birds of New York' (1914) quotes no winter record of the species in New York State, and Braislin's Long Island 'List' (1907) gives the latest autumn record of this subspecies as October 10 (and on this date I saw one at Forest Hills, L. I., 1914 — C. H. R.).—R. C. MURPHY, *Brooklyn Institute Museum*, and C. H. ROGERS, *American Museum of Natural History, New York City.*

The Blackburnian and Bay-breasted Warblers at Martha's Vineyard, Mass.—These warblers are quite rare in eastern Massachusetts, therefore it may be well to record the following observations:

Chapman notes in his 'Handbook of Birds of Eastern North America': Blackburnian Warbler, "Cambridge, T. V., uncommon." Bay-breasted: "Cambridge, rather rare T. V."

Howe and Allen in their 'Birds of Massachusetts' say: Blackburnian Warbler: "Martha's Vineyard: 'Transient. Rare.'" Bay-breasted: "Martha's Vineyard: 'Transient.'"

When at my summer place at Oak Bluffs, M. V., which is located in an oak grove, I am usually alert for birds, it being a favorable place for observation. About 10 A. M., May 21, 1905, a most delightful morning, I heard a warbler's song with which I was unfamiliar. Upon investigating I discovered a pair of Blackburnian Warblers (*Dendroica fusca*) in the lower branches of an oak, 15 feet from cottage. They were beautiful, graceful birds; flitting from branch to branch, catching insects, singing now and then; spreading their tails, showing their white webs and their black and white and orange parts showing to perfection. I had a near view of the handsome male and his slightly plainer mate, both being in their faultless nuptial dress. I had waited years for this sight and enjoyed it thoroughly.

September 12, 1914, while exploring the pine barrens near East Chop, Martha's Vineyard, where the Grasshopper Sparrow and the Heath Hen sometimes occur, I encountered a flock of probably 125 migrating sparrows and warblers. I examined several of the latter which proved to be Blackpolls, and then a warbler attracted my attention which had an unusually deep yellow breast. I at first thought it one of the comparatively highly colored, fall Pine Warblers. I quickly lost sight of this bird and searched for another, which I soon found, and by its chestnut flanks and white tail patches I recognized the Bay-breasted Warbler (*Dendroica castanea*). There were surely two in the mixed flock and doubtless more.—CHARLES L. PHILLIPS, *Taunton, Mass.*

The Cape May Warbler (*Dendroica tigrina*) as an Abundant Autumnal Migrant and as a Destructive Grape Juice Consumer at Berwyn, Pa.—For several years, previous to the crushing sleet of the past winter, a pie cherry tree crowned with the foliage of a fugitive Clinton grapevine overhung my shop platform; and a thirty foot pine bending under the weight of several Niagara grapevine runners, stood close to my bedroom window. These vines remained unpruned principally because the fruit served as a capital lure for many migrating birds in just the places most convenient for observation.

From the cherry tree I secured an adult female Cape May Warbler on September 25, 1909, a notable capture at that time since it was my first fall record.

From the same tree, on September 12, 1913, I took a specimen each of the Cape May and Tennessee Warblers, and on the 14th and 15th observed twenty and thirty adult and immature female Cape Mays on the pine tree. These birds were almost constantly on the move, darting after one another, only now and then pausing an instant to gather some minute insect from leaf or fruit, especially about the grape bunches; and six shots failed to drive the survivors from the tree. By the 19th, the number diminished to

about ten individuals, all extremely tame, and one was closely approached as it perched upon a bunch of Clinton grapes eating the pulp or juice, I was unable to tell which. Again on the 20th, I saw an individual alight on a bunch of Niagara grapes, deliberately puncture the skin and eat greedily; this and several other specimens were taken with dripping bills.

No adult males had been noted from the first, the proportion of young increased as the days passed, and the individuals grew less active, more deliberate, reminding one of the Vireos; though it appears characteristic of this species to inhabit for a time one or two isolated trees in a yard.

None were noticed on the 23d, but on the following day they were present in considerable numbers allowing an approach within four feet, and on the 27th again became common, though all appeared immature. By October 2, the six or more present were all immature females. On this date I examined closely the fruit remaining on the two trees, and found about 50% showing triangular or ragged punctures, which the bees, especially the yellow jackets, swarmed about and sucked freely. On the 4th, I secured apparently adult male showing some traces of orange cheek patches; the only one observed during the flight; and up to their final departure, on the 7th, there was a fair proportion of yellow-breasted adult females.

Specimens secured early in this remarkable flight carried no fat, in fact were rather lean, but after some days of feeding became fat, inactive and even sluggish; an adult female shot in the act of eating from a grape, and brought to me for identification by a neighbor, was positively enveloped in fat, and the skin became so saturated with oil I had the greatest difficulty in saving it. I do not recall having handled a more oily specimen of this size.

The Flicker (*Colaptes auratus luteus*), Blue Jay (*Cyanocitta cristata cristata*), Purple Grackle (*Quiscalus quiscula quiscula*), English Sparrow (*Passer domesticus domesticus*), White-throated Sparrow (*Zonotrichia albicollis*), Scarlet Tanager (*Piranga erythromelas*), Waxwing (*Bombycilla cedrorum*), Red-eyed Vireo (*Vireosylva olivacea*), Black and White Warbler (*Mniotilta varia*), Black-throated Blue Warbler (*Dendroica caerulescens caerulescens*), Magnolia Warbler (*D. magnolia*), Black-poll Warbler (*D. striata*), Ovenbird (*Seiurus aurocapillus*), Redstart (*Setophaga ruticilla*), Catbird (*Dumetella carolinensis*), Brown Thrasher (*Toxostoma rufum*), Hermit Thrush (*Hylocichla guttata pallasii*) and Robin (*Planesticus migratorius migratorius*), were present and eating grapes, whole or piecemeal, but they were generally easily frightened away and the damage they occasioned confined to the fruit on the trees. The Cape May Warbler, however, overflowed to wherever grapes were found, and did considerable damage to all unbagged bunches in the vicinity and also at Paoli, two miles west.

I sent ten stomachs to Mr. W. L. McAtee of the Biological Survey and avail myself of his kind permission to publish his reply. "Hymenoptera constituted on an average 57.5 per cent of the contents of the stomachs. A third perhaps of this material was parasitic Hymenoptera and their

destruction counts against the bird. The others were ants and small bees and are of neutral importance except perhaps the ants which may be injurious. Diptera made up 16.7 per cent of the stomach contents and again a large proportion of them were parasitic species. Lepidoptera (small moths) constitute 16.7 per cent, beetles 7.8 per cent and the remainder was made up of Hemiptera, spiders and miscellaneous insects. Except for the spiders the food was entirely composed of insects, and a large proportion of useful species were taken and no decidedly injurious ones. I should say that these Cape May Warblers did very little to pay for the destruction of grapes."

In 1914, about half a dozen Cape May Warblers arrived on September 6. I watched an immature female at a distance of five feet, the bird not minding me in the least; it ran out on a twig and reaching across to a bunch of Clinton grapes, punctured one and repeatedly ate from it, none as far as I have noticed have gone through the motions of drinking with raised beak; when it was satisfied, I examined the grape and found it intact as far as the pulp was concerned, but the juice was partly extracted.

On the following day the number of individuals had doubled; further increased on the 11th, becoming common on the 12th, 13th and 14th, and by the last date the red and purple grape crop was ruined; some grapes had as many as three or four wedge-shaped punctures; while the white grapes had not been touched. However, on the 17th I found the Niagara grapes utterly destroyed. I counted forty-five grapes on a single bunch with from one to three punctures. It would seem that a fresh puncture occurred on every visit and the havoc made during the last three days. The species was very abundant until the 21st, and about ten or a dozen constantly present until Oct. 18; the last one was seen on the 20th.

Single Tennessee Warblers (*Vermivora peregrina*), were taken on October 3 and 8; and during the season, almost all the species enumerated for 1913, with the addition of the Parula Warbler (*Compsothlypis americana usneæ*) and Bay-breasted Warbler (*Dendroica eastanea*); but all in greatly reduced numbers owing to the abundance of wild fruit on which they fed undisturbed.

I believe that grape juice was the principal food of the Cape May Warbler during its lengthy visit in this neighborhood. It was present in countless numbers at Berwyn and vicinity as far as a mile south of the village, apparently by far the most abundant species for a period; the complaints of the "little striped yellow bird" were many, and so far as I am able to learn, all unbagged grapes were ruined; the loss must have been many tons worth several hundred dollars.—FRANK L. BURNS, *Berwyn, Penna.*

Cape May Warbler Eating Grapes.—On September 12, 1914, at West Grove, Chester Co., Pa., where I spent the summer and fall, I observed three Cape May Warblers (*Dendroica tigrina*) feeding upon ripe grapes. I did not note how long this species remained with us, but I recall distinctly that for several days a few of them might be seen at almost any

time in the tree over which the grapevine grew.— ISAAC G. ROBERTS, *West Chester, Pa.*

Addendum.— Referring to specimens of the Cape May Warbler (*Dendroica tigrina*), mentioned in lines 27 and 28, there should have been, on page 105 of this volume of 'The Auk,' a footnote as follows: ² Proc. Portland Society Natural History, April, 1882.— N. C. B.

The Rock Wren at National, Iowa.— A single individual of this species (*Salpinctes obsoletus obsoletus*) was observed on the morning of September 27, 1914, and was still here the next day. It was found in a wet ravine about the roots and thick sprouts of willow trees that grow about thirty feet from my bird blind. It had a favorite spot where in full view it would sit many minutes preening itself. While it was under observation a House Wren and English Sparrows were present with which it could be compared. Its head was not so slim as that of the House Wren, but seemed fuller or rounder, suggesting more the head of the Warbling Vireo, which was emphasized by its ashy color, while the very light breast rendered it conspicuous against the dark bark of the willows. It cocked its tail and scolded in true wren fashion.

The bird could not be taken. It was watched on both days as long as I could spare the time, and the description of it, here given, was written down while the bird was present. Rump and tail a dull rufous, the color being brighter on the rump; head and nape ashy, with a brownish wash, there being a gradual blending of this ashy with rufous along the back until the brighter rufous of rump is reached; a tinge of rufous on the tertials, the rest of the wings dark gray with darker bars; tail, rump, and back barred; no bars nor stripes could be detected on nape, head or under parts except tail; no light or white stripe over the eye; throat and breast a grayish white, somewhat lighter than corresponding parts of the *Passer domesticus*. The most strikingly marked portion was the under part of the tail, buffy white in color with conspicuous lateral bars of dark brown or black. A subterminal band of black on the tail is mentioned, also figured, in books of Mrs. Bailey, and of Baird, Brewer and Ridgway, also in 'The Birds of Washington.' I failed to see this though it might have been possible had I been on the lookout for it, as I was for the stripe over the eye. In the hand, traces of such a streak probably could have been found. The bird was studied from thirty to thirty-five feet away and I used both 8-power and 5½-power Bausch and Lomb binoculars, the latter being better for near distances.

Our place is six miles from the Mississippi River. This brings the occurrence of the species very near to the eastern limit of Iowa; and it makes the 148th species identified on our place with four or five more just beyond our borders.— ALTHEA R. SHERMAN, *National, Iowa.*

Corthylio — A Valid Genus for the Ruby-crowned Kinglet.— The genus *Regulus* as currently recognized comprises some eighteen forms

representing several specific types. These fall into two groups, the larger of which, including the Gold-crests and Fire-crests is Holarctic in distribution, the other containing the Ruby-crowned Kinglets only (a continental species of three races and a closely allied island species) being strictly Nearctic.

As long ago as 1850 Cabanis referred *Regulus calendula* to his genus *Phyllobasileus*, which included small Willow-Wren-like forms now included in *Reguloides*. Three years later, however, concluding that *calendula* was more nearly related to true *Regulus* yet generically distinct he proposed for it the name of *Corthylio*.

As is well known the type of *Regulus* (*R. regulus*) and its immediate allies differ from *R. calendula* (and from all other birds as well) in the presence of a single flat feather overlying each nostril. This represents the several much smaller and more bristly antrorse plumules of the Ruby-crown. The latter is further distinguished by longer tarsi, a larger and wider bill, absence of stripes on the head and uniform olive-green crown of the female.

In spite of these differences, however, it has not seemed necessary to separate the Ruby-crown from *Regulus*, and Cabanis's genus has been almost universally ignored. The discovery of an additional character now renders necessary, in my opinion, the recognition of *Corthylio*.

While recently identifying some bird remains from the crop of a Sharp-shinned Hawk, I was struck by the peculiar form of the hind-toe of a foot which proved to be that of a Golden-crowned Kinglet. The pad forming the sole of the toe for its basal half is approximately obovate (broader terminally than basally), abruptly contracted distally, the sub-truncate end strongly contrasting with the narrow terminal half of the toe. This conspicuous pad is shorter than the rest of the toe beyond it (excluding the claw) and reticulated into about a dozen polygonal sections. No other birds examined (including Mniotiltidæ, Sylviidæ, Fringillidæ, Paridæ and Vireonidæ) at all closely approach the species of true *Regulus* in these peculiar features, in which they seem to be as unique as in the supranasal plumule.

In the ordinary song-bird foot the sub-basal pad of the hallux is tapering or gradually rounded terminally, where it is usually not very strongly defined, longer than the distal portion of the toe, its superficial divisions minute and very numerous. *Reguloides superciliosus* is normal in these respects, and *Regulus calendula* exhibits but a slight approach to true *Regulus* in the form of the pad, which is longer than the rest of the toe, the reticulations being larger than usual but smaller than in true *Regulus*.

If the validity of *Corthylio* as a genus is conceded the names of the Ruby-crowned Kinglets will stand as below. The Guadalupe form is in my opinion (based on examination of an excellent series) specifically distinct. Neither in coloration (at least in fresh plumage), in the relation of bill and tarsal length to that of the wing, nor in the mutual proportions of the ninth and tenth primaries, is there any evidence of intergradation with the continental forms. "*Regulus cuvieri*" is referable to true *Regulus*.

- Corthylio calendula calendula* (Linnæus).
 " " *cineraceus* (Grinnell).
 " " *grinnelli* (Palmer).
 " *obscurus* (Ridgway).

W. DEW. MILLER, *Amer. Muscum of Natural History, New York City.*

A Note on the Migration at Sea of Shore Birds and Swallows.—

The following notes, made during the cruise of the whaler *Daisy* in 1912, throw a little light on the oceanic routes sometimes followed by migrating shore birds and swallows. It is quite probable that the recorded positions, which lie well to the eastward of Bermuda, are not in the normal tracks of the North American species mentioned. The month of August, 1912, was, however, prevailing calm in the western temperate Atlantic, and the possibility of migrants having been blown out of their courses would seem to be limited to the effects of local storms.

Ereunetes pusillus. On August 16, in lat. 31° 22' N., long. 60° 14' W. a sandpiper of this species flew around the vessel, not daring to alight. After circling for some minutes near the water it mounted higher and higher until it was flying about the topmast heads. When it had gone off the sailors told me that several of "the same kind" had been standing on the *Daisy's* bowsprit (!) during the morning.

Pisobia maculata (?) August 23, lat. 32° 20' N., long. 50° 35' W. Late in the afternoon a sandpiper was observed. It circled the brig for an hour, without coming very near, and *settled into the water* for several brief rests. Finally, I saw it perch upon our bowsprit, but it left almost immediately. I believe that the bird was a Pectoral Sandpiper, but am not quite positive.

Hirundo erythrogaster. August 17, lat. 31° 31' N., long. 58° 40' W. Four Barn Swallows joined us at noon and perched in the rigging while they preened their feathers thoroughly. At seven in the evening half a dozen were sitting along the royal brace, with others flying pathetically around the brig, evidently puzzled, and doubtless hungry. Next morning, and throughout the day (Aug. 18), several were with us, one of which sat for its photograph within a yard of the camera.

Hirundo rustica. European Barn Swallows twice came on board, the first time on September 15, thirty miles west of St. Antão, C. V. I., and again on September 29, in lat. 8° 16' N., long. 24° 25' W. The former bird was collected.—ROBERT CUSHMAN MURPHY, *Brooklyn, N. Y.*

Rare Birds near Waynesburg, Pa.—Waynesburg College recently secured for use in its bird course a small collection of mounted birds taken in this region some fifteen years since. Two specimens among them are particularly interesting in that they have rarely, if ever, been recorded from this section of the State. They are: Yellow-crowned Night Heron (*Nyctanassa violacea*) and Bald Eagle (*Haliaeetus leucocephalus leucocephalus*). The former was collected on Ten Mile Creek and the latter on a farm near Waynesburg, Pa. In the latter part of April, 1907, I captured an injured

Florida Gallinule one mile west of this town; it is the only record for the region.—SAMUEL S. DICKEY, *Waynesburg, Pa.*

Some New York City Notes.—I elow I record personal observations of some species either of unusual occurrence, or seen in unusual places in New York City.

REDHEAD (*Marila americana*).—Two were seen on the Jerome Park Reservoir in the Bronx on January 10, 1915.

CANVASBACK (*Marila valisineria*).—On January 10, 1915, I saw seventeen Canvasbacks on the Jerome Park Reservoir. Seven were females. They allowed a close approach, and did not take wing but swam away.

RED-HEADED WOODPECKER (*Melanerpes erythrocephalus*).—I saw one of these birds in partly immature plumage near Riverdale on January 20, 1915.

WHITE-THROATED SPARROW (*Zonotrichia albicollis*).—A flock of eleven of these birds was present in City Hall Park on May 13, 14, 15 and 16, 1914. During the time that I observed them they remained for the most part under some low bushes at the southwest corner of the Park, and seemed quite oblivious to the noise of traffic in Broadway. On two occasions I heard one of them singing.

SCARLET Tanager (*Piranga erythromelas*).—Two males in full plumage were present in City Hall Park on May 13 and 14, 1914. I saw them on the latter date. Their conspicuous color attracted large crowds and many diverting comments were overheard. The birds were mentioned in the 'Evening Sun' of May 14.

OVENBIRD (*Seiurus aurocapillus*).—I saw three Ovenbirds in City Hall Park on May 13 and 14, 1914. On the latter date they were usually near the Scarlet Tanagers mentioned above. Although they walked about in the center of the grass plots they passed unnoticed by the many persons who were watching the bright colored Tanagers.

VEERY (*Hylocichla fuscescens fuscescens*).—On May 13, 1914, I saw two Veerys in City Hall Park in company with the White-throated Sparrows noted above. They also passed unnoticed.

My experience in bird observation about New York City has been limited to two years, and the occurrence of migratory birds in City Hall Park may not be unusual. However it seemed rather startling to me to find the four last named species in the very heart of the down town section, where thousands of persons are constantly passing and there is an incessant rumble and roar of traffic. It may be of interest to note that the Tanagers were the only ones molested by the hordes of English Sparrows which infest the Park, and that even in their case I observed no serious attacks.—CLIFFORD H. PANGBURN, *Lawrence Park, Bronxville, N. Y.*

Notes from Wisconsin.—**BITTERN** (*Botaurus lentiginosus*).—On July 4, 1914, near Stoughton a Bittern was observed swallowing a snake about twelve inches long. The bird seized it by the head and, after

considerable manœuvring during which the snake occasionally wrapped itself around the Bittern's neck, succeeded in swallowing it.

KING RAIL (*Rallus elegans*).—A single bird was observed at close range on August 30, 1914, near Madison between Monona and Wanbesa Lakes. Records for the Madison region appear to be scarce.

SOLITARY SANDPIPER (*Helodromas solitarius*).—This species was exceedingly common along the Bois Brulè river in northwestern Wisconsin during the last week of August, 1913. The birds were usually in twos, were fully as common as Spotted Sandpipers, and were not at all timid.

RUFFED GROUSE (*Bonasa umbellus umbellus*).—The crops of two grouse collected by Mr. A. W. Schorger in Ashland County, in November (1914) were full of the catkins of hazel (*Corylus rostrata*, apparently). The birds were taken early in the morning. The crop of a grouse taken by the writer in Sawyer County in the first week of October (1914) was distended with small green catkins until $2\frac{1}{2}$ inches in diameter. The bird was taken at dusk. It is probable that this catkin was also from hazel bushes. Bendire does not mention hazel as a food of the Ruffed Grouse though it is listed in Barrow's 'Birds of Michigan'.

MOURNING DOVE (*Zenaidura macroura carolinensis*).—Ten Doves were seen near Verona on Dec. 24, 1913, and one bird as late as Jan. 4, 1914, in the same locality.

PILEATED WOODPECKER (*Phlæotomus pileatus abieticola*).—This species was almost always in evidence during a canoe trip in the latter part of August, 1913, extending from the Lake Superior shore up the Bois Brulè and down the St. Croix River as far as Groutsbury, Wis. On a trip taken in the first part of October, 1914, down the Flambeau River from Lac du Flambeau to Ladysmith, only two Pileated Woodpeckers were seen. This species appears to retire so rapidly before settlement, that records showing present distribution may be of some value.

RED-BILLED WOODPECKER (*Centurus carolinus*).—A single bird was seen on February 1, 1914, near Blue Mounds by Mr. Schorger and the writer.

CAROLINA WREN (*Thryothorus ludovicianus ludovicianus*).—On Sept. 17, 1914, the writer observed a bird of this species in a fringe of bushes on the shore of Lake Mendota, Madison. The bird was under observation for half an hour and sang frequently. It was noted again on Sept. 20 and 28. There are few records of this species in Wisconsin.—NORMAN DEW. BETTS, *Madison, Wis.*

Changes and Additions to the 'List of the Birds of Gallatin County, Montana.'—The following changes, due to recent identifications of specimens made by me in the list of Gallatin County birds published in 'The Auk,' Vol. XXVIII, pp. 26-49.

Astragalinus tristis tristis. GOLDFINCH.—The specimen taken at Three Forks, February 12, 1910, should be *A. t. pallidus*, Western Goldfinch. Dr. L. B. Bishop informs me that this bird while resembling the eastern form in plumage, shows by the measurements of the bill that it

belongs to the western race, as probably all of the Gallatin County birds of this species do.

Pinicola enucleator alascensis. ALASKA PINE GROSBEAK.—Two birds taken near Bozeman, December 21, 1908, have been sent to Mr. Robert Ridgway for better identification, and are considered by him to be the Rocky Mountain Pine Grosbeak, *P. e. montana*, and identical with the summer birds of the region.

The following new species may be added to the list through the observations of Mr. G. B. Thomas.

Marila collaris. RING-NECKED DUCK.—Mr. Thomas secured two birds of this species near Belgrade on October 10, 1912. They were male and female and were from a flock of eight or nine birds. This is the first record of this species from Montana of which I am aware.

Anthus spraguei. SPRAGUE'S PIPIT.—Mr. Thomas has written me that he has seen this bird in Gallatin County, but I have been unable to get from him the date or exact locality of this occurrence.—ARETAS A. SAUNDERS, *West Haven, Conn.*

What Bird Lovers Owe the Late Professor King.—Not the man who determines how many birds eat a certain insect, nor what one bird eats, but the man who passes in review all the common birds of a given region in his study of the proportions of the food, is entitled to rank as pioneer in Economic Ornithology. On this basis it is proposed that the late Professor F. H. King, formerly chief of the U. S. Division of Soils, should be considered our first important Economic Ornithologist to use modern methods in the United States.¹

Many men had previously examined the food of a single species of bird in different parts of the country. Professor Samuel Aughey of Nebraska, from 1865 to 1877, studied the stomachs of Nebraska birds in relation to the number of locusts they consumed. However, not until the time of Professors S. A. Forbes of Illinois and F. H. King of Wisconsin, had anyone made a study of all the common bird species in order to record all the types of insects which birds ate. Dr. Forbes' studies of birds' stomachs were first published in 1876, according to a letter from him, dated October 15, 1912.

In an interview at the Cleveland meetings of the American Association for the Advancement of Science, December 31, 1912, Professor Forbes admitted that the work for this paper was all done in that or the preceding year, while Professor King began his paper in July, 1873, and continued it until October, 1877, the field work being done mostly in 1873-4. In 1876-8, according to a letter from Prof. J. H. Comstock, 1912, Professor King worked in the Cornell laboratory, analyzing the contents of the birds'

¹ Cf. Review of Economic Ornithology in the United States by T. S. Palmer, Asst. Chief of the Biol. Survey, U. S. Dept. Agric. Yearbook for 1899. Here older authors are ranked as pioneers in the study of the food in birds' stomachs.

stomachs previously collected, but did not publish, due to delays in the Geological Survey, until 1883, when T. C. Chamberlain's 'Geology of Wisconsin,' Vol. 1, came off the press.

It thus appears that King's work began before that of Dr. Forbes, but was delayed in publication until some years after Dr. Forbes published his first and second researches. While Prof. Aughey had studied ninety different bird species representing 630 stomachs and Dr. Forbes some 40 species representing 460 stomachs (combining figures of all three papers of 1876, 1880 and 1883), Professor King studied 83 species representing over 1800 stomachs, 1600 of these being reported.

The University of Wisconsin has been slow to recognize the great value of Professor King's researches along this line and the noteworthy character of his work. We should take some steps to make generally available the statistical data of the paper as published in the ponderous volumes of the early 80's.

In view of these facts, a partial bibliography of Professor King's writings concerning birds may be recorded here.

1883. Economic Relations of our Birds.—Geol. of Wis., Vol. 1, pp. 441-610 (1886). Reproduced in Trans. Wis. Sta. Agric. Soc. for 1886, vol. XXIV, pp. 372-480.
1884. The Industrial Relations of Our Birds.—Trans. Wis. Sta. Agric. Soc. for 1882-3, vol. XXI, pp. 261-271.
1892. The Migration and Usefulness of Our Birds.—Arbor Day Circular, Wisconsin.
1893. The Robin.—Arbor and Bird Day Annual, Wisconsin, pp. 32-4.
1896. (Mar. 19) The Ruffed Grouse.—Arbor Day Annual, May 1, 1896, Wisconsin, pp. 23-5.
1897. (March 24) The Blue-eyed Yellow Warbler.—Arbor and Bird Day Annual, April 30, 1897, Wisconsin, pp. 8-10.
1899. (March 13) The Migration and Usefulness of Our Birds.—Arbor and Bird Day Annual, May 12, 1899, pp. 34-7. (A reprint of 1892 circ., out of print.)
1911. (Bird Migration at Hong Kong Island) Farmers of Forty Centuries. p. 62.—Pub. at Madison, Wis., by Mrs. F. H. King.—A. C. BURRILL, *Madison, Wis.*

Morning Awakening Notes at Jefferson Highland, N. H.—Mr. Francis H. Allen in his general note in 'The Auk,' January, 1915, p. 110, again calls in question the genuineness of the early songs which precede the singing of the Robin as morning songs given in response to the break of day, still regarding them as songs of night. Others may share in some measure his incredulity. I desire, therefore, that my records obtained at Jefferson Highland, N. H., should remove this doubt, for they show conclusively season by season that there not only do Song Sparrows and Chipping Sparrows habitually sing several times before the Robin, but that Wood Pewee and Alder Flycatcher are always much earlier singers, and that

White-throated Sparrow, Savannah Sparrow, and Vesper Sparrow so generally sing a few songs before the Robin that it is quite impossible to regard all this earliest singing as other than the singing of the birds in response to the appearance of dawn, suffusing the eastern sky with beautiful soft light and announcing departing night and approaching day. The records indicate that the awakening of the earliest singing birds is gradual, but none the less a genuine awakening, although they give their songs only occasionally in this earliest singing and reserve more demonstrative singing until the light of day has increased. So regular are these earliest songs from the several species of earliest singers that the idea that they are songs of the night is quite untenable. Songs of the night are few, irregular, and adventitious, due to the caprice of the bird, occasionally heard, but not to be regularly looked for and with certainty heard. These earliest songs after the first light of dawn are unfailingly given and can be looked for with certainty of realization.

In the hour preceding visible dawn, which in days of earliest sunrise at Jefferson is 2.30 o'clock or a little before, I have very, very few times heard any expression of song, yet I have often been awake at one o'clock and remained awake listening carefully until I have gone out at two o'clock or a few minutes thereafter. Whereas, as the time of 2.30 approaches, it is usual to hear the first songs from one, two, or three birds which are within range of hearing, and these songs are followed by repetitions from the same birds or from other birds at infrequent intervals for a time, until their awakening is more complete. So it has been my practice to be out shortly after 2 o'clock, when not before; in season for these first responses to the break of day, and experience has shown that the birds' awakening begins with these songs, given when the dawn has already visibly brightened the eastern sky.

The Ovenbird's early flight song, which is heard quite unfailingly at dawn, is its twilight song, equally so in the morning as in the evening and late afternoon. It can be depended upon, at least in the woodlands of Jefferson Highland, and it must be borne in mind that my testimony on the whole subject of the morning awakening is the result of my experience in this mountain hamlet, where there is broad expanse of sky and complete silence reigns, when the day opens, broken only by the birds as they awake and sing.—HORACE W. WRIGHT, *Boston, Mass.*

RECENT LITERATURE.

'The Auk' Index, 1901-1910.¹—The first 'Auk' Index was published in 1907, and covered the period 1876-1900, it including the 'Bulletin of the Nuttall Ornithological Club,' virtually the first series of 'The Auk,' and the first seventeen volumes of 'The Auk.' It set a high standard for index makers, and, as said by a reviewer (*Auk*, XXV, 1908, p. 100), "We know of no index to scientific literature comparable with this in point of detail and utility." The new Index, covering the period 1901-1910, is prepared on essentially the same plan, and in typography and make-up the pages of the two works are nearly exact counterparts. The index matter covers a much smaller number of pages (250 instead of 426) than were required in the earlier volume, as it embraces only ten years instead of twenty-five, but the amount per year averages twice greater. The introductory matter, however, occupies 28 pages instead of 7. This includes an 'Introduction' of ten pages by the Chairman of the Index Committee, Dr. T. S. Palmer, who is also the chief editor, giving an account of the plan of the work, the composition of the Committee, and acknowledgements of aid. This is followed by a 'Biographical Index,' and a 'Supplement to the Twenty-five Year Index.' The latter relates to the names of authors mentioned in the general index, completing names that were not given fully in the first index, and adding the date of birth, and also of death of those not now living. Of 175 names previously more or less defective 140 have been completed, at great cost of labor in efforts to secure the missing information.

The 'Biographical Index,' by Dr. Palmer, is a new feature, and one of high interest and importance as a record of the date and place of birth, and also of death in case they are deceased, of some 275 ornithologists, among which, as the author states, "will be found many of those most prominent in the annals of ornithology in America and Europe, especially during the last 40 years." In addition to these items, an asterisk prefixed to a name indicates that a biographical notice of the person has appeared in 'The Auk,' to which a reference is given. This list occupies 13 pages in double column, and we have no doubt will be consulted more frequently and valued more highly than any other part of the volume. The amount of correspondence and research involved in its compilation can be appreciated only by the few who have attempted similar work.

¹ Ten Year Index | to | The Auk | Volumes XVIII-XXVII — 1901-1910 | Prepared by a Committee of the | American Ornithologists' Union | Edited by | T. S. Palmer and W. W. Cooke | [vignette] New York | Published by the American Ornithologist's Union | 1915 — 8vo, pp. xxviii + 250. Price in paper covers, \$2; bound in cloth, \$3. Orders should be addressed to Jonathan Dwight, Jr., Treasurer, 134 West 71st St., New York, N. Y.

It was voted to prepare the present index at the meeting of the A. O. U. held in Cambridge, in November, 1912. Dr. T. S. Palmer was appointed chairman with power to select the members of the Index Committee. "A few weeks later," as stated in the introduction, "a committee of 13 members was organized, with Professor W. W. Cooke as secretary, and at a meeting on February 7, 1913, plans were perfected and the work distributed." The aid of Dr. Dwight, Chairman of the original Index Committee, and of Dr. Richmond and Dr. Stone, editor of 'The Auk,' was secured in correcting the proof. The Committee eventually comprised 22 members, divided into three subcommittees, to each of which were assigned special features of the work. To Professor Cooke, the secretary of the committee, fell the work of preparing the copy for the press. The manuscript was in the hands of the editor in April, 1914, but through delays in printing and proofreading the issue of the work was delayed till early in 1915. The Index Committee has thus made a good record for promptness and efficiency in its difficult task.—J. A. A.

The New B. O. U. List.¹—After a lapse of thirty-two years we have a second edition of the official list of British birds. It is well conceived, well carried out in detail and well printed. Full headings to all higher groups are given as in the A. O. U. Check-List, which is an improvement over the recent 'Hand-List' of Dr. Hartert and his associates. In the case of generic headings the reference and type are always given while the etymology and origin of all scientific names are explained. The synonymy under each species consists of references to the original place of publication, the first edition of the B. O. U. List, the 'Catalogue of Birds of the British Museum', and Saunders' 'Manual' 2nd edition; or in the case of recent additions to the first record of the bird in the British Isles. There is then a paragraph on 'Distribution in the British Islands' and 'General Distribution.' The data on Migration are not so full as in the 'Hand-List' nor are they given a separate paragraph. When subspecies are recognized the so called typical race is given binomially without the duplication of the specific name and the trinomials are printed in smaller type, following exactly the style of the original A. O. U. Check-List, a much less consistent plan than that of the last edition of this work or of the British 'Hand-List.'

In the introduction, beside the rules which governed the Committee's labors there is a 'Summary of British Birds according to their Status,' in which there are listed 141 Residents, 47 Summer Visitors, 46 Winter Visitors, 30 Birds of Passage, 61 Occasional Visitors, 149 Rare Visitors and 1 Extinct Species; total 475, an increase of 99 over the first edition. There are three appendices; (1), a hypothetical list; (2), a list of "nomina conservanda"; and

¹ A List | of | British Birds | Compiled by a Committee | of the | British Ornithologists' Union | *vignette* | Second and Revised Edition | Published by the | British Ornithologists' Union | and sold by | William Wesley & Son, 28 Essex Street, Strand, | London, W. C. | 1915. Svo, pp. i-xxii + 1-430. Price, 7s. 6d.

(3), a discussion of nomenclatural matters and types of the genera. Such is the plan of the work which, except in the one point mentioned above, seems admirable.

It is of course the questions of classification and nomenclature that interest us most in a check-list. As to the former the Committee has adopted the system of 'Sharpe's 'Hand-List of Birds', reversing the order so as to begin with the Crows, which brings the work nearly in accord with the 'Hand-List' of Hartert *et al.* In matters of nomenclature: (1) the tenth edition of Linnæus has been accepted as a starting point instead of the twelfth; (2) tautonyms have been allowed; (3) trinomials have been adopted; (4) the fixation of a type for each genus according to the rules of the International Commission is recognized as a necessity. After having adopted such astounding changes from the antiquated policies that have heretofore governed the B. O. U., we feel like forgiving the Committee for the little list of thirteen *nomina conservanda* which the members refuse to relinquish, and the emendations which they feel must be made in the spelling of a few names! The advanced stand that is taken by the new B. O. U. List is certainly creditable to all concerned and makes a great stride towards that ultimate goal of uniformity for which so many of us have been striving.

Comparing the present work with the original 1883 edition we find 92 changes in specific and 51 in generic names; and yet the 'Hand-List' of Hartert *et al.*, which seemed to some so impossible, contained only 111 specific changes and 72 generic!

Comparing the new list with the latter we find only 86 differences, nearly half of which are questions of the limits of genera or of the specific or sub-specific rank of certain forms. Thirty cases depend upon dates of publication and the recognizability of early diagnoses or the acceptance of certain authors—as Vroeg and Oken; six hinge on whether names are sufficiently different in form to be recognized as distinct and then there are the thirteen *nomina conservanda*. Practically all of these differences can readily be settled by convention, as there is really no longer any principle at stake.

Comparing the new list with that of the A. O. U., we find less discrepancy in the matter of genera than was the case with the British 'Hand-List'. Thirteen genera of the A. O. U. list rejected by Hartert and his associates are here recognized, but many others are not regarded as separable, as *Nannus*, *Acanthopneuste*, *Planesticus*, *Archibuteo*, *Chaulelasmus*, *Nettion*, *Charitonetta*, *Olor*, *Actitis*, *Helodromas*, *Ozyechus*, *Pelidna*, *Erolia*, *Lobipes* *Ionornis* and *Herodias*. *Hierofalco* on the other hand is recognized as distinct.

The A. O. U. use of *Hirundo* is endorsed, but the use of *Bombycilla* for the Waxwings is avoided by an argument that really has no basis except on the ground of a *nomen conservandum*. *Flammea* is used for the Barn Owl, both *Aluco* and *Tyto* being preoccupied and so also with *Polysticta* for Steller's Eider, which is supplanted by *Heniconetta*.

The name *rusticolus* for the Gyrfalcon is rejected in place of *gyrfalco* and

the two races appearing under these names in the A. O. U. list are united, while two races of *islandus* are recognized from Greenland.

The use of *Colymbus* for the Loons and *Ænanthe* for the Wheatear is correct as already stated in these columns and must be followed by the A. O. U. Committee.

It is matter for general congratulation that three Committees, working independently, have been able to come to such close agreement on all matters covered by the International Code of Nomenclature, and the differences that still remain emphasize the fact that it is no longer questions of nomenclature but of taxonomy that cause diversity in names.

The Committee of the B. O. U. deserve to be congratulated upon the excellent piece of work that they have accomplished and, with the exception of the unfortunate thirteen *nomina conservanda*, we can heartily recommend the nomenclature of the new list to all who write on British birds.— W. S.

Hankin on Animal Flight.¹— No ornithological problem has caused so much speculation, even from the earliest times, as the soaring bird; to quote Sir Guilford Molesworth, although “many theories have been advanced . . . they have all been miserably insufficient”; while even Lord Kelvin admits: “That which puzzled Solomon puzzles me also.” Practically everyone who has written on the matter has had a theory and the literature of the subject as a whole may be said to consist of a maximum of explanation with a minimum of observation. It is therefore a gratification to find a work that is almost exclusively devoted to observation, such as Dr. Hankin has produced,— observations moreover of the most detailed and careful kind which constitute one of the most valuable contributions to the subject of flight which has ever appeared.

The need of such a record of observation is recognized by the author who says by way of introduction: “Those best qualified to form an opinion have as a rule had little or no opportunity of studying the facts at first hand. Such authorities have, in some cases, published accounts of soaring flight which have consisted entirely of explanation. Others have related a few facts with more or less tentative explanations. The present book will be found to contain the facts of the case with no explanation at all.”

Dr. Hankin's observations were carried on mainly at Agra, India, where the opportunities for the study of soaring flight — always best seen in the tropics — were excellent. His records show that there is a definite time each day when soaring becomes possible, which is earlier as the season advances. The presence of either wind or sunshine is an absolute necessity

¹ Animal Flight. | A Record of Observation. | By | E. H. Hankin, M. A., Sc.D. | Late Fellow of St. John's College, Cambridge, | Honorary Fellow of Allahard University, | Chemical Examiner and Bacteriologist to | the Government of the United Provinces | and of the Central Provinces, India, Associate Fellow of the Aeronautical Society of | Great Britain. | (First Edition) | London: | Iliffe & Sons Ltd., 20, Tudor Street, E. C. | [1913?] Svo. pp. 1-405 + Index unpagged. Price, 12s. 6d.

for soaring, but it is an undisputable fact that soaring is possible when there exists, so far as it is possible to determine, a perfect calm.

With the idea that the sun's heat possibly caused ascending currents in the air Dr. Hankin made extended observations along this line, with the result that the time of appearance of "heat eddies" indicating upward air currents was found to coincide almost exactly with the time of the beginning of soaring.

He found, on the other hand, however, that "heat eddies" not directly caused by the sun had no relation to the "soarability" of the air and that when the solar energy that causes "heat eddies" was held back by thin clouds, soaring continued, uninterrupted.

Ordinary ascending air currents from "heat eddies," therefore, seemed not to be the basis of soaring nor did they seem sufficiently powerful, and he concludes "if soarability is due to ascending currents caused by the sun's rays, these currents must resemble heat eddies in being widely and apparently uniformly distributed," but "they must differ in containing a great deal more energy and in being as yet undiscovered."

Mr. William Brewster's observations on Gulls sailing into the teeth of the wind, near an advancing vessel were duplicated in Dr. Hankin's experience. He says the Gulls were observed in the usual "soarable area" on the leeward side of the stern and also "gliding ahead of the ship in a head wind, keeping the same speed for minutes together. Sometimes they kept at a distance of only a few feet from the bridge and so under the best condition for observation and yet no trace of any movement of the wings could be observed." He adds "were these cases of the soarable area being greatly extended or was the air uniformly soarable under the tropical sun?" Mr. Brewster's observations go to disprove the latter suggestion as they were not in the tropics.

The evidence that Dr. Hankin has gathered seems to indicate that "besides the effect of the air disturbance caused by the motion of the ship another factor of importance is the nature of the wind . . . some winds are soarable and other winds are not soarable. Apparently in both cases some unknown factor affecting soarability is involved."

Dr. Hankin's observations are not limited to soaring birds but cover the whole field of flight as the following chapter headings will show: 'Preliminary Description of Soaring Flight'; 'Preliminary Account of the Conditions Necessary for Soaring Flight'; 'Preliminary Account of Directive Movements in Gliding Flight'; 'On Conditions Affecting Sun Soarability'; 'A Further Description of Steering Movements'; 'Metacarpal Descent'; 'Arching'; 'Functions of the Tail'; 'Flapping Flight'; 'Lateral Stability'; 'Position of Centre of Gravity'; 'The Flight of Bats'; 'The Flight of Flying Fishes'; 'The Flight of Sea Gulls'; 'Ascending Currents'; 'Wind Soarability'; 'Soaring in Stormy Winds'; 'Colour Phenomena of Soaring Flight'; 'Relative Efficiency of Different Wing Forms in Respect to Soaring Flight'; 'On the Flight of Dragon-flies'; 'Glossary'.

In turning over the pages of Dr. Hankin's volume one is astonished at

the extent of his observations. No factor that could possibly affect flight seems to have been overlooked and data have been collected in regard to meteorology and along other side lines with as much care as in studying the actions of the birds. A clever method of plotting the track of a bird soaring high in air was devised by tracing the movements of the bird on the surface of a horizontal mirror, with copying ink, from which impressions could readily be transferred to paper. A series of dots, instead of a continuous line, each dot corresponding to the tick of a metronome, gave in addition, the speed of the bird when the altitude had been ascertained.

The book is well worthy of the attention of every one interested in bird flight, whether or not he be inclined to supply the explanations which Dr. Hankin refrained from attempting, and unlike most treatises on flight it will be found entirely free from technical terms or mathematical formulæ.—
W. S.

Snethlage's 'Catalogue of the Birds of Amazonia.'¹—Dr. Snethlage's contributions to the ornithology of the Amazon region are well known to students of neotropical birds and her knowledge of the entire avifauna as well as her familiarity with many parts of the country fit her admirably for the task which she has just brought to a conclusion.

The catalogue consists of the technical and vernacular name of each species with references, a statement of range, a list of the specimens in the Museu Goeldi, with localities, and a description of the male and female. Under each genus is a key to the species, and under orders and families, keys respectively to the families and genera. Plates of the heads and feet of representatives of the principal groups accompany the general key to the orders. The work is, as will be noticed, intended to serve two purposes— as a manual for resident bird students and as a work of reference for ornithologists in other parts of the world.

The text is naturally in Portuguese, but this does not detract from its value to foreign ornithologists, since to them the descriptions are of the least importance, and the localities and ranges are easily made out.

There are 1117 species included in the Catalogue which forms a most valuable contribution to South American ornithology. The recent activity in the study of South American birds has reached a stage where faunal works of this sort are badly needed to bring into systematic order the scattered work of numerous writers.

Dr. Snethlage writes us that the work was published in Germany and the copies intended for the American correspondents of the Museum were held in Hamburg when the war broke out. She requests us to announce that these will be forwarded as soon as possible.— W. S.

¹ *Catalogo das Aves Amazonicas contendo todas as especies descritas e mencionadas até 1913 pela Dr. Emilia Snethlage (com 6 estampas e 1 mappa). Boletim do Museu Goeldi (Museu Paraense) de Hist. Nat. e Ethnogr. Tomo viii, 1911/12. Para, Brazil. 1914. pp. 1-530.*

Hornaday's 'Wild Life Conservation in Theory and Practice.'¹

— The lectures published under this title in the attractive volume before us, were delivered before the Yale Forest School, through the efforts of Prof. James W. Toumey and their delivery and publication represent, in the language of the author, the "Awakening of Yale University" to the necessity of aiding by educational methods the preservation of the wild life of America. In his preface Dr. Hornaday says further, "What is needed — and now demanded — of professors and teachers in all our universities, colleges, normal schools and high schools is vigorous and persistent teaching of the ways and means that can successfully be employed in the wholesale manufacture of public sentiment in behalf of the rational and effective protection of wild life. Thus far the educators of this country as a class and a mass have not done a hundredth part of their duty toward the wild life of the United States and Alaska. Let him who doubts this very sweeping statement ask the next young university graduate that he meets how much he has learned in his university about the practical business of protecting wild life."

The five chapter headings are: 'The Extinction and Preservation of Valuable Wild Life'; 'The Economic Value of Our Birds'; 'The Legitimate Use of Game Birds and Mammals'; 'Animal Pests and Their Rational Treatment'; 'The Duty and Power of the Citizen in Wild Life Protection'.

Dr. Hornaday has gleaned his facts from reliable publications and from his wide personal experience and has assembled them in a convincing manner, so as to make clear the economic side of the question. On the matter of practical preservation of wild life he argues in his well known forceful manner, condemning without mercy the "game hog" and all enemies of conservation, pointing out at the same time the duty of the government, the official and the citizen in furthering the work.

Dr. Hornaday's volume will serve admirably as a text book for furthering in other educational institutions the work that the Yale Forest School has inaugurated, or as a handy work of reference for the public in general. We can heartily recommend it as a valuable contribution to the cause with which Dr. Hornaday has for years been so closely identified.— W. S.

Hartert's 'Die Vögel der palaarktischen Fauna.'²— This installment covers the remainder of the Aquilidæ, including the Vultures and

¹ Wild Life Conservation | in Theory and Practice | Lectures delivered before the Forest | School of Yale University | 1914 | By | William T. Hornaday, Sc.D. | Author of "The American Natural History," "Our Vanishing Wild Life," etc.; | Ex-President of the American Bison Society | with a Chapter on | Private Game Preserves | By Frederic C. Walcott | *vignette* | New Haven: Yale University Press | London: Humphrey Milford | Oxford University Press | MDCCCXIV. Svo. pp. 1-240. Price, \$1.50 net.

² Die Vögel der palaarktischen Fauna. Systematische Uebersicht der in Europa Nord-Asien und der Mittelmeer-region vorkommenden Vögel. Von Dr. Ernst Hartert. Heft IX (Bd. II. 3) seite 1089-1216 mit. 31 Abbildungen. Ausgegeben im Oktober, 1914. Berlin.

begins the Ciconiidae. Only one new form appears, *Meliërax canorus neumanni* (p. 1165) Arbut, Mereau.— W. S.

Phillips on Experimental Studies of Hybridization among Ducks and Pheasants.¹— The experiments here described were carried on during the past five years. The species involved were the Mallard, Pintail, Australian and East Indian Ducks; and the Ring-neck, Prince of Wales, Lady Amherst and Golden Pheasants, and the investigations deal mainly with the inheritance of male secondary sex characters.

In domestic birds a number of clearly Mendelizing characters have been demonstrated and sex-linked characters have also been described in canaries, pigeons and domestic fowls. In his experiments with wild species, however, Dr. Phillips found "a very different state of things." "Characters often apparently clear-cut and antagonistic do not segregate clearly." "There is some evidence that in closely related geographical races there is a nearer approach to orthodox Mendelism, but this is never reached, even in back crosses, except occasionally in isolated characters or in the more undifferentiated plumages of the female sex."

Dr. Phillips comes to the conclusion that it is almost certain that the ordinary subspecies of the ornithologist is very far from being a unit variation and that sex-linked inheritance is probably a feature of domestic races in birds. Indeed in species hybrids in almost every feather region the most minute detail of feather pattern and color show the influence of both parental races.

Dr. Phillips' paper is of great importance, showing what many students of systematic zoölogy have long felt, that it is not safe to assume that laws and principles of heredity demonstrated in domesticated strains of animals necessarily prevail in the case of wild species.

Too few of those engaged in experimental breeding have a proper training in systematic zoölogy to appreciate the nature of wild species, and we, therefore, especially welcome publications from an investigator so well informed on both sides of the problem as is Dr. Phillips.— W. S.

Allen on Pattern Development in Mammals and Birds.²— Dr. Allen has made a valuable contribution to the subject of coloration, a field by the way which opens up many possibilities for the ornithologist who may care to enter it. In the particular phase of the subject which he has been investigating — pattern development — he shows that pigmentation develops from certain centers, each one covering a very definite area. Loss of strength in a center of pigmentation and consequent failure to cover the entire area, results in a white or unpigmented line or space between this

¹ Experimental Studies of Hybridization among Ducks and Pheasants. By John C. Phillips. Jour. of Experimental Zool., Vol. 18, no. 1, January, 1915, pp. 69-112, ppl. 1-8.

² Pattern Development in Mammals and Birds. By Glover M. Allen. American Naturalist, 1914, pp. 385-412, 467-484, 550-566.

and the next area, producing a pied or a reticulated pattern. Such patterns, due to areal reduction, have, in wild species, often become fixed and a permanent part of the normal pattern. The development of such patterns has probably been very gradual, and it may be seen in process of development today in certain species in which the extent of white areas is quite variable—as the white neck patches of the Cackling Goose.

Dr. Allen also finds that the converse of this centripetal style of pigmentation is present in many species resulting in black pigmentation at the extremities—tip of nose, ears, tail or toes—or along primary breaks between pigmented areas. Furthermore the patches are physiologically independent of one another and may be differently colored in different individuals.

A careful study of Dr. Allen's paper will give us an intelligent idea of the apparently anomalous coloration of many domestic animals and when we become familiar with the locations of the various pigment centers, we see at once an explanation of many of the distributions of color in wild species, and why we find a constant duplication of general pattern or of prominent color patches in widely separated species.—W. S.

Shufeldt on the Skeleton of the Ocellated Turkey.¹—Dr. Shufeldt here presents a detailed study of the skeleton of this interesting bird and compares it bone for bone with that of the more familiar turkey, *Meleagris gallopavo*. While he considers that the differences in the external characters of the two birds are sufficient to establish them in separate genera, he fails to find any notable difference in the skeletons, nothing indeed which would indicate more than specific differentiation.—W. S.

Smith's 'Handbook of the Rocky Mountain Park Museum.'²—This neatly printed little book is a guide to the Museum at Banff, Alberta. The ornithological portion contains the names of all species found within the limits of the park, with data for the specimens exhibited and special mention of those species which may be seen alive in the immediate vicinity of the museum. There is a full description of one species in each family, but it would seem that a general account of each family group would have been better in such a work. The species, so described, are elevated to undue importance in the popular mind over equally important species which are granted only nominal mention. We understand, however, that this is only a forerunner of a fuller edition and that these descriptions are devised for labels quite as much as for the users of the handbook. The framing of such a book so that descriptive labels may be printed off from the same type is an excellent idea.—W. S.

¹ On the Skeleton of the Ocellated Turkey (*Agriocharis ocellata*) with notes on the osteology of other Meleagridæ. By R. W. Shufeldt. Aquila, Vol. XXI, 1914, pp. 1–52, pls. I–XIV, (Nov. 15, 1914). (In Hungarian and English.)

² Handbook of the Rocky Mountains Park Museum. By Harlan I. Smith. Svo, pp. 1–126. Ottawa, 1914.

Mearns on New African Birds.¹—The birds here described were obtained on the Frick, Rainey and Smithsonian African Expeditions, except one secured by Dr. W. L. Abbott in 1888. They are as follows: *Francolinus hildebrandti helleri* (p. 381) Mt. Lololokui; *Chalcopelia afra kilimensis* (p. 383) Mt. Kilimanjaro; *C. chalcospila intensa* (p. 384), Hawash River, Abyssinia; *C. c. media* (p. 385), Gardulla, Abyssinia; *Cinnyris venusta blicki* (p. 386), Lake Stephanie; *C. mediocris garguensis* (p. 387), Mt. Gargues; *C. reichenowi kikuyensis* (p. 388), Escarpment Sta.; *Chalcomitra senegalensis atra* (p. 388), Thika River; *Anthreptes collaris garguensis* (p. 389), Mt. Gargues; *Estrilda atricapilla keniensis* (p. 390), Aberdare Mts.; *Halcyon senegalensis cinereicapillus* (p. 391), Kisingo, Uganda; *H. malimbicus prenticei* (p. 392), Lake Victoria, Uganda; *Melittophagus variegatus lorongi* (p. 393), Lake Albert, Uganda; *Colinus striatus jebelensis* (p. 394), Gondokoro.

These forms are very fully described often with remarks upon allied races.—W. S.

Von Ihering on Brazilian Birds.²—Prof. von Ihering has been investigating the life histories, habits and structure of various groups of Brazilian birds in their bearing on the systematic arrangement of the genera. In a recent paper he takes up the cuckoos,¹ arranging them in six subfamilies, *Phœnicophainæ*, *Coceyzinæ*, *Centropinæ*, *Crotophaginæ*, *Scythropinæ*, and *Cuculinæ*. Incidentally he discusses the Brazilian birds which lay their eggs in the nests of other birds.

In another paper³ he writes of the ornithological collection of the Museu Paulista and contributes some new observations on the nests and eggs of Brazilian birds, considering some 48 species. There is a fine colored plate of *Phylloscartes paulista* and *Guracava difficilis* and two other plates of nests and eggs.—W. S.

Allen's 'Birds in their Relation to Agriculture in New York State.'⁴—This little pamphlet is a veritable mine of information and its very conciseness will appeal to those who have not time to seek out their information from a number of more formidable publications, while it will undoubtedly carry home the principles of bird conservation to many who could not otherwise be reached.

¹ Descriptions of New African Birds of the Genera *Francolinus*, *Chalcopelia*, *Cinnyris*, *Chalcomitra*, *Anthreptes*, *Estrilda*, *Halcyon*, *Melittophagus*, and *Colius*. By Edgar A. Mearns. Proc. U. S. Nat. Mus., Vol. 48, pp. 381-394. January 19, 1915.

² Biologia e Classificacao das Cuculidas Brasileiras. Por Hermann von Ihering. Revista Mus. Paulista, IX, pp. 371-410. July, 1914. (In Portuguese and German.)

³ Novas Contribuicoes para a Ornithologia do Brazil. Por Hermann von Ihering. Revista Mus. Paulista, IX, pp. 411-488. August, 1914. (In Portuguese and German.)

⁴ Birds in their Relation to Agriculture in New York State. By A. A. Allen. The Cornell Reading-Courses, IV, No. 76, November 15, 1914, pp. 17-56.

The half-tones from original photographs are excellent and varied. The common birds are considered under the convenient and rather novel headings of (1) 'bird and mammal eaters'; (2) 'fish, frog and crayfish eaters', including 'stalkers, plungers, divers'; (3) 'insect eaters',—'strainers, probers, scratchers, borers, gleaners'; (4) 'vegetable feeders',—seed eaters, fruit eaters. A convincing colored plate by L. A. Fuertes depicts the Horned Owl, Cooper's and Sharp-shinned Hawks devouring respectively a chicken, pigeon and robin, while the Marsh Hawk, Red-tailed Hawk and Barred Owl are feasting on meadow mice and a rat, and the Sparrow Hawk on a grasshopper. Dr. Allen has produced a valuable addition to the literature of bird protection, which could be reprinted for use in a much wider field with advantage.—W. S.

Simpson's 'Pheasant Farming'.¹—This is a most attractive little brochure, illustrated by half-tones from photographs and drawings, and a colored plate by Bruce Horsfall. The chapter headings give a good idea of the contents: 'Propagation of Game Birds'; 'Varieties of Pheasants'; 'The Chinese Pheasant in Oregon'; 'Equipment for a Pheasant Farm'; 'The Ideal Mother for Pheasants'; 'Food for Young Pheasants'; 'Enemies of the Game Breeder'; 'Advice to Beginners'.

The demand for game and the absolute necessity of preventing the marketing of native species will make this industry of constantly increasing importance and this excellent little pamphlet will be in much demand.—W. S.

Recent Biological Survey Publications.—The ornithological activities of the Survey as set forth in the annual report of the chief, Mr. Henry W. Henshaw,² covered the food of Wild Ducks; the relation of birds to the Boll and Alfalfa Weevils and to the Range Caterpillar; the economic status of the Starling; and the general protection and attracting of birds and enforcement of the migratory bird law.

Mr. W. L. McAtee has prepared a timely report on 'How to attract Birds'³ covering protection of grounds from cats, and the preparations of all sorts of feeding and shelter devices. There is also appended a valuable list of wild fruit and berry bearing trees and shrubs with their fruiting seasons. A report on the food of Robins and Bluebirds⁴ by Prof. Beal sets forth in great detail the animal and vegetable food of these familiar birds as shown by the extended investigations of the Biological Survey.

¹ Pheasant Farming. By 'Gene M. Simpson. Bull. No. 2, Oregon Fish and Game Commission, 1914.

² Report of Chief of Bureau of Biological Survey. By H. W. Henshaw. Advance Sheets from Annual Report of the Dept. of Agriculture for 1914 [Dec. 12, 1914], pp. 1-12.

³ How to Attract Birds in Northeastern United States. By W. L. McAtee. Farmers Bulletin U. S. Dept. Agr. No. 621, Dec. 14, 1914, pp. 1-15.

⁴ Food of the Robins and Bluebirds of the United States. By F. E. L. Beal. Bull. U. S. Dept. Agr. No. 171, Feb. 5, 1915, pp. 1-31.

In the case of the Robin the birds do no serious damage when their normal food supply is abundant, but in sections of New Jersey where the birds have been protected for years, they are constantly increasing, while the native berry bearing shrubs have been largely supplanted by domestic varieties. They are then very destructive to the berry crops and as Prof. Beal says: "Under such circumstances there is no doubt that a law allowing the fruit grower to protect his crop when attacked by birds would be proper." The Robin is similarly destructive to the olive plantations of California.

The examination of the Bluebird's food "fully justifies the high esteem in which the bird is held. It does not prey upon any product of husbandry or in any way render itself injurious or annoying." During the berry season of spring and early summer it feeds mainly upon insects, its fruit eating period being from late fall to early spring when waste fruit is available.

Prof. Cooke¹ describes the attempt to secure an estimate of the number of breeding birds in various sections of the country during 1914. The plan was the same as that outlined in the request for coöperation in a similar effort during 1915 which appears in 'Notes and News' of the present issue of 'The Auk.'

The 1914 census showed the Robin to be the most abundant species in the Northeastern States, with the English Sparrow second, followed by the Catbird, Brown Thrasher, House Wren, Kingbird and Bluebird.—W. S.

Economic Ornithology in Recent Entomological Publications.—

The most emphatic acknowledgement of the economic value of birds in any recent entomological paper is that of Mr. J. A. Hyslop in a bulletin on "Wireworms attacking cereal and forage crops,"² who says, "Probably the most important factor in keeping wireworms in check are the birds." The significance of this statement is apparent from the authors estimate that wireworms are among the 5 worst pests of Indian corn, and among the 12 worst for wheat and oats. A list is given of 90 species of birds found by the Biological Survey to feed upon wireworms.

In a report on "The grasshopper problem and alfalfa culture,"³ Professor F. M. Webster states that "upward of 100 species of birds are known to feed to a greater or less extent upon grasshoppers, but probably the most useful in this direction are quails, prairie chickens, the sparrow hawk and Swainson hawk, the loggerhead shrike, all cuckoos, the cowbird, all black-birds, and meadowlarks, the catbird, and the red-headed woodpecker."

The results of some original investigations by Messrs. R. N. and T. Scott Wilson of the bird enemies of the three cornered alfalfa hopper (*Sticto-*

¹ Preliminary Census of Birds of the United States. By Wells W. Cooke. Bull. U. S. Dept. Agr. No. 187, Feb. 11, 1915, pp. 1-11.

² Bulletin 156, U. S. Department of Agriculture, Jan. 27, 1915, 34 pp.

³ Farmers' Bulletin 637, U. S. Department of Agriculture, Jan. 25, 1915, 10 pp.

cephala festina) are presented by V. L. Wildermuth.¹ Thirty-one stomachs representing 8 species of Arizona birds were examined and specimens of the alfalfa hopper found in 10 stomachs. The species of birds eating this insect were the Killdeer, Black Phoebe, and Sonoran Red-winged Blackbird. A record for the Nighthawk is quoted from Biological Survey records.

Bird enemies of midges, especially the giant midge (*Chironomus plumosus*) are mentioned in various recent papers by A. C. Burrill.² The species of birds mentioned are the Tree Swallow, Barn Swallow, Kingfisher, Sandpipers, Red-winged Blackbird, English Sparrow, and Palm Warbler.

In his ninth report³ as state entomologist of Minnesota, Professor F. L. Washburn, includes an article on "Useful Birds found in Minnesota." Paragraphs containing brief descriptions of appearance and habits, and the more important economic information about 21 species of birds form the bulk of the report. Discussion is included also of bad birds, birds of doubtful utility, and protection of planted corn from crows and other animals.—W. L. M.

Two Recent Papers on Bird Food by Collinge.—In "Some Observations on the food of nestling sparrows,"⁴ Professor W. E. Collinge presents a comparative study of the food of juvenile *Passer domesticus* taken in fruit-growing and in suburban districts. The report is based on examinations of more than 280 stomachs, and is a convincing demonstration of the powerful influence of availability in controlling the choice of food by birds. The illustration of this factor is the occurrence of kitchen refuse in 53 out of 87 stomachs of suburban sparrows, and in only one out of 200 birds collected in fruit-growing regions.

The results of the study, on the whole, are favorable to the sparrow. Professor Collinge "is of the opinion that if this species were considerably reduced in numbers, the good that it would do would probably more than compensate for the harm, especially in fruit-growing districts."

The second paper in hand is a brief summary of the economic importance of British Wild Birds.⁵ The commoner species are classed in the following groups:

1. Distinctly injurious — House-sparrow, Bullfinch, Sparrow-hawk, Wood-pigeon, and Stock-dove.
2. Too plentiful, and consequently injurious — Missel Thrush, Blackbird, Greenfinch, Chaffinch, Starling, and Rook.
3. Injurious, but not plentiful — Blackcap.

¹ Journal of Agricultural Research, Vol. III, No. 4, Jan. 15, 1915, p. 360.

² By the Wayside, Vol. 13, No. 7, March, 1912, pp. 50-51; Vol. 14, No. 6, February, 1913, p. 44; Bulletin Wis. Nat. Hist. Soc., Vol. X, Nos. 3-4, April 18, 1913, pp. 145-146; Vol. XI, Nos. 1-2, June, 1913, p. 66.

³ Fifteenth Rep. State Entomologist of Minn., 1913-1914, pp. 1-19, Col. Pls. 1-3. Also issued as Circular No. 32.

⁴ Journ. British Board of Agriculture, Vol. XXI, No. 7, October, 1914.

⁵ Nature. Jan. 7, 1915.

4. Neutral—Jay.

5. Beneficial—Song Thrush, Fieldfare, White-throat, Great Tit, Blue Tit, Wren, Goldfinch, Linnet, Yellow Bunting, Magpie, Jackdaw, Skylark, Barn Owl, Brown Owl, Kestrel, and Plover.—W. L. M.

'**First Report of the Brush Hill Bird Club.**'¹—The reviewer had the pleasure, in March, 1914, of inspecting a most interesting exhibit of materials for attracting birds. The well prepared report here cited puts into permanent form the valuable features of that exhibit. It discusses nesting boxes and their use, and tells where they can be obtained. Similar information is given for bird baths.

A collection of the seeds and fruits available to birds at the time of the bird show was an important and effectively arranged exhibit. The kinds are listed in the present report, and their value commented upon. Addresses are given of firms from whom various dried berries and grains can be purchased; also a list with publishers of the more important books, pamphlets and journals relating to birds.

National and State game laws are reprinted, and the relations of the bird club work to schools are emphasized. The report includes also a list, by Mr. Ralph E. Forbes, of birds seen in and about Milton during the years 1904 to 1914.

The striking success of the exhibit, which was open for two months and had an attendance of from 40 to 94 persons daily, and the usefulness of the 'First Report of the Brush Hill Bird Club' must be reckoned, in large part, personal achievements of the genial and energetic general manager, Dr. Harris Kennedy.—W. L. M.

Recent Reports on Game and Bird Protection.—The New Jersey Audubon Society presents a very creditable report² for the year 1914 and in Bulletin No. 9 makes an appeal for greater support and additional members which should be met by the bird lovers of the State. There is also an exquisite photograph of the Long-billed Marsh Wren and nest by Francis Harper illustrating an article on the second nesting of the species by Mary P. Allen.

Mr. W. L. Finley's attractive 'Oregon Sportsman'³ continues to keep alive interest in game and bird protection in his State while the recently established 'California Fish and Game' edited by H. C. Bryant⁴ does the same for the great commonwealth lying south of it. In the January number, Joseph Grinnell and the editor have an article on the Wood Duck in California.—W. S.

¹ Milton, Mass., 1914, 123 pp., 6 pls., 1 map.

² Fourth Annual Report of the New Jersey Audubon Society. Oct. 6, 1914.

³ The Oregon Sportsman. Wm. L. Finley, Editor. December, 1914, January, 1915.

⁴ California Fish and Game. H. C. Bryant, Editor, Jan., 1915.

The Ornithological Journals.¹

Bird-Lore. Vol. XVII, No. 1. January–February, 1915.

Bird-life in Southern Illinois. II. By Robert Ridgway.

The Story of a Red-tailed Hawk — Part 1. By Mrs. A. B. Morgan.

How Winter Thins Their Ranks. By J. W. Lippincott.

Migration Notes of N. A. Sparrows. By W. W. Cooke. Plumage notes by F. M. Chapman. Color Plate by L. A. Fuertes. This paper concludes the series.

Bird-Lore's Fifteenth Christmas Census, shows an increase in the number of reports as well as their thoroughness. Some editorial correction would seem warranted in such a case as that of the Chickadees since the record of both species in South Carolina, where only the Carolina is known, will prove confusing.

The Audubon department is full of interest while the Educational Leaflet treats of the Loon with a color plate by Brooks.

The Condor. Vol. XVI, No. 6. November–December, 1914.

A Forty-five Year History of the Snowy Heron in Utah. By A., E. and A. O. Treganza.

The effects of Irrigation on Bird Life in the Yakima Valley, Washington. By Clarence H. Kennedy.— An estimated increase of 60,000 birds.

Breeding of the Bronzed Cowbird in Arizona. By M. F. Gilman.

The Condor. Vol. XVII, No. 1. January–February, 1915.

With Rallus in the Texas Marsh. By G. F. Simmons.

The Nesting of the Black Swift. By W. L. Dawson.— Corroborating the breeding of the species at Santa Cruz.

The Kern Redwing — *Agelaius phœniceus aciculatus* subsp. nov. (p. 13). Isabella, Kern Co., Cal. By Jos. Mailliard.

The Status of the Arizona Spotted Owl. By H. S. Swarth.

Birds Observed on Forrester Island, Alaska During the Summer of 1913. By Harold Heath.

Birds of the Boston Mountains, Arkansas. By Austin P. Smith.

The Wilson Bulletin. Vol. XXVI, No. 4. December, 1914.

Notes on a Northern Robin Roost. By A. R. Abel.

The Birds of the Douglas Lake Region. By Jas. S. Compton.

A Hermit Thrush Study. By Cordelia J. Stanwood.

A Brief Study of the Nest Life of the Black-throated Green Warbler. By Cordelia J. Stanwood.

The Determination of the Food of Nesting Birds. By A. R. Cahn.

A Flight of Shore-birds near Youngstown, Ohio. By J. P. Young.

Corrections of the A. O. U. Check-List in Regard to Birds of Ohio. By W. F. Henninger.

¹ The names of the editor and publisher of each journal will be found in the January number of 'The Auk.'

Nineteen Years of Bird Migration at Oberlin, Ohio. By Lynds Jones.

Discouraging the English Sparrow. By T. H. Whitney.

The Oölogist. Vol. XXI, No. 12. December 15, 1914.

A Great Flight of Grebes. By R. B. Simpson.— At Warren, Pa.

Nine Unusual and Interesting Experiences. By G. A. Abbott.— Nesting of Marbled Godwit, etc.

The Oölogist. Vol. XXII, No. 1. January 15, 1915.

Nesting of the Great Gray Owl in Central Alberta. By A. D. Henderson.

Numerous papers on nesting of other Owls.

Blue-Bird. Vol. VII, No. 4. January, 1915.

The Last Passenger Pigeon. By R. W. Shufeldt.— With a reproduction of a photograph of the head taken from the dead bird.

The Brown Creeper at Home. By Cordelia J. Stanwood.— With excellent photographs of nests and young and careful detailed study.

Farming Birds in Iowa. By Florence L. Clark.— Farms made into bird refuges by agreement of owners to allow nothing but predatory animals to be killed thereon.

The Ibis. X Series, Vol. III, No. 1. January, 1915.

On a Collection of Birds from British East Africa and Uganda, presented to the British Museum by Capt. G. S. Cozens. Part I. By Claude H. B. Grant.— The collection was made by Mr. Willoughby P. Lowe who accompanied Capt. Cozens, and the trip extended from September 21, 1912, to March 7, 1913, covering country between Naivasha and the German border and then northwest to the White Nile. The various geographic races are discussed and compared under each species.

A Recent Ornithological Discovery in Australia. By Gregory M. Mathews.— A geographic and historical discussion of the avifauna of northern Australia.

The Crested Penguin in Australian Waters. By H. Stuart Dove.

Report of the Birds collected by the late Mr. Boyd Alexander during his last Expedition to Africa — Part II. The Birds of St. Thomas' Island. By David A. Bannerman.— Sixty-five species.

Note on the Genus *Ithagenes*. By E. C. Stuart Baker.— Excellent colored plate of the heads.

A Few Notes on *Tetrao urogallus* and its Allies. By Collingwood Ingram.— *T. u. aquitanicus* subsp. nov. (p. 132) from the Pyrenees.

Notes on the Bird Life of Eastern Algeria. By Rev. F. C. R. Jourdain.— With Contributions by H. M. Wallis and F. R. Ratcliff — 197 species listed.

Bulletin of the British Ornithologists' Club. No. CCI. November 24, 1914.

Messrs. Rothschild and Hartert (p. 24) describe *Ceyx solitaria mulcata* subsp. nov., New Hanover.

Mr. D. A. Bannerman discusses the birds of the islands of the Gulf of Guinea.

Mr. Claude Grant describes *Scopus umbretta bannermani* subsp. nov.

(p. 27), Mt. Leganisho, B. E. A., also *Halycon leucocephala ogilviei* subsp. nov. (p. 28), So. Angoniland, Nyasaland and *H. senegalensis superflua*, subsp. nov. (p. 28), Limpopo R., Transvaal.

Bulletin of the British Ornithologists' Club. No. CCII.

Messrs. Rothschild and Hartert describe *Dicaeum geelvinkianum rosseli* (p. 32), Rossel Island, Louisiade Group.

Dr. Hartert describes *Callisitta azurea expectata* (p. 34), Pahang, Malay Peninsula, Mr. Ogilvie-Grant, *Collocalia hirundinacea excelsa* (p. 34), *C. esculenta maxima* (p. 35), and *C. nitens* (p. 35), all from the Utakwa River, Snow Mts. of New Guinea.

Bulletin of the British Ornithologists' Club. No. CCIII.

Hon. Walter Rothschild discusses the nomenclature and relationship of the "Masked Gannets." He concludes that the name *Sula dactylatra* should be used instead of *S. cyanops* and recognizes five subspecies of which *S. d. californica* (p. 43) is described as new from San Benedicto Island, the form ranging along the Californian and Central American coasts.

Mr. W. L. Selater points out that the type of the genus *Sula* is *Sula sula* Brisson—*S. leucogastra* Bodd. He also contributes some short biographical notices of Bonaparte, Gould, Strickland and Jardine.

Mr. D. A. Bannerman describes *Poliolais alexanderi* (p. 53) from Cameroon and *Zosterops stenocricota poensis* (p. 54), Fernando, Po.

Mr. Claude H. B. Grant proposes *Centropus superciliosus loanda* (p. 54) Dalla Tando, Angola; *C. s. sokotræ*, (p. 55), Sokotra; and *Melittophagus variegatus bangweoloensis* (p. 55) Lake Bangweolo, N. E. Rhodesia.

Bulletin of the British Ornithologists' Club. Vol. XXXIV.

This volume of 344 pages consists of the Migration Report for the spring of 1913 and autumn of 1912. It follows the plan of the preceding reports and contains an enormous amount of detailed information. Reports were received from 327 observers and light keepers. The Committee which tabulated the data recognize several distinct immigrations across the channel from France. In the case of the Cuckoo these occurred April 14-16, April 19-24 and April 27-May 1.

British Birds. Vol. VIII, No. 7. December 1, 1914.

Feeding-habits of the Sparrow Hawk. By W. Farron.

The 'British Birds' Marking Scheme. Progress for 1914 and Some Results. By H. F. Witherby.—A most interesting report.

British Birds. Vol. VIII, No. 8. January 1, 1915.

Notes on the Breeding-Habits of the Curlew Sandpiper. By Maud D. Haviland.—At the mouth of the Yenesei River.

A Practical Study of Bird Ecology. By H. G. Alexander.

British Birds. Vol. VIII, No. 9. February 1, 1915.

Notes on the Breeding-Habits of the Little Stint. By Maud D. Haviland.—At Golchika, mouth of the Yenesei.

Report on the Results of Ringing Black-Headed Gulls. By H. W. Robinson.—During the years 1909-1913, 11,769 of these Gulls were banded in the nest. Of these 414 have been recovered.

Avicultural Magazine. Vol. VI, No. 2. December, 1914.

Cranes in Captivity. Edit.

The Pigeon Hollandais. By Graham Renshaw.— Historical account of *Alectroenas*.

Weavers. By W. Shore Baily.— Photograph of nests in his aviary.

English Names for the Parrots. By Dr. E. Hopkinson.— A convenient compilation, continued in Nos. 3 and 4.

Avicultural Magazine. Vol. VI, No. 3. January, 1915.

Birds of Paradise on Little Tobago. By O. Millsum.— The birds are still doing well.

Avicultural Magazine. Vol. VI, No. 4. February, 1915.

My Hummingbirds and How I Obtained Them. By A. Ezra.— Interesting account of exportation and successful keeping of several West Indian Species.

Bird Notes. Vol. V, No. 11. November, 1914.

A Journey Across the Sierras. By W. S. Baily (continued).— Mr. Baily's amusing disregard of the published information on American birds is still in evidence. Of *Pica nuttalli* he tells us he has seen a good many in the Rocky Mts. in Utah and Wyoming! In the December number is a continuation in which we are informed of the presence of the "White-eyed Grackle (*Quiscalus quiscalus agelæus*)" in the Santa Clara Valley— surely a new species for California!!

Bird Notes. Vol. VI, No. 1. January, 1915.

Foreign Birds at the Show. By W. T. Page.— A plate of interesting hybrid Weavers, Finches and Bulbuls.

The Austral Avian Record. Vol. II, No. 6. December 19, 1914.

On the Species and Subspecies of the genus *Fregata*. By G. M. Mathews. — The bird of Ascension Island upon which the name *Pelecanus aquilus* of Linnaeus is based proves to be quite distinct from the common widely distributed form which must be known as *Fregata minor* Gm. Eight subspecies of this bird are proposed and two of *F. ariel*, the form of the A. O. U. Check-List is true *minor*.

The Austral Avian Record. Vol. II, No. 7. January 28, 1915.

Additions and Corrections to my List of the Birds of Australia. By G. M. Mathews.— Two new genera and 57 new subspecies or species are described.

Notes on Some Australian Types. By G. M. Mathews.

Diggles' Ornithology of Australia and Other Works. By G. M. Mathews. — Seven species described in the 'Transactions of the Philosophical Society of Queensland' were from the Aru Islands, not from Australia.

The Dates of Publication of Vieillot's *Galerie des Oiseaux*. By G. M. Mathews.

The South Australian Ornithologist. Vol. II, Part 1. January, 1915.

Notes on some of the Birds observed on Mount Dandenong, Victoria, October, 1914. By Edwin Ashby.

Birds of the Cairns District, Queensland. No. 1. By G. M. Mathews.
A Sketch of the Life of Samuel White. By S. A. White.

Ornithologisches Jahrbuch.¹ XXV, Heft 3-4. May-August, 1914,
(October 27, 1914.) [In German.]

Review of Bird Migration in Ascania Nova. Taurien Govt., Southern
Russia. By H. Grote.

On the Birds of the Irkutsk Govt. By H. Johansen.—*Hypotriorchis
subbutco irkutensis* (p. 83) subsp. nov. Dorfe Omoloi (Kreis Kirensk).

Remarks and Criticisms on Publications on Certain Species of Birds of
the Canaries. By R. von Thanner.

Journal für Ornithologie.² 62, Heft 4. October, 1914. [In German.]

The Phylogeny of the Thrushes. By J. Gengler (concluded).

Contributions to the Ornithology of Prussian Schlesia. By C. Keyser
(concluded).

Birds of the Middle Kergisensteppe. By P. P. Suschkin (concluded).

South Somaliland as a Zoogeographic Division. By O. Graf Zedlitz.—
List of 98 species (continued in January number to 194 species).

Journal für Ornithologie. 63, Heft 1. January, 1915.

Some New Forms of Central African Birds in the Grauer Collection.
By Moriz Sassi.—*Hyliota slatini* (p. 112), Beni; *Phyllastrephus lorentzi*
(p. 112), Moera; *Geocichla princei graueri* (p. 113), Moera; *G. gurneyi
oberländeri* (p. 115), Beni-Mawambi; *G. g. tanganjicae* (p. 116), Urwald;
Cossypha bocagei albimentalis (p. 117), Urwald.

On a Small Collection of Birds from Northern Mesopotamia. By O.
Neumann.

New Species. By A. Reichenow.—*Oreopsittacus arfaki intermedius*
(p. 124), New Guinea; *Centropus senegalensis tshadensis* (p. 124), Tschad
district, Central Africa; *Aethomyias nigrifrons* (p. 124), New Guinea;
Micræca poliocephala (p. 124), New Guinea; *Pachycephala hypoleuca*
p. 125), New Guinea; *Melanorhæctes umbrinus* (p. 125), New Guinea;
Ploceus melanolæma (p. 125), Fernando Po.; *Zosterops setschuana* (p. 125),
Ta-tsieng-lu-ting in Setchuan; *Cleptornis palauensis* (p. 125), Palau;
Melirrhophetes rufocrissalis (p. 126), New Guinea; *Melilestes chloreus*
(p. 126), New Guinea; *Philemonopsis meyeri canescens* (p. 126), New
Guinea; *Ptilotis simplex* (p. 126), New Guinea; *Xanthotis chlorolæma*
(p. 127), New Guinea; *X. melanolæma* (p. 127), New Guinea; *Thelazo-
menus* n. gen. (p. 127), allied to *Xanthotis*, type *T. pæcilocercus* (p. 127),
New Guinea; *Chalcomitra adamauæ* (p. 127), Adamaua; *C. tanganjicae*
(p. 128), Urwald; *Phyllastrephus leucolæma camerunensis* (p. 128), Duma,
Cameroons. *Camaroptera caniceps* (p. 128), Duna; *Crateroscelis virgata*
(p. 128), New Guinea; *C. albigula* (p. 128), New Guinea; *Pseudopitta* n.
gen. (p. 129) type *Eupetes incertus* Salvad; *Crateropus jardinei hypobrun-*

¹ Edited by Victor Ritter Tschusi zu Schmidhoffen, Hallein, Salzburg Austria.

² Edited for the German Ornithological Society by Dr. A. Reichenow. L. A. Kittler, Leipzig, Agent.

neus (p. 129), Amadi, Congo dist.; *Bradornis pallidus tessmanni* (p. 129), Carmot, E. Cameroon.

On *Pelecanus sharpei*. By A. Reichenow.

Ornithologische Monatsberichte. Vol. 22, No. 10-11. October-November, 1914. [In German.]

Emberiza melanocephala Scop. and its division into two races.—*E. m. orientalis* sp. n., (p. 159) Eastern Sarpa-steppe.

Description of a New Weaver-bird from Abyssinia. By J. v. Madarasz.—*Othyphantes edmundi* (p. 161).

Ornithologische Monatsberichte. Vol. 22, No. 12. December, 1914. Ornithological Observations on a Trip through Uhehe and Ubena [Africa]. By L. Schuster.

Messenger Ornithologique.¹ V, No. 3. 1914. [In Russian.]

Contributions to the Ornithology of the Tomsk Govt. By H. Johansen (continued from 1912, No. 4).

The Species and Races of Remiza of Russian Turkestan. By N. A. Sarudny.

Messenger Ornithologique. V, No. 4. 1914. [In Russian.]

An Ornithological Excursion in Eastern Transcaucasia. By W. W. Stantschinsky.

A New Pheasant from Turkestan. By N. A. Sarudny.—*Phasianus mongolicus bergii* subsp. nov. (p. 277).

An Unnamed Saxicola. By N. A. Sarudny.—*S. finschii neglecta* subsp. nov. (p. 279).

On the Avifauna of Transcaucasia. By P. W. Nesterow (continued from 1913, No. 3).

On the Rosy Finch of Turkestan. By N. A. Sarudny.

A Hybrid between *Nyroca ferina* and *N. nyroca*. By N. A. Sarudny.

Messenger Ornithologique. VI, No. 1. 1915. [In Russian.]

Pages 5-8 contain a convenient list of the new names proposed in the 'Messenger', 1910-1914, consisting of 1 genus, 2 species and 55 subspecies.

On the Avifauna of the Ussuri country. By G. J. Poljakow.—*Perdix daurica suschkini* subsp. nov. (p. 38); *Bubo bubo ussuriensis* subsp. nov. (p. 44).

Contributions to the Ornithology of Turkestan. By N. A. Sarudny (continued from 1913, No. 4).

Some Remarks on the Geographic Distribution of *Cyanistes cyanus* and on the Origin of *C. pleskei* Cab. By J. Domaniewski.

¹ Edited by G. I. Poljakow, Gut. "Sawino," Oberalowka, Moscow Govt., Russia.

Ornithological Articles in Other Journals.¹

Galloway, A. R. and Thomson, A. L. Notes on High Mortality among Young Common Terns in Certain Seasons. (*Scottish Naturalist*, December, 1914.)—On the Scottish coast.

Clyve, Robert. Notes on Birds Observed at the Butt of Lewis [Hebrides]. (*Scottish Naturalist*, February, 1915.)

Taverner, P. A. Geological Survey Museum Work on Point Pelee, Ont. (*Ottawa Naturalist*, November, 1914.)—Largely ornithological.

Allen, Arthur A. The Paramo of Santa Isabel. (*Amer. Museum Jour.*, January, 1915.)

The Roosevelt-Rondon Scientific Expedition. By L. E. Miller. (*Amer. Museum Jour.*, February, 1915.)—This and the preceding give accounts of two of the American Museum's recent expeditions.

Clark, A. H. Distribution of the Onychophora. (*Smithson. Misc. Coll.* 65, No. 1, Jan. 4, 1915.)—Pages 6-8 discuss the question of primary and secondary colonization in migratory birds, the latter being exemplified in species which have spread from the tropics to summer in temperate regions, by individuals which revert and breed sporadically in the tropics.

Yerkes, R. M. Color Vision in the Ring-Dove (*Turtur risorius*). (*Proc. Nat. Acad. Sci.*, I, No. 2, pp. 117-119.)

Brother Alphonsus. Distribution of Our Birds in Spring and in Winter. (*Amer. Midland Naturalist*, January, 1915.)—Comparisons of several seasons based on the number of times each species was recorded. As there are no data as to the amount of time or the number of days devoted to observation, the results are rather unsatisfactory.

Bartsch, Paul. Birds Observed in the Florida Keys, April 20-30, 1914. (*Year Book*, No. 13, Carnegie Inst. of Washington, pp. 192-195.)—A brief diary of observations and a nominal list of 47 species.

Wormald, Hugh. Courtship of Ducks and Notes on Hybrids with Illustrations. (*Trans. Norfolk and Norwich Nat. Sci. Soc.*, IX, pt. V, pp. 693-701.)

Anon. Wild Birds Protection in Norfolk, 1914. (do. pp. 765-769.)

Riviere, B. B. Notes on the Autumn Migration on the Norfolk Coast. (do. pp. 770-773.)

Gurney, J. H. The Irruption of Waxwings into Norfolk during the Winter of 1913-14. (do. pp. 773-775.)

Long, S. H. and Riviere, B. B. Fauna and Flora of Norfolk. Additions to Part XI. Birds (Sixth List). (do. pp. 784-797.)

Baker, E. C. Stuart. The Game Birds of India, Burma and Ceylon.

¹ Some of these journals are received in exchange, other are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

(Jour. Bombay Nat. Hist. Soc., November, 1914, pp. 183-196.) — Two beautiful colored plates of Sand Grouse.

Stevens, H. Notes on the Birds of Upper Assam (do.) — A well annotated list containing in the present installment 243 species. The preservation of the original form of a word is carried to the extreme of refusing to change the termination of the specific name to agree with the gender of the genus!

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CORRESPONDENCE.

A Bird Census of the United States.

EDITOR OF 'THE AUK':

Dear Sir: A preliminary census of the birds of the United States was undertaken by the Bureau of Biological Survey during the spring of 1914. The results were so encouraging that the work is to be repeated in the spring of 1915 on a larger scale, and will probably be repeated yearly hereafter in order to obtain permanent records showing the fluctuations in the bird population of the United States. Observers are particularly desired in the West and South and it is hoped that the readers of 'The Auk' will be able to render valuable assistance in the campaign for the coming season. Anyone familiar with the birds nesting in his neighborhood can help, more particularly as only about the equivalent of one day's work is needed.

The general plan is to select an area containing not less than 40 nor more than 80 acres that fairly represents the average conditions of the district with reference to the proportions of plowed land, meadowland, and woods, and go over this selected area early in the morning during the height of the nesting season and count the singing males, each male being considered to represent a nesting pair. In the latitude of Washington, D. C., the best time is the last week in May; in the South the counting should be done earlier; while in New England and the northern part of the Mississippi Valley about June 10 is the proper time. The morning count should be supplemented by visits on other days to make sure that all the birds previously noted are actually nesting within the prescribed area and that no species has been overlooked.

Readers of 'The Auk' and others who are willing to volunteer for this work are requested to send their names and addresses to the Biological Survey, Washington, D. C. Full directions for making the census and blank forms for the report will be forwarded in time to permit well considered plans to be formulated before the time for actual field work. As the Bureau has no funds available for the purpose, it must depend on the services of voluntary observers.

Very truly yours,

U. S. Dept. Agr.
Feb. 16, 1915.

E. W. NELSON,
Assistant Chief, Biological Survey.

[It is to be hoped that the readers of 'The Auk' will respond promptly to Mr. Nelson's appeal. The Biological Survey has done so much for both birds and bird students throughout the country that this request for coöperation should meet with a hearty response.—ED.]

NOTES AND NEWS.

LOUIS DI ZEREGA MEARN'S, formerly an Associate of the American Ornithologists' Union, died of diphtheria at the Sydenham Hospital, Baltimore, Maryland, April 3, 1912. He was born at Fort Verde, in central Arizona, November 5, 1886. He was graduated from the Rensselaer Polytechnic Institute, at Troy, New York, in the class of 1909, with the degree of C. E. After graduating from the Institute he spent a year and a half at the Dudley Southern Observatory, at San Luis, Argentine Republic, and after his return from South America, he was employed for some time in the observatory at Albany, New York. Shortly before his death he accepted a position with the Baltimore Sewerage Commission.

Throughout his life he was deeply interested in nature studies and was especially devoted to biology. His observations were recorded with fidelity and clearness. In the field he was a delightful companion, an accurate and quick shot with shotgun or rifle, and a clever and successful mammal trapper. He began a collection of plants when four years old, and collected his first mammal at Fort Snelling, Minnesota, May 18, 1891, sending the latter to Dr. J. A. Allen, who acknowledged the little white-footed wood-mouse as coming from the youngest contributor to the mammal collection of the American Museum of Natural History. Mr. Mearns's specimens were of excellent quality, carefully recorded, with detailed measurements. For many years his collection was stored in the United States National Museum, at Washington; but, about a year before his death, it was donated to the museum, to which it forms a valuable addition.

Although much interested in the study of botany, the few published writings that he has left relate solely to mammals and birds. Following is a complete list of his biological publications:

1. On the Occurrence of the genus *Reithrodontomys* in Virginia. *The American Naturalist*, vol. 31, February 1, 1897, p. 161.
2. Notes from Newport. *Notes on Rhode Island Ornithology*, vol. 1, No. 3, July, 1900, pp. 13-15.
3. Spring Arrival and Departure Notes, 1900. *Notes on Rhode Island Ornithology*, vol. I, No. 3, July, 1900, p. 18.
4. Birds observed at Chepachet, R. I. *Notes on Rhode Island Ornithology*, vol. I, No. 4, October, 1900, pp. 21, 22.
5. Notes from Newport, R. I. *Notes on Rhode Island Ornithology*, vol. I, No. 4, October, 1900, p. 22.
6. Arrival and Departure Notes, 1900. *Notes on Rhode Island Ornithology*, vol. I, No. 4, October, 1900, p. 22.
7. Arrival and Departure Notes, 1900. *Notes on Rhode Island Ornithology*, vol. II, No. 1, January, 1901, p. 8.
8. Birds Observed on Prudence Island, Narragansett Bay, Rhode Island. *Notes on Rhode Island Ornithology*, vol. II, No. 4, October, 1901, pp. 18-19.

9. A List of the birds Observed on the Island of Rhode Island and the Adjacent Waters. Notes on Rhode Island Ornithology, vol. III, No. 2, April, 1902, pp. 6-12; vol. III, No. 3, July, 1902, pp. 13-14; vol. III, No. 4, October, 1902, pp. 17-23.

10. The Louisiana Water-Thrush in Minnesota. *The Auk*, vol. XX, No. 3, July, 1903, pp. 307-308.—EDGAR A. MEARNS.

THREE years ago 'Recent Literature' in 'The Auk' was extended to include a brief review of the ornithological magazines and ornithological articles in other periodical publications, beginning with January 1, 1912. Space usually allows only a quotation of the titles of the more important articles and a citation of the new forms proposed. Even this, however, enables the reader to consult all the publications bearing upon his special line of work, while the index to the volumes will contain references to practically all the new species described by ornithologists, in every part of the world.

The resources of the library of the Academy of Natural Sciences of Philadelphia render it possible to make this record nearly complete and it is interesting to check up the list of new forms recorded for 1912 in 'The Auk' with those catalogued in the 'International Catalogue of Scientific Literature.' The vast number of Australian genera, species and subspecies proposed by Mr. Gregory M. Mathews were not listed in 'The Auk' although all of his papers are noticed. One paper by Mr. Robert Ridgway containing 14 new genera, published in the 'Proc. Biol. Soc. of Washington,' was not sent to 'The Auk' and was overlooked, as it was presumed that all ornithological publications of this society had been received for review. Outside of this only nine new names were missed, two of which were in publications which did not reach either 'The Auk' or the Academy library. The benefit of having these new species, etc., listed, usually within three months of the time of publication, instead of waiting nearly two years for the appearance of the 'International Catalogue' is, we trust, worth the labor of compilation.

On the evening of January 7, 1915, the Delaware Valley Ornithological Club celebrated the twenty-fifth anniversary of its founding with an informal dinner at The Roosevelt, Philadelphia. Sixty-six members and eight guests were present; Stewardson Brown, president of the Club, presided, and Dr. Spencer Trotter acted as toastmaster. The speakers were, Dr. A. K. Fisher and John H. Sage, president and secretary of the A. O. U.; Charles F. Batchelder representing the Nuttall Ornithological Club of Cambridge; John T. Nichols, of the Linnæan Society of New York; Dr. T. S. Palmer of the U. S. Biological Survey, Washington, D. C., Prof. Robert T. Young of the University of North Dakota, a former active member of the Club; and several of the local members.

The 'D. V. O. C.' represents a type of organization which does much to advance the interests of bird study. Organized in 1890 by seven young

men interested in recording bird migration data, it has aimed to recruit its members so far as possible from those of high school and college age and to encourage the active participation of young men in all its work. Its field has been broad and discussion on any phase of ornithology is welcome, while the spirit of good fellowship which has always characterized its meetings has been carefully preserved.

Twenty-five years make great changes in the development of the members of any organization, and gathered around the anniversary table on January 7 might be seen doctors and lawyers of eminence, college professors, men high up in business corporations, and officers of banks and trust companies, mingled with the younger members who go to make up the bone and sinews of the Club today — all preserving their interest in bird study, ready to advance it in any way, and no doubt better for the existence of the 'D. V. O. C.'

A REVIEW of Joseph Grinnell's 'Mammals and Birds of the Lower Colorado Valley,' by Francis B. Sumner which appears in 'Science' for January 8, 1915, should be read by all who are interested in zoögeography, both for the interesting discussion of some of the points raised in the paper, and as an illustration of how far apart the systematists and experimental biologists stand in their consideration of evolutionary problems.

Prof. Sumner it should be said is much more lenient to the systematist than many of those who approach the subject from his point of view and who, as some one has put it, look upon systematic work as a disease, like the measles, from which everyone suffers at some time or other but from which one is expected to recover rapidly. Nevertheless some of his statements will doubtless astonish readers of 'The Auk' who have been brought up on zoögeography. For instance he says: "It would seem *a priori* that in traveling along a uniform gradient from a region of higher to one of lower average temperature or vice-versa, one would continually pass into and out of the ranges of species which found their limits of physiological adaptability at different points along the line. One would scarcely expect to encounter critical points, where the fauna and flora as a whole, or at least the most characteristic members of it, were suddenly replaced by quite a different assemblage. Yet this is the essence of the 'life-zone' conception.

"It would be foolhardy, indeed, for a zoölogist of limited field experience to criticize this conception. It is doubtless based upon extensive and accurate observations and represents real facts. But unfortunately they are, in a high degree, facts which, by their very nature, are scarcely communicable to most biologists. Before the life-zone conception can be of much service to the average student of evolutionary problems it will have to be expressed in terms which he is able to comprehend without making extended explorations, under the personal escort of one of the initiated. Until then such expressions as 'Upper Sonoran,' 'Transition' and the like will be to him mere empty names, or at best, they will recall to his mind certain colored areas, on a map of North America, the boundaries of which seem to have been chosen quite arbitrarily."

The "average student of evolutionary problems" is not a very definite term but it would seem that many systematists might be included in this category and were one of them to pick up a current work on Mendelism we think he might readily be pardoned if he made a similar plea for the "personal escort of one of the initiated."

The fact of the matter is that the two classes of investigators know too little of the work of one another. The majority of our biological schools are so thoroughly under the influence of the experimental biologists that students are trained and graduated with little or no conception of zoögeography or of the true nature of systematic research. The museums, on the other hand, foster the development of systematic workers, who are not inclined to consider seriously experiments based upon artificial domestic strains of animals, the origin of which may be unknown, or to admit that results so obtained have much to do with the evolution of natural species, which usually do not give similar results when used for experiment.

Careless work has been done on both sides but this does not discredit the vast amount of valuable contributions that each has made to the general problem of evolution. Systematic and zoögeographic research will not get to the bottom of the problem, unaided; neither will it be solved solely in terms of "zygotes" or "gametes."

Systematic nomenclature has also been a target for the experimental biologists, who are exasperated at the variety of names for the same species, or genus, and who fail to see the need of complicated rules of nomenclature. They are, however, threatened with precisely the same trouble and will have to take refuge in the same remedy. The terminology of Cytology, for example, is becoming so burdened with names, nearly or quite synonymous, that they are bewildering even to those fairly well "initiated."

MR. SAMUEL N. RHOADS accompanied by Mr. Earl L. Poole, both of the Delaware Valley Ornithological Club, left early in January for several months' collecting in Guatemala.

As we go to press we learn of the final arrangements for the A. O. U. Meeting in San Francisco, May 18-20, 1915, and once again urge all members, both on the Pacific coast and in the country to the eastward, to make every effort to be present.

The eastern contingent will leave New York on May 6 reaching San Francisco on the evening of May 15. Two days, May 10-11, will be spent at the Grand Cañon, and two days and a half at Los Angeles.

From the San Francisco Committee of the A. O. U. and Cooper Club comes word that the sessions will be held at The Inside Inn, within the Exposition Grounds, with the annual dinner on the evening of the 18th. Friday the 21st will be devoted to a trip to the Farallon Islands, on the U. S. Fisheries steamer 'Albatross,' and other trips will be arranged in accordance with the number of visitors and their inclinations.

From Los Angeles, Mr. J. E. Law, Chairman of the Entertainment Committee of the Southern Division of the Cooper Club, writes that arrangements will be made to escort the eastern visitors to the Santa Barbara Islands, Mt. Lowe, or other points of interest during their stop in that city.

The splendid program that is thus offered and the cordial hospitality of the California ornithologists should be sufficient inducement to cause every member in the east or middle west who can possibly arrange to do so, to join the A. O. U. party and communicate as soon as possible with Mr. John H. Sage, Portland, Conn.

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CONTENTS

	PAGE
SOME BIRDS FROM SINAI AND PALESTINE. By <i>John C. Phillips</i> . (Plate XVII)	273
THE FOSSIL REMAINS OF A SPECIES OF <i>HESPERORNIS</i> FOUND IN MONTANA. By <i>R. W. Shufeldt, M. D.</i> (Plate XVIII)	290
SUMMER BIRDS OF FORRESTER ISLAND, ALASKA. By <i>George Willett</i> . (Plates XIX-XX)	295
NOTES ON THE ROCK DOVE (<i>Columba domestica</i>). By <i>Charles W. Townsend, M.D.</i>	306
ON THE NESTING OF CERTAIN BIRDS IN TEXAS. By <i>George Finlay Simmons</i> . (Plates XXI-XXII)	317
THE BIRD LIFE OF TRINIDAD ISLET. By <i>Robert Cushman Murphy</i> . (Plates XXIII-XXV)	332
EARLY RECORDS OF THE WILD TURKEY. V. By <i>Albert Hazen Wright</i>	348
<p>GENERAL NOTES.— The Red-throated Loon (<i>Gavia stellata</i>) in Jackson Park, Ill., 367; Another European Widgeon in Virginia, 367; Snow Geese and Swans in Massachusetts, 367; Wilson's Snipe Wintering in Nova Scotia, 368; Spotted Sandpiper and Water, 368; Gray Sea Eagle off Nantucket, 368; Young Kingbird on a Cherry and Dragon-fly Diet, 368; The Bohemian Waxwing (<i>Bombycilla garrula</i>) at Ithaca, N. Y., 369; Prothonotary Warbler at South Vineland, N. J., 370; Brown Thrasher Wintering in Mass., 370; Birds Observed in Trinity Church Yard, New York City, 371; Type Locality of Lewis's Woodpecker and Clarke's Nutcracker, 371.</p>	
<p>RECENT LITERATURE.— Levick's 'Antarctic Penguins,' 372; Miller on Ptosis, with Special Reference to the Feathering of the Wing, 373; Cory on New South American Birds, 374; Shufeldt on the Tree Ducks, 374; Shufeldt on Fossil Birds in the Marsh Collection, 375; White on an Expedition to the Interior of Australia, 376; Cassinia, 1914, p. 376; Publications on Bird Protection, 377; Bird Enemies of two Beetle Pests, 377; Dissemination of the Chestnut-blight Fungus, 378; The Ornithological Journals, 378; Ornithological Articles in Other Journals, 383; Publications Received, 384.</p>	
<p>NOTES AND NEWS— Obituary: Harry K. Pomeroy, 386; Lord Brabourne, 387; The Generic Problem, 387; Thirty-third Meeting of the American Ornithologists' Union at San Francisco, California, May 17-20, 1915, 388.</p>	

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BUTLER'S OWL *Strix butleri* (Hume)

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SOME BIRDS FROM SINAI AND PALESTINE.

BY JOHN C. PHILLIPS.

Plate XVII.

WE left Suez on March 22, 1914, for a brief trip through the Sinai Peninsula, and then to Jerusalem, via Akaba and the east side of the Dead Sea. Mr. Mann was to pursue insects and reptiles and both of us put in our spare moments chasing birds and trapping mammals. As much of the route lay through a desert, our catch was small, except for the reptiles. Mammals, though in places numerous, were hard to trap and many specimens were stolen by jackals or eaten by ants before daylight, so that we often despaired of bringing back a representative lot.

This journey takes one through several very different types of country. The bare desert around Suez, very similar to the deserts of Egypt; then the rugged Sinai plateau with peaks up to 8500 feet in height; the low deserts around Akaba, with an Arabian and Dead Sea fauna; the bare-wind swept 5000 foot plateau east of the Dead Sea depression; and lastly the oleander and cane jungles of the Dead Sea and its affluents, with a sub-tropical fauna and flora, and an altitude as low as 1300 feet beneath the level of the sea.

When you leave Suez behind, you enter upon the worst stage of the journey. The spring sun is scorching from nine o'clock till four, and the level stretches of gravel and limestone are hardly

relieved by the sight of a single creature, barring lizards and scorpions. At rare intervals an Egyptian Vulture sails overhead or a pair of Ravens follows the caravan for a time. At nightfall one or two White Wagtails gather around the tents and run about under the very feet of the camels.

There are only two spots along this road where birds can really exist. One is the Wells of Moses, eight miles from Suez, and the other is Wady Gharandel, identified with the Elim of the Bible Exodus. At this latter place we arrived on the third day, camping at the upper end of the Wady where there was a well some six feet below the surface of the ground and a number of palms, sayal thorn trees and shrubs of various sorts. Here we got a few birds, a Great Grey Shrike, Wheatears in abundance, Ruppell's and Bonelli's Warblers, Chiff-Chaffs, Spanish Sparrows and the pale Cray-Martins. Besides these we saw that very characteristic plain gray warbler of the Sinai Peninsula, *Cercomela asthenia*, the Chat-Robin or Black-start. Here too we began to see the Sinai Desert Larks.

Between Gharandel and Wady Feran, where you first find real water, there is almost nothing of interest to the ornithologist. For part of a day the road runs along the coast of the Red Sea under rough cliffs, but not a gull or a shore-bird enlivens the monotony of that shell strewn shore. You begin to see some of the handsome Black and White Chats along this part of the road. We took three species, the White-rumped, Pied and Hooded Chat. These are very striking birds, extremely shy and by no means easy to get. The White-rumped has a very low but sweet song. Wherever there is any vegetation at all one sees if he looks closely, an extraordinary little wren-like cock-tailed warbler, *Scotocera iniquietus* that is an adept at hiding. If I remember rightly, it has a peculiar little Chickadee-like note which I heard long before I ever managed to get the bird. When one gets into the ravines about Petra this little bird is more plentiful. Then another very characteristic warbler of the scattered sayal trees is the Lesser White-throat which returns to Palestine and breeds in great numbers. You can identify it a long way off by its monotonous "sip-sip-sip." I think it is quite the commonest spring bird of Sinai.

On April 1, we arrived at the beautiful brook of Feran and

pitched camp at the mouth of the Wady Aleyât; to students of Bible history, one of the most interesting spots on the peninsula. Most of the ancient traditions center around this place, the ruins of an ancient church and a fine monastery crown the hill of El-Meharret, and the rocks are riddled with graves and cells of anchorites. The serrated peak of Serbal rises just to the south, the most picturesque mountain on the peninsula, and still claiming distinction as the mountain of the Law Giving, in spite of the attempts of the Greek monks to transport all the bible traditions to the neighborhood of Gebel Katherina.

The brook of Feran waters three miles of a rugged canyon filled with palms, nebk and tamarisk. The climate at this elevation is wonderful, and the bothersome flies and heat of the desert have been left behind. The Palestine Bulbul mingles his Robin-like song with the purring of the stream, and a fair number of other birds are to be found, especially at the head springs. In the thick palms a few shy Tristram's Grackles evaded my gun. We took both the Rock and the Blue Thrush, the latter supposed to be "the sparrow that sitteth alone upon the house-tops" of scripture. Then there were Redstarts, several Warblers, two species of Wag-tails, Tree Pipits and Spanish Sparrows. I even saw a Snipe. In the neighboring valleys the lively little Sand Partridge was abundant. It is hard to dismiss the beautiful little See-see (*Ammodramus heyi*) without a word of notice. He is the only fat thing in Sinai. He lives in flocks of fair size, and curiously enough, numbers are seen together even in the breeding season. One morning (April 9), I watched the mating antics of a pair of these birds. The female was squatting in the sand and the male constantly hopped over and ran around her. Every little while they would seize each other by the bills and wrestle about with much flapping of wings and their feathers flying. They kept this up for ten minutes and I had to leave them still at it.

Best of all, at Feran however, was the capture of a Butler's Owl (*Strix butleri*, see Plate XVII), our specimen making the third one known to science. The first one was sent to Hume from South Baluchistan, and the second came from Sinai. The background of the plate shows the vale of Feran and the rough outline of Mt. Serbal where the ibex and the leopard still wander.

We only spent three days at Feran and then moved south to the convent of St. Catherine. On the way, passing up the rugged defile, Nekb-el-Hawa, or pass of the winds, we met our first Rose Finches. This rare rock-loving *Carpodacus* lives only on the highest and roughest parts of the country, keeping in little scattered troops. It is a very wild and restless bird and what it manages to live upon I do not know. I saw it again only at Petra. Zedlitz (1912), says that the bird does not breed till its second year. From my specimens I should say that both sexes were rose-colored when adult, but others have described the females as plain colored, like the young males.

In the garden of the convent of St. Catherine there were a few birds but nothing that we had not seen before. A side trip to Um Shomer, a high mountain in the south, took us over an absolutely birdless region with nothing but Desert Larks and Crag Martins at the rarest intervals. One morning at sunrise I found myself high up on a spur of Um-Shomer. I thought I never had seen such desolate grandeur. Westward about fifty miles of the Gulf of Suez was in sight, bathed in a light mist, while a long stretch of the Gulf of Akaba limited the east and northeast view, backed by the low peaked mountains of Midian. The whole rugged south end of Sinai was spread out like a relief map, and not a sound came to my ears.—A single Eagle soared about the crags of Um-Shomer, perhaps looking for a young ibex, but he was all alone. Far out on the Gulf of Suez as the mist cleared I could see with my glass the big steamers plying to the ends of the world.

Some of the scarcity of birds in Sinai may have been due to lack of rain. Usually rain and snow fall every winter, but now for several years there has been practically a continual drought. The vegetation is much reduced and every sayal tree is cut back for camel food.

From the convent to Akaba at the head of the long gulf of that name, we did not see many birds. For days we journeyed along the beach of the gulf meeting very rarely a Sandpiper, or one or two European Kingfishers. At intervals there were groups of palm trees with a few Warblers, Chats and Wheatears about them.

At Akaba we had to wait eight days for our mules. A long palm grove and the remains of quite a large town with a Turkish fort

stretches along the beach. The place is interesting to students of migration for it seems to be on the great highway from northeast Africa up the great Dead Sea depression to Palestine, and so over western Asia. We took a good many birds here, among them a Land Rail in a half dead condition, a Baillon's Crake, one specimen of the rare Audouin's Gull, here far east and south of its eastern limit, a stray Burgomaster Gull, also well south of its range, some Dunlins and Greenshank and a couple of Garganey Teal. One night we saw coming north up the gulf the most extraordinary flock of hawks I have ever heard of. We judged there were 1500 to 1800 scattered out over a wide area. We shot four and they were of one species, the Levant Sparrow Hawk. Such a flock must have been migrating from Africa or perhaps south Arabia, but the species has only been taken once or twice in Egypt and never elsewhere in Africa.

Among the palm trees hundreds of splendid European Bee-eaters with their tuneful chirping were constantly at work on a small sand beetle that was just then having its nuptial flight. We saw here for the first time the curious awkward Hopping Thrush, a pale thrasher-like bird that seems really ashamed of its power of flight. It is another of the characteristic Dead Sea species.

There were a good many Fan-tailed Ravens here and many migrating Blue-headed Wagtails, besides other birds that need not be mentioned. The Fan-tailed Raven has a curious flight and sometimes tumbles like the Roller. Tristram describes its note as rich and musical. A careful two months' collecting in the Akaba palms at the proper season would produce a very rich collection of migrants.

Between Akaba and Petra our advance guard was robbed, and the Arabian soldier with it was shot and left for dead by the robbers. This was at the rise of the great plateau which bounds the eastern side of the desert of Arabah, always a bad region.

Once on top of the cliffs you reach a cold and windy region and see the first traces of rude cultivation. We did no more collecting till we reached Petra, that famous old city of the Nabataeans.

Petra is in the middle of one of the many canyons that lead down from the great Arabian plateau to the Dead Sea basin. There is

running water and a good deal of vegetation — even juniper trees among the crags. The place is justly famous as a goal for tourists and is destined to be much visited in the future. Here we found a great many migrants and saw for the first time the Palestine Sun-bird. This truly African bird pushes up through the Dead Sea basin and has been found in summer as far north as Beyrout. In the cliffs of Petra were colonies of that noisy and disagreeable Rock Sparrow, *Petronia petronia*, and occasionally a pair of Tristram's Grackles, whose song has been so greatly admired by nearly all travellers in southern Palestine. Here again we met a good number of rose finches, although they have never been recorded outside Sinai before. These Petra finches turn out to be so much smaller than the Sinai birds that I have ventured to give them a new name. At Petra, too, the tamarisk bushes were full of migrating gold-finches and black capped warblers, and from this time on, the gold-finch became the commonest bird. The blue-rock pigeons, which I have not mentioned before, were found here and there in Sinai, and at Petra and farther north there were many, but wary to a degree. I never could account for the wariness of all species of birds hereabouts, a fact commented upon by Zedlitz, (1912).

We had such hard luck with our mouse traps at Petra that we had to pull them up. The jackals robbed the line as neatly as the wolverines of our northern wilds are said to do.

From Petra our road lay along the edge of the great Moab plateau. The barley was nearly ripe and the fields were full of Larks and Ortolans with here and there a Stork. These latter were astonishingly tame.

At Wady Kerak we made a side-trip to the south end of the Dead Sea. The heat there was really very trying but we obtained a few birds, among them the rare little Moabitic Sparrow whose range is perhaps the smallest in the world, as it is only known from a few patches of jungle in this immediate region. He looks like a gaudy but miniature English Sparrow with a yellow spot on each side of his throat.

Around the south end of the Dead Sea at this time (May 7) there were many birds. Arabs were just harvesting their grain, preparatory to leaving the Dead Sea for the better climate of the uplands. There were many Turtle-Doves, Blue-rocks, Hey's

Partridges, Egyptian Quail, European Rollers, Great Grey Shrikes, Crested Larks, Wheatears, Goat-suckers, and three species of Swallows, the Common European, the Red-rumped, and the Dead Sea Crag-Martin.

After we left Kerak we hurried on to Jerusalem, crossing many of the Dead Sea ravines, now filled with oleanders in full bloom. The olive groves of the various towns we passed through were well supplied with birds, and resounded with the songs of Goldfinches and Black-caps, while Greater Tits and many common warblers were present in large numbers. The only rarity we took was the Barred Warbler, which apparently has not before been taken in Palestine.

We reached Jerusalem on May 15 and after this the only birds collected were taken by Mr. Mann from the Mt. Herman region west of Damascus.

The total number of species in the collection is ninety.

STRUTHIONIDÆ.

Struthio camelus Linn. OSTRICH.—Ostrich eggs were common among the Arabs at Maan, on the Hadj Railroad. I was told that they came from the desert two days' journey east and northeast of that town.

Phasianidæ.

Caccabis chukar synaica (Bp.). CHUKAR PARTRIDGE.—One ♂; Madeba, May 10. This specimen is the same as the Jerusalem series in the Selah Merrill Coll., Museum Comparative Zoölogy, and only a little different from a Kurdestan specimen. It is much paler than birds from northern India. The chukar is scarce in Sinai but plentiful along the crest of the Moab plateau.

Ammoperdix heyi (Temm.). HEY'S PARTRIDGE; SEE-SEE.—Four specimens; Wady Hamer, Sinai, April 9, Wady Kerak, Dead Sea, May 5.

These two pairs, one from Sinai, the other from the Dead Sea, differ markedly; enough to suggest two forms. Comparison with the Selah Merrill series of over 30 in the Museum of Comparative Zoölogy, taken near Jerusalem, does not bear this out, for this series shows a great range of color. Some males are much darker all over than others; some females are barred all over the under parts, while some are nearly plain buff-colored. Nicoll (Ibis, 1909, p. 640) in discussing the African form *A. h. cholmleyi* O. Grant, refers to the presence or absence of white lores and forehead in Egyptian specimens. *A. h. cholmleyi* is supposed to lack the white lores

and forehead, but Nicoll shows that this is not constant at least for Egypt. The type locality of *A. h. cholmleyi*, however, is near Suakin, Sudan (O. Grant, Hand-Book of Game Birds, Vol. II, p. 294), where it is conceivable that a form different from the Egyptian one may exist. At any rate the Jerusalem series shows no variation in the white lores and forehead.

Coturnix coturnix coturnix (Linn.). EGYPTIAN QUAIL.—One ♂; Moses Wells, Suez, March 23. Seen only at above place and around Dead Sea.

Pteroclididae.

Pterocles lichtensteini arabicus Neumann.—One ♂; Akaba, April 14.

The type locality of the true *lichtensteini* is from Nubia (Temm. Coll., Pl., Vol. V, pls. 25-26). This is based on Lichtenstein (Verz. Doubletten 1823, p. 65). Nubia as used there included Sennar and part of Abyssinia and was rather a vague term.

In 1905 Erlanger (J. F. O., 1905, p. 92) separated a race, *P. l. hyperythrus*, from southern Somaliland, at the same time limiting *P. l. lichtensteini* to northern Abyssinia and northern Somaliland.

Later on Neumann described two other forms, *arabicus* from southern Arabia and *sukensis* from East Africa (Ornith. Monatsbr., 1909, p. 152).

My single specimen, taken from a flock of 10 or 12 birds on the Sinai side of the gulf near Akaba, extends somewhat the northwesterly range of the species. There are other specimens collected by Burton in "Midian" and at Jedda (Shelley Coll.).

I have for comparison seven males from Hawash R., northern Abyssinia, and six males from British East Africa, besides a number of females. These specimens are mostly from the U. S. Nat. Mus. collection. The first series is not far from the type locality of *P. l. lichtensteini* and the second series should represent *P. l. sukensis*.

The form *arabicus* which my own specimen represents is said to differ from true *lichtensteini* by a general lighter and brighter color. The upper tan-colored breast band of the same shade as the lower breast band, and not darker as in *P. l. lichtensteini*. The lower black band, separating breast from abdomen, much reduced or nearly absent, and the abdomen itself lighter. The golden bars on the upper side as wide or wider than the black bands, etc. In my specimen, however, not all of these characters are present, for the species is itself extremely variable. The lower black breast band is not reduced but the belly is lighter than any of the African specimens. The lower tan-colored breast band is very similar in color to the upper band, but in the type species, the two areas sometimes closely resemble each other. The character of barring on the upper side is a very variable one and I should say of little value in separating *arabicus* from *lichtensteini*. The only constant character then, as far as my series goes, is the very light belly area of the Arabian race.

P. l. sukensis would appear to be a very poorly marked southern race of the type species. I have seen no specimens from the locality of *P. l. hyperythrus*.

COLUMBIDÆ.

Columba livia schimperi Bp. ROCK PIGEON.—This form, now confined to Sinai (Zedlitz, Jour. für. Ornith., 1912), and also *C. l. palestina* Zedlitz from Palestine, were probably both taken. None were preserved, so I can throw no light upon the existence of these two forms, whose validity must still be open to question.

Turtur turtur (Linn.). TURTLE DOVE.—One ♂; Shobek, April 30. Met with in large numbers in the Dead Sea gorges.

RALLIDÆ.

Crex crex (Linn.). CORN CRAKE.—Pair; Akaba, April 19; Shobek, Palestine, April 30.

Porzana pusilla Pall. BAILLON'S CRAKE.—One ♀; Akaba, April 20. According to Reichenow there may be a resident form of this species in Africa.

LARIDÆ.

Larus hyperboreus Gunnerus. GLAUCUS GULL.—One ♂; Akaba, April 18. A far southern record for this gull.

Larus audouini Payraudeau. AUDOUIN'S GULL.—One ♀; Akaba, April 21. Wing 15.5 in.; bill 2.4; tarsus 2.25; tail 6.5. This rare gull is east and southeast of its known range in the Western Mediterranean. Its eastern limit is the Greek Islands but most, if not all, of the specimens have come from west of Italy. Tristram is quoted as having observed the bird at Malta and Dresser says it has been seen near Cairo.

LIMICOLÆ.

Pelidna alpina alpina (Linn.). DUNLIN.—One ♂; Akaba, April 17.

Tringa nebularia Gunner. GREENSHANK.—One ♀; Akaba, April 20.

ARDEIFORMES.

Pyrherodias purpurea (Linn.). PURPLE HERON.—One ♂; Akaba, April 18.

ANATIDÆ.

Querquedula circia (Linn.). GARGANEY TEAL.—Two shot at Akaba, April 17.

FALCONIDÆ.

Astur brevipes Severtzoff. LEVANT SPARROW HAWK.—Four ♂♂; Akaba, April 20. A flock of 1200 to 1800 apparently all of this species seen migrating north on this date. This bird is very rare in Egypt and has not been taken in Africa (outside Egypt). This migration was perhaps from southern Arabia. The specimens were very fat but their stomachs were empty.

Cerchneis tinnunculus (Linn.) KESTREL.—One ♂; Tafeleh, southern Palestine, May 3.

STRIGIDÆ.

Strix butleri Hume. BUTLER'S OWL. (Plate XVII).—One ♂; Wady Feran, Sinai, March 31. Wing, 245 mm., tarsus, 48 mm., tail, 150 mm. This specimen, apparently an adult male, was brought into camp alive by an Arab. It constitutes the third known record of this extremely rare owl. In size it seems to be the same as both the other specimens. In color also it corresponds very closely with Hartert's description (Vogel der Pal. Fauna, p. 1027) and this description is based on both the other specimens. From Hume's original description of the type (Stray Feathers, VII, p. 316) my specimen apparently differs in having the first primary less plain colored and more like the others as to its barring.

Hume's bird came from Omára, on the Mekran coast of southern Baluchistan in 1878; the skin was badly damaged. In 1879 Tristram (Stray Feathers, VIII, p. 417) discovered one other skin that had remained unidentified in his own collection for ten years. This one was from Mt. Sinai (exact locality not given).

This owl must be a rock-living bird. The plate shows typical Feran scenery with Mt. Serbal in the background.

HALCYONIDÆ.

Alcedo ispida pallida Brehm. KINGFISHER.—Two ♂♂; Akaba, April 15. Zedlitz (1912) in his work on Sinai, throws out this rather poorly marked form. The beak is usually thinner and more pointed than in the western birds.

MEROPIDÆ.

Merops apiaster Linn. EUROPEAN BEE-EATER.—Three; Akaba, April 16.

CAPRIMULGIDÆ.

Caprimulgus europæus meridionalis Hartert. NIGHT-JAR.—One ♂; Wady Kerak, Palestine, May 5.

MICROPODIDÆ.

Apus apus apus (Linn.). SWIFT.— Three ♀ ♀; Shobek, Palestine, April 30. These are the same size as examples from England. They might be referred to the *marwetzi* of Reichenow but that race is poorly marked and our material is insufficient.

Apus murinus murinus (Brehm). PALLID SWIFT.— One ♀; Shobek, April 30.

HIRUNDINIDÆ.

Chelidon rustica rustica Linn. SWALLOW. Five; Akaba, April 14; ain Hodra, Sinai, April 10; Wady Ain Heisha, Syria, May 31.

Chelidon rustica transitiva Hartert. PALESTINE SWALLOW.— One ♀; Nuheibeh, Sinai, April 13.

Chelidon daurica rufula (Temm.). RED-RUMPED SWALLOW.— One pair; Dead Sea, May 6; Madeba, May 10.

Hirundo urbica urbica Linn. HOUSE MARTIN.— Five; Petra, South Palestine, April 28-29; Shtôra, Syria, June 8.

Riparia riparia riparia (Linn.). SAND MARTIN.— Four; Moses Wells, Suez, March 23.

Riparia obsoleta obsoleta (Cab.). PALE CRAG-MARTIN.— Five; Gharandel, Sinai, March 25; Wady Feran, March 31; Petra, April 27; Wady Hisa, May 3.

MUSCICAPIDÆ.

Muscicapa striata neumanni Poche. EASTERN SPOTTED FLY-CATCHER.— Nine; Petra, April 28; Wady Hisa, May 4; several Syrian localities, May and June.

BRACHYPODIDÆ.

Picnonotus capensis xanthopygos (Hemp. & Erlich.). PALESTINE BULBUL.— Pair; Wady Feran, March 31.

TIMELIDÆ.

Crateropus squamiceps squamiceps (Cretzschm.). HOPPING THRUSH.— One ♀; Akaba, April 21.

TROGLODYTIDÆ.

Nannus troglodytes pallidus Hume. WREN.— Two ♂ ♂; Sheba, Syria, May 25.

These two specimens appear to belong to this form as nearly as can be

told from Hartert's description (Vog. d. Pal. Fauna, p. 781). Certainly they are not like *N. l. cypristes* from Cyprus. They are not red-brown like the European examples and are pale and nearly unbanded on the lower sides. The wing is 46 and 48 mm. The wren is very rare in Syria.

TURDIDÆ.

Monticola saxatilis (Linn.). ROCK THRUSH.—Two ♂♂; Wady Feran, March 31; Shobek, Palestine, May 1.

Monticola solitarius solitarius (Linn.). BLUE THRUSH.—Pair; Wady Feran, Sinai, March 31.

Phœnicurus phœnicurus phœnicurus (Linn.). REDSTART.—Six; Wady Feran, March 31; Monastery, Sinai, April 9; Akaba, April 21; Shobek, Palestine, April 30; Ain Gleidat, May 2.

Luscinia luscinia (Linn.). NIGHTINGALE.—Three; Petra, April 28; El Katuma, Syria, May 20; Mimis, Syria, May 30.

Cercomela melanura melanura Temm. PALESTINE BLACKSTART.—Seven; Wady Feran and Wady Saal, Sinai, March 29–31, April 7.

Cenanthe cenanthe rostrata Hemp. & Ehrb. WHEATEAR.—Ten; Gharandel, March 25; Wady Feran, March 31; El Hawa, April 3; Nu-huibeh, April 13; Akaba, April 20. The wing bands of these specimens are not very apparent, so that one of the characters of this race is lacking. The bills are 17 to 18 mm., a little short. This poorly marked form migrates to Egypt, Somaliland and German East Africa. It is a variable race as Tristram and Hartert have both pointed out.

Cenanthe isabellina (Cretzschm.). ISABELLINE WHEATEAR.—One ♂; Shobek, Palestine, May 1.

Cenanthe lugens lugens (Licht.). PIED CHAT.—One ♂; Shobek, May 1.

Cenanthe leucopyga (Brehm). WHITE-RUMPED CHAT.—Three; Wady Feran, April 1; Wady Garbeh, April 2.

Cenanthe monacha (Temm.). HOODED CHAT.—Two; Wady Feran, March 29; Nuheibeh, April 13.

Cenanthe melanoleuca finchii (Heugl.). BLACK-THROATED WHEATEAR.—Four; Ain Hodra, Sinai, April 10; Akaba, April 19; Tafileh, May 3; Shiba, Syria, May 25.

SILVIIDÆ.

Agrabates galoctotes galoctotes (Temm.). RUFOUS WARBLER.—Two ♂♂; Shobek, April 30; Rasheya, Syria, May 21.

Locustella fluviatilis (Wolf). RIVER WARBLER.—One ♂, Tafileh, southern Palestine, May 3. This rather rare bird was taken by Tristram in northern Palestine.

Acrocephalus strepera strepera (Vicill.). REED WARBLER.—Two;

Hibariyeh, Syria, May 28. One of the specimens is certainly a breeding bird. Tristram mentions the species but it has not definitely been recorded from Palestine.

Hippolais languida (Hemp. & Ehr.). UPCHER'S WARBLER.—Three; Rasheya, Syria, May 21, June 1.

Hippolais pallida pallida (Hemp. & Ehrb.). OLIVACEOUS WARBLER.—Five; Akaba, April 16; Tafleleh May 2; Wady Hisa, May 3; Litany River, Syria, June 4.

Sylvia nisoria nisoria (Bechst.). BARRED WARBLER.—One ♂; Shobek, May 1. The wing is 84 mm., which is small, so that it does not belong to the rather doubtful eastern race, *Merzbacheri*.

This rather local bird has not been recorded from Palestine before, but has been taken in Asia Minor, Persia, and central Asia. The winter quarters of the eastern breeding birds are unknown.

Sylvia communis icterops Ménétr. EASTERN WHITE-THROAT.—Two; Wady Gazella, Sinai, April 10. Saghbin, Syria, June 5.

These are the same as the Selah Merrill series from Jerusalem; not so red-brown on the back as European birds.

Sylvia ruppelli Temm. RUPPELL'S WARBLER.—Nine; Gharandel, March 25; Moses Wells, March 23; Wady Feran, March 27-28; Wady Gharbeh, April 2.

Sylvia hortensis crassirostris Cretzschm. ORPHEAN WARBLER.—Two; base of Mt. Hermon, Syria, June 2.

Sylvia curruca curruca (Linn.). LESSER WHITE-THROAT.—Six; Moses Wells, March 22-23; Wady Feran, March 27-31; Ammik, Syria, June 6.

Sylvia atricapilla atricapilla (Linn.). BLACK-CAP.—Eight; Akaba April 16-18; Petra, April 27-29; Tafleleh, May 2; Rasheya, Syria, May 21.

Phylloscopus sibilatrix sibilatrix (Bechst.). WOOD-WREN.—One ♀; Tafleleh, May 2.

Phylloscopus bonelli orientalis (Brehm.). BONELLI'S WARBLER.—Gharandel, March 25; Wady Feran, Sinai, March 27-30; Wady Saal, April 8.

Phylloscopus collybita (Vicill.). CHIFF CHAFF.—Three; Wady Gharandel, March 25; Petra, April 27. The wing of the ♂ is 62, ♀ ♀ 56 and 57. They are therefore rather too small for *P. c. abietina* (Nilss.), the eastern race. In color they resemble specimens from England and they are certainly no paler. I cannot make out the eastern race from my material.

LANIIDÆ.

Lanius excubitor aucheri Bp. GREAT GREY SHRIKE.—Four; Wady Gharandel, March 25; Wady Feran, April 1; Wady Haman, Sinai, April 9.

Lanius nubicus (Licht.). MASKED SHRIKE.—Two; Akaba, April 16-20.

Lanius senator niloticus (Bp.). EASTERN WOOD-CHAT SHRIKE.— Five; Tafleh, Palestine, May 2 and 3; Ammik, Syria, June 6; Baneyas, Syria, May 28.

Lanius collurio collurio Linn. RED-BACKED SHRIKE.— One ♂; Wady Hisa, May 4.

PARIDÆ.

Parus major terræsanctæ Hart. PALESTINE GREAT-TIT.— Two; Tafleh, Palestine, May 2-3.

NECTARINIDÆ.

Cinnyris osea Bp. PALESTINE SUN-BIRD.— One ♂; Petra, April 27. I found this a rare bird.

MOTACILLIDÆ.

Motacilla alba alba Linn. WHITE WAGTAIL.— Three; Moses Wells, Suez, March 23; Wady Feran, April 1; Abu Sweira, Sinai, April 13.

Budytes flava flava Linn. BLUE-HEADED WAGTAIL.— Four; Wady Feran, Sinai, March 31; Akaba, April 19-21; Shobek, Palestine; April 30.

Budytes melanocephala Licht. BLACK-HEADED WAGTAIL.— One ♂; Wady Feran; Sinai, March 29.

Anthus trivialis (Linn.). TREE-PIPIT.— Five; Wady Feran, Sinai, March 31; Wady El Ain, April 12; Nuheibeh, Sinai, April 13; Akaba, April 15.

Anthus campestris campestris (Linn.). TAWNY PIPIT.— One; Ain Gleidat, Palestine, May 2.

ALAUDIDÆ.

Otocorys alpestris bicornis Brehm. MT. HERMAN HORNED LARK.— Two ♂♂; Mt. Hermon, May 24.

Melanocorypha calandra calandra (Linn.). CALANDRA LARK.— Three; El Kerak, Palestine, May 7; Saghbin, Syria, June 5; Ammik, Syria, June 6.

Melanocorypha bimaculata. Ménés. EASTERN CALANDRA LARK.— Two; Ammik, Syria, June 6; Rasheya, Syria, June 2.

Calandra brachydactyla brachydactyla Leisl. SHORT-TOED LARK.— Two ♂♂; Ain Gleidat, Palestine, May 2; Madeba, Palestine, May 10.

Ammomanes deserti katherinæ Zedlitz. SINAI DESERT LARK.— Three; Wady Feran, Sinai, March 29; Monastery, Sinai, April 3.

Zedlitz has described this form from the high parts of Sinai and thinks it differs from the lark around the low deserts of Suez and Egypt, *A. d. isabellina*. He writes that it has a more lively voice and its wings make a whistling sound when it flies! It is said to be more grey and less red on the upper side than *isabellina*, and with a larger bill than *fraterculus* of

Palestine. Its coloration is described as the same as that of *fraterculus*. All these forms are certainly poorly marked, but Sinai birds can at least be told from Palestine ones by their larger bills. It appears somewhat doubtful whether a mountain and a desert form can exist side by side in Sinai for there would be apt to be a seasonal movement up and down the mountains.

FRINGILLIDÆ.

Chloris chloris chlorotica (Bp.). PALESTINE GREEN FINCH. Eight; Mt. Hermon region, May 22–June 7.

Carduelis carduelis carduelis (Linn.). GOLDFINCH.— Three; Petra, April 27; Ammik, Syria, June 6.

Petronia petronia puteicola (Festa). PALESTINE ROCK SPARROW.— Four; Petra, April 27–29; Rasheya, Syria, May 21.

Carpospiza brachydactyla (Bp.). DESERT ROCK SPARROW.— One ♂, Rasheya, Syria, May 21.

Acanthis cannabina fringillirostris (Bp. and Schleg.). EASTERN LINNET.— Seven; Mt. Hermon region, May 24–25.

Passer domesticus indicus Jardin & Selby. EASTERN HOUSE SPARROW.— One ♂; Tafeileh, Palestine, May 2. Wing 75 mm., cheeks pure white. This specimen is too small for *biblicus* of Palestine and Syria. It appears to be typical *indicus*. The head cap is very dark grey as in all old birds.

The exact range of *P. d. indicus* is still in doubt. Hartert thought that southern Arabian specimens belonged to this form, which extends over India, Persia and China, but becomes intermediate to *P. d. domesticus* in the Transcaspiian region.

Lorenz and Hellmayr (Denkschrif akad. der Wissenschaften, 1907, p. 106) describe a new subspecies of house sparrow from southern Arabia, east of Aden. From their description I cannot see that this is anything more than an early winter plumage of *indicus*. It certainly is very close to *indicus* and differs only in being "brighter."

Zedlitz, 1912, in his work on Sinai birds (Jour. für Ornith., 1912, p. 566), takes up this question. He quotes Le Roi as saying that Sinai sparrows do not conform to *biblicus* or *indicus* and still less to the *niloticus* of Nicoll & Bonhote. Zedlitz's own single specimen from Sinai and five others collected by Koenig, were, he says, small and not like *biblicus*.

He arranges the sparrows of Western Asia as follows:

1. Sinai and southern Palestine. Much smaller than *biblicus* ♂. Wing, 80; ♀, 74–79. Color whiter than *niloticus*, ear coverts grey.
2. *P. biblicus*; confined to Syria and Palestine. Large. Wing, 82–84. Ear coverts light grey.
3. Asia Minor Sparrow. (Eight specimens.) Wing, 78–81. Ear coverts almost white, or extremity light grey.
4. *P. indicus*; India & Persia, limits not known. Size small, like Sinai

birds. Wing, 74-78. Ear coverts mostly pure white like the sparrow of Asia Minor.

Larger series are necessary to clear up the disputed points.

Passer hispaniolensis transcaspicus Tschusi. SPANISH SPARROW.—Six; Wady Gharandel, Sinai, March 26; Feran, March 31; Mt. Hermon region, Syria, May 22-25.

Passer maobiticus maobiticus Tristr. DEAD SEA SPARROW.—One (sex?); mouth of Wady Kerak, May 8. I think this specimen comes from a region a little north of the known range of this sparrow. Wady Safye is the nearest point south, where it has been taken. I saw only this one bird in the cane jungles at the edge of the sea; there may have been many more sparrows in this cane, however, as the jungle is almost impenetrable at this point.

Serinus syriacus Bp. SYRIAN CANARY. One ♂; Ammik, Syria, June 7.

Carpodacus synoicus (Temm.). SINAI ROSE FINCH.—Seven; Pass of Hawa, Sinai, April 3; Petra, April 27-29.

This species does not appear to have been taken outside of the Sinai Peninsula before; but I found it common at Petra and secured five specimens there. These birds are smaller than Sinai specimens. Wing, 81 to 84 mm.; exposed culmen, 9 to 9.5; tarsus, 19; tail, 65-69.

Temminck's type was taken near "Mt. Sinai" and was presumably drawn to scale (Temm. Pl. Col. 375). The wing on the plate measures 87 mm. Hartert gives the wing of this species as 86-89. The wings of my Sinai adults are 85 mm. I therefore propose the name of

Carpodacus synoicus petræ, SUB. SPEC. NOV.

for the northern birds, separated as they are from Sinai, by the great low desert of the Arabah.

Type, ♂ No. 66024, Mus. Comp. Zoöl., collected at Petra, southern Palestine, April 28, 1914, by J. C. Phillips.

Characters. Like *C. s. synoica* (Temm.) but smaller, especially in the wing and bill. Wing, 84 mm. or under; bill shorter and narrower; exposed culmen, 9-9.5; tarsus, 19 mm. Rosy parts of the plumage slightly paler and more pinkish.

I am somewhat in doubt about the plumage of the adult females in these two forms. It has always been given as plain brown, like the young males, but I carefully sexed one of my adult rosey specimens as a female. The proportion of rosy birds as I saw them in the wild was rather too large for the supposition that only old second year males attain this plumage.

Emberiza hortulana. ORTOLAN BUNTING.—Four; Akaba, April 15-18; Ain Abu-Heran, April 23; Petra, April 29.

Emberiza cæsia Cretzschm. CRETZSCHMARS BUNTING.—Three; Syria, May 27-30.

Emberiza melanocephala Scop. BLACK-HEADED BUNTING.—Eleven; Mt. Hermon region, Syria, May 27, June 7.

EULABETIDÆ.

Amydrus tristrami tristrami (Scl.). TRISTRAM'S GRACKLE.— One ♂;
Wady Kerak, Dead Sea, May 7.

CORVIDÆ.

Covus affinis Rüpp. FAN-TAILED RAVEN.— One ♂; Akaba, April 18.

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THE FOSSIL REMAINS OF A SPECIES OF HESPERORNIS
FOUND IN MONTANA.

BY R. W. SHUFELDT, M.D.

Plate XVIII.

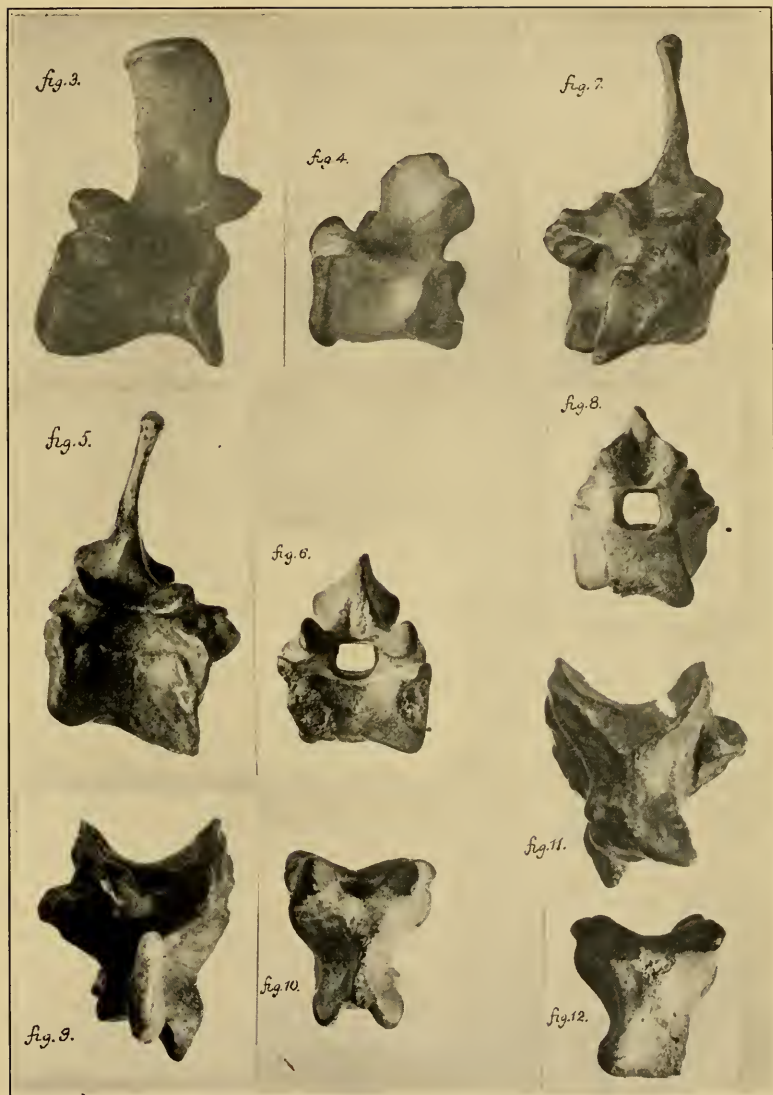
EARLY in November, 1914, Mr. Charles W. Gilmore, who has charge of the fossil birds and reptiles in the Division of Palæontology of the United States National Museum, Washington, D.C., sent me a fossil vertebra, which was collected when he was associated with Dr. T. W. Stanton on an expedition in Montana during the early autumn of 1914. This vertebra, when received by me, was labeled thus:

"*Coniornis altus* Marsh, Lumbar vertebra, Dog Creek, 1 mi. above its mouth, Fergus County, Montana. Cretaceous Claggett formation (upper yellowish sandstone) September 26, 1914." T. W. Stanton, C. W. Gilmore. All. No."

There being no proper material in the collections of the U. S. National Museum wherewith to compare this vertebra, I studied it as best I could through comparing the fossil bone with the figures given by Marsh in his *Odontornithes*. This comparison convinced me of the fact that the vertebra belonged to some medium-sized *Hesperornis*; further, that it more closely resembled the 23d vertebra of the spinal column of *Hesperornis regalis* than it did any other vertebra, and I was therefore led to believe that it was the corresponding vertebra of some species of *Hesperornis*, smaller than *H. regalis*, probably of a species heretofore undescribed.

As I knew that Doctor Richard S. Lull, of the Peabody Museum, was engaged upon a study of the *Hesperornithida*, at the time this bone came to me for study, I determined to refer it to him for an opinion. This I did with a letter dated at Washington, D. C., the 10th of November, 1914.

Doctor Lull very kindly made an exhaustive study of this fossil vertebra, and returned it to me with a letter of transmittal, dated November 20, 1914. At the close of his communication on the subject, he says: "I will lend you a cast of the 23d vertebra. of



REMAINS OF HESPERORNIS IN MONTANA.

H. regalis No. 1207, but as it is one of a set of casts we would like to have it returned when you are through with it."

Reproductions of my photographs of this cast, together with those of the vertebra here being considered, are exhibited on Plate XVIII.

The following is Dr. Lull's paper in full:

"It is evidently the last dorsal vertebra, the 23d, hence was compared with the equivalent bone of three specimens of *Hesperornis regalis*, the mounted specimen, Cat. No. 1206, and *Hesperornis* Nos. 1477 and 1499. Also with the second mounted specimen, *Leptornis crassipes*, holotype, Cat. No. 1474.

"The new bone has suffered from fracture and abrasion, by which certain of the fractured surfaces, e. g., stumps of the transverse processes, are smoothed over and rendered deceptive.

"It is smaller than any of the four equivalent bones, though there is as much range among them as between the least of them and the new bone.

"It differs from the other three but resembles No. 1477 in the manner in which the neural spine arises, in that the forward margin as preserved has a slight backward instead of a forward inclination. The new specimen differs from all four but resembles No. 1499 most closely, in that the lateral walls of the centrum are not so deeply excavated. In No. 1499 this depression is slight, but more marked than in the new specimen, and its greatest depth lies further to the rear. There is a decided ridge leading from the postzygapophysis to the base of the transverse process in three of the vertebrae. This is obsolete in the new bone and also in 1499.

"The anterior articular face seems to be less deeply excavated in the new specimen than in any of the four at Yale. This difference, however, may be more apparent than real, as the lateral limitations of this face are chipped and worn away. A very slight hæmal spine is represented by a broken area in all five vertebrae. Herein there is essential agreement.

"Vertebra No. 1499, *Hesperornis sp.*, comes the nearest to the new bone in size and general appearance, differing therefrom in being proportionately somewhat longer; this difference is, however, heightened by the broken character of the new specimen. A further distinction lies in the fact that, whereas in the new specimen

the prezygapophyses are buttressed by a sharp-edged ridge of bone extending from above the stump of the rib facets somewhat obliquely inward and upward, in 1499 there is in this place a distinct transverse crease instead of a vertical buttress. A rounded vertical forward margin in place of the sharp-edged buttress characterizes the other three Yale specimens, and the crease in 1499 may have, been accentuated if not caused by the slight vertical crushing to which the bone has been subjected.

“Such distinctions as I can see are certainly not generic, and so far as the actual bones go, specific contrasts are hard to find. The distinctions between *Lestornis crassipes* and *Hesperornis regalis*, for instance, lie in other bones than this vertebra, so that had I the 23d vertebræ alone for comparison, I could hardly distinguish them specifically — certainly not generically. I am sure the new bone is that of a species of *Hesperornis*, possibly new, though this belief is based mainly on geographic rather than on anatomical distinction.

“The bone No. 1499 is not specifically determined if it is not *H. regalis*.”

With reference to the exact locality, where this vertebra was found, and other data, Mr. Charles W. Gilmore has given me the following valuable and interesting information. “The vertebra (Cat. No. 8199) was found by Dr. T. W. Stanton on Dog Creek, Montana, on the left hand side of the valley about one mile above its mouth. The bed from which the vertebra was collected is now assigned to the Claggett formation because it is marine, while the overlying Judith River deposits are freshwater with a few intercalated brackish-water beds.

“The specimen is from the upper yellowish sandstone from a fossiliferous band containing numerous sharks’ teeth, vertebræ and teeth of other fishes.

“The only other bird remains known from this area is the type of *Coniornis altus*, reported by Hatcher¹ as coming from ‘near the base of the Judith River beds on Dog Creek.’

“Since the *Coniornis* type was collected some years prior to the differentiation of these exposures into successive and distinct

¹ Bull. No. 257, U. S. Geological Survey, 1905, p. 99.

formations, it is quite probable that both specimens came from the same geological level."

Professor Marsh was firmly convinced that the great toothed divers of the extinct genus *Hesperornis* were confined to the Cretaceous Beds of Kansas. So tenacious was he of this opinion that, when the fossil remains of a big extinct diver came into his possession, having been collected in Montana by Hatcher, he was very loath to consider it a species of *Hesperornis*, notwithstanding the fact that the fossil bones presented strong hesperornithine characters. He therefore created a new genus — *Coniornis* — to contain it.

Now the vertebra found by Doctor Stanton has been shown by Doctor Lull and myself to have undoubtedly belonged to a species of *Hesperornis*, and the specimen practically presents the same characters as the fossil vertebra of a *Hesperornis* in the Yale University collection, No. 1499, though there are a few appreciable differences.

Up to the present time, science has nothing to show by way of proof that the long bones, described by Marsh as belonging to a big extinct diver which he named *Coniornis altus*, belonged to the same species from an individual of which came the vertebra discovered by Doctor Stanton.

Basing my opinion on the proportions existing between the 23d vertebra of *Hesperornis regalis* and the tibio-tarsus in that species — as compared with the proportions of the vertebra here being considered and with the tibio-tarsus of the species Marsh described as *Coniornis altus* — I should say that the vertebra found by Doctor Stanton belonged to a somewhat smaller species of *Hesperornis* than did the long bones of Marsh's *Coniornis*, which latter is also a *Hesperornis* as I have elsewhere pointed out.

I herewith propose a provisional name for this apparently new species of *Hesperornis*, basing it upon the vertebra described in this paper. I suggest the name for it of *Hesperornis montana*.

Possibly, in the future, more fossil material of the *Hesperornithidæ* may be found in the above named formation in Montana; and this material may go to show that all the forms here named and considered belonged to the same species, they being distinguished only by such differences as may have been due to age and sex. On the

other hand — and what appears to me to be more likely — the discovery of additional material may conclusively prove that the several individuals here considered were distinct species, which now, at least, seems evident in the case of the one numbered 1499 in the Yale Museum.

PLATE XVIII.

[All the figures in the Plate are reduced to about three-fourths the actual size of the specimens shown. R. W. S.]

FIG. 3. Left lateral view of the cast of the 23d vertebra of *Hesperornis regalis*. Belongs to a set in the collection of Yale University Museum. Other views of this cast are given in Figs. 5, 7, 9 and 11.

FIG. 4. Direct left lateral view of the vertebra of *Hesperornis montana*. Other views of this fossil bone are given in Figs. 6, 8, 10 and 12.

FIG. 5. Direct anterior view of the cast of the 23d vertebra of *Hesperornis regalis*. Same specimen as Fig. 3 and others.

FIG. 6. Direct anterior view of the 23d vertebra of *Hesperornis montana*. Same as shown in Fig. 4 and others.

FIG. 7. Direct posterior view of the cast of the 23d vertebra of *Hesperornis regalis*. Same specimen as Fig. 5 and others.

FIG. 8. Direct posterior view of the 23d vertebra of *Hesperornis montana*. Same fossil as shown in Fig. 6 and others.

FIG. 9. Direct dorsal view of the cast of the 23d vertebra of *Hesperornis regalis*. Same specimen as shown in Fig. 7 and others.

FIG. 10. Direct dorsal view of the 23d vertebra of *Hesperornis montana*. Same fossil as shown in Fig. 8 and others.

FIG. 11. Direct ventral view of the cast of the 23d vertebra of *Hesperornis regalis*. Same specimen as shown in Fig. 7 and others.

FIG. 12. Direct ventral view of the 23d vertebra of *Hesperornis montana*. Same fossil as shown in Fig. 8 and others.



FORRESTER ISLAND FROM THE WEST SIDE OF PETREL ISLAND.

SUMMER BIRDS OF FORRESTER ISLAND, ALASKA.

BY GEORGE WILLETT.

Plates XIX-XX.

DURING the period from May 23 to August 15, 1914, the writer was stationed on Forrester Island, Alaska, in the interests of the U. S. Biological Survey. What time could be spared from routine duties was occupied in study of the bird life in this most interesting section. The following account is taken from notes made at this time.

Forrester Island is of volcanic origin, and is between four and five miles long by one and a half miles wide at the widest part. It is heavily timbered with spruce, hemlock and squaw pine from the water's edge up to the top of the island, 1395 feet at the highest point. The island is situated in $54^{\circ} 45'$ north latitude, being about 12 miles directly west of Dall Island and southwesterly from Prince of Wales Island, and only a short distance north of the Canadian boundary. There are several small islets lying a short distance off the main island, the most important of which are Petrel Island at the south end, and Cape Horn and Sea Lion Rocks, and Lowrie Island at the north end. Lowrie Island is low and well timbered, while Petrel Island is higher, more rocky and timbered only toward the top.

These are all included in the Forrester Island Bird Reservation, as is also Wolf Rock, a bare rocky islet lying about ten miles north of the north end of Forrester. With the exception of this latter locality, all parts of the reservation were visited by the writer, most of them several times. Practically all the time that could be spared to ornithological investigation was devoted to the study of the water birds, consequently the notes on land birds must be considered very incomplete. There were more land birds in this locality than I have ever noted in any other section of southeastern Alaska. As will be seen, however, the number of species is not great.

The climate is about the same as that of adjacent sections, being

exceedingly moist at all times, the rain fall probably closely approaching 100 inches annually. During the past summer there were only occasionally days of good weather, the major part of the season being rainy or windy, frequently both.

There was a camp of several hundred fishermen on the island. They were engaged in trolling for king salmon which were generally abundant.

The following is an annotated list of birds observed.

Gavia sp.?—Loons were noted at a distance several times during the summer, but I was never able to approach them closely enough to be positive as to the species. The Pacific Loon (*Gavia pacifica*) was common in the channel west of Prince of Wales Island, May 22, evidently on the northward migration.

Lunda cirrhata. TUFTED PUFFIN.—The most abundant of the Alcidae. Estimated numbers, 35,000 pairs. This species began to deposit the eggs about the second week in June. The principal colonies are on the west side of the main island, on Petrel Island and on Cape Horn Rocks.

The fishermen detest these birds because of their penchant for stealing the herring that is used as bait in trolling for salmon. After the fisherman has placed a fresh herring on the hook and lets the line out to trolling distance, the puffin will dive and neatly remove the bait from the hook. I have seen this done when the bird was forced to go down at least fifteen fathoms. Apparently a puffin will attach itself to a particular trolling boat and will follow it for hours. The fishermen attribute to the bird a surprising amount of cunning. One Norwegian assured me solemnly that the parrot would rise up on the crest of a wave and look into the boat in order to count the herring therein. Their eyesight is deficient at times, however, as they will sometimes dive after a spoon. Frequently the puffins will get all the herring the fisherman has and he will be obliged to cease fishing or have recourse to a spoon, which latter method is not nearly so successful as to results. As far as I was able to ascertain, this habit of stealing bait is confined to this species, the Horned Puffin apparently not having acquired it.

Fratercula corniculata. HORNED PUFFIN.—Nowhere very abundant but fairly well distributed along the shores of the main island, also on Petrel Island and Cape Horn Rocks. Probably 1000 to 1200 pairs in all. Generally nesting in small colonies of from five to twenty pairs each. No nests were seen in burrows, all those noted being in cavities in cliffs and in crevices in caves and under boulders, never more than a hundred feet (generally less than fifty feet) above the water. The nesting location is much more similar to that of the Pigeon Guillemot than to that of the Tufted Puffin. The nest is very frequently so far back in a cavity as to be impossible to approach closely. The nesting cavity is generally fairly well lined with

grass, frequently supplemented with a few feathers. The eggs are deposited during the last ten days in June. The first young were noted July 22, but some were probably out several days earlier. A few of the eggs of this species are quite heavily spotted with brown but the majority are indistinguishable from those of the last. The feeding habits of the Horned Puffin are very similar to those of the Tufted Puffin but, as a rule, they seem to feed closer to shore, frequently being seen in small flocks inside the kelp patches.

Cerorhinca monocerata. RHINOCEROS AUKLET.— Estimated number, about 20,000 pairs. The nesting colonies of this species seem to be confined to the eastern side of the main island. On all the slopes in this locality, where the ground is not too wet to burrow in, they are abundant from a few feet above the rocky beaches to four or five hundred feet on the hillsides among the timber. The burrows are generally from seven to nine feet in length, crooked, and often forked two or three times. The burrowing bird tears the earth loose with its bill and throws it backward with its feet. The shallow nest cavity is more or less sparsely lined with grasses and leaves, and additions are apparently made to the nest lining during the incubation period and even after the young is hatched. The egg laying begins the fourth week in May and probably continues far into June, as a bird was found incubating an egg as late as July 22.

The incubating birds are relieved by their mates at about 11 P. M. and 2 A. M., about three hours on the night shift and twenty-one on the day shift. It was, of course, impossible to ascertain whether or not the same bird continues to incubate during the day throughout the entire period, but in this country of long days and short nights, it seems improbable that such should be the case. The birds go considerable distances in search of food and evidently prefer the smooth water of the inside channels to the rougher water around Forrester Island. While they are rarely seen in the latter locality in the daytime, they are abundant in the channels between Prince of Wales Island and Dall and Suemez islands. They begin appearing in small flocks in the vicinity of Forrester Island about an hour before dusk and fly restlessly back and forth from then until dark. On one or two occasions while walking among the nesting colonies in the daytime, I was surprised to see an incubating bird leave the burrow and fly to sea. I do not consider this a regular occurrence, but believe rather that the bird heard my approach and was frightened into leaving the nest.

The Indians' favorite method of capturing these birds is to build a large fire in the nesting colony at the time of night when the birds are changing. They become bewildered by the light and are easily despatched with the aid of long spruce boughs. All auklets and murrelets are eaten by the Indians and are known to them as "little ducks."

Ptychoramphus aleuticus. CASSIN'S AUKLET.— The least common of the burrowing birds. Probably not more than 2000 pairs on the reservation, although this number is a pure guess, as it is impossible to differentiate, from outward appearances, the burrows of this species from those of the

next. Among the total number of burrows excavated, however, the percentage of the Cassin's Auklet was very small. They were found nesting on the east side of the main island and on Petrel Island. Eggs were noted occasionally from May 30 to June 9. On the latter date large young were common on Petrel Island, so the nesting season must have commenced in April. A bird incubating two eggs was found on this latter occasion. It seems probable that one of these was deposited by another bird.

Synthliboramphus antiquus. ANCIENT MURRELET.—Very abundant. Estimated number, 20,000 pairs. The principal nesting colonies of this bird are on the eastern slope of the main island where they mingle with the two species of auklets. They also nest in lesser numbers on Petrel Island among the petrel colonies. From observations it would seem that this murrelet seldom burrows in open ground but prefers locations among roots of trees and under logs and rocks. The nesting season evidently begins about May 1 and continues well into June, the most of the eggs, however, being deposited about May 10 to 15.

The newly hatched young has a greyish band across the chest and the abdomen is also shaded with grey. In two or three days this disappears, leaving the under parts pure white. The young leave the nest when about four days old and follow the parent bird to the water. This movement takes place generally between 11 P. M. and 1 A. M. At this time of night the calls of old and young murrelets may be heard in all directions. At the time of my arrival on the island, May 23, the young were already leaving the nests, and the latest noted was on the night of July 2. They were most plentiful June 1 to 10. The old bird precedes the young to the water, generally keeping from twenty to one hundred feet ahead of it. A continuous communication is maintained between the two, the frequent cheeps of the young being answered by the parent. By the aid of a lantern I was able to watch the progress of this movement. The chicks come tumbling down the hillsides, falling over rocks and logs and, directed by the adult, generally make their way to the bottom of the nearest ravine which they follow to the salt water. Arriving at the water's edge, in response to the anxious calls of the parent who is already some distance out on the water, the chick plunges in and swims boldly out through the surf and joins its parent. Whether or not both young generally leave the nest on the same night, I am unable to state but I know that this is not always the case, as in one or two instances a solitary young was found in a nest, the evidence showing that two birds had been hatched and that one had already left. The young murrelets are easily attracted by light and they often wandered into the tents of the fishermen where, rendered helpless by the glare of the light, they were easily captured.

The old bird with the young evidently proceeds immediately out to the open water as, even when hundreds took to the water at night, they could not be found anywhere in the vicinity of the island the next morning. During the entire summer not a single young murrelet was seen after it had

taken to the water. Like the Rhinoceros Auklets, the old birds were occasionally seen near the shore but in very small numbers compared to the total number nesting on the island. Their principal feeding ground is, seemingly, well out to sea.

Brachyramphus marmoratus. MARBLED MURRELET.—During the early part of the summer this species was not noted in the vicinity of the reservation and I am sure that it does not nest on the island. The first birds were seen July 25, when three adults were found feeding a little distance from shore. One bird taken at this time was an adult female which, according to the condition of the sexual organs, had nested some time previously. After this date the species was further noted on several occasions.

It was plentiful in the channels around Prince of Wales and Dall islands throughout the summer and evidently nests in these localities. Mr. W. D. McLeod, of Howkan, informs me that during late May and the month of June he has observed Marbled Murrelets flying down from the mountains of Dall Island at dusk.

Cephus columba. PIGEON GUILLEMOT.—Probably 300 pairs on the reservation. Generally distributed along rocky shores, the favorite feeding ground being around the kelp patches close in. This bird has a peculiar habit of sometimes carrying a small fish around in its bill for a considerable length of time before eating it. One bird noted carried the fish for a full two hours, the lower mandible being in the gill and the upper one on top of the fish's head. The nests of the sea pigeon were for the most part inaccessible, being far in the recesses of crevices in the roofs of caves. A nest containing one egg was found June 26. This egg was later destroyed by crows, which are very numerous around the sea bird colonies and prey especially on the eggs of the sea pigeon, cormorant and murre.

Uria troille californica. CALIFORNIA MURRE.—Probably 20,000 pairs nesting on the reservation. The principal rookeries are on the west side of Forrester Island, on Cape Horn Rocks and on Petrel Island. There seemed to be no nests at all on the easterly and more protected side of the island. These birds begin to deposit their eggs about July 20 and probably all the females had laid by August 5. Owing to the destruction of many of the eggs, however, fresh eggs may be found until late in August. This destruction of a considerable percentage of the eggs is due to two causes. First, the thieving crow who finds in the stupid murre an easy victim, and second in the clumsiness of the murre, themselves. Many of the eggs are laid on narrow ledges of cliffs and the clumsy birds when leaving or alighting on the nesting ledge frequently roll the egg over the side of the cliff. During several visits paid to the murre colonies, many eggs were seen thus destroyed. On one occasion an egg dropped seventy or eighty feet and struck on the back of a murre on a ledge below. The first young murre was noted August 13.

Stercorarius parasiticus. PARASITIC JAEGER.—Migrant. Several birds seen near Lowrie Island August 3.

Rissa tridactyla pollicaris. PACIFIC KITTIWAKE.— Common before June 10 and after August 10. Immature birds in the majority.

Larus glaucescens. GLAUCOUS-WINGED GULL.— Estimated numbers. Nesting birds, 3000 pairs; immatures, 10,000 (this does not count young raised this year). This species was nesting scatteringly along nearly the whole coast of the main island and there were substantial colonies on Petrel Island and adjoining rocks and on Cape Horn and Sea Lion rocks. They began laying the first week in June and by the middle of the month the nesting season was at its height. On August 13 large young were the rule, although a few nests containing eggs were noted on that date. The young birds depend a great deal on protective coloration for concealment. On the approach of an intruder they lie absolutely motionless among the rocks and, so perfectly do their colors blend into the gray of the rocks, very frequently escape detection. One youngster, yet unable to fly, fell from a cliff into the water below. Here he was joined by one of his parents who guided him to a sloping rock and assisted him to land.

Larus argentatus. HERRING GULL.— Although this gull has not been previously reported from the reservation, it was found to be fairly common, especially around the rocks at the north end. The immature birds outnumbered the adults, however, at least ten to one. The only place the species was found nesting was on Cape Horn Rocks, where two nests, each containing two eggs, were noted on June 22, the birds being flushed and positively identified in both instances. A few days later these eggs had disappeared, probably having been taken by the natives. It was impossible to estimate the number of herring gulls breeding as their nests could not be differentiated with certainty from those of the last species. From the number of adults noted, the nesting birds probably number about twenty pairs. Immature birds estimated at 400. Total 440.

Diomedea nigripes. BLACK-FOOTED ALBATROSS.— One bird seen near Lowrie Island August 3. I was on a launch at the time and, heading directly toward the bird, succeeded in approaching within fifty feet before it took alarm and flew away, pursued for a short distance by two gulls.

Puffinus griseus. SOOTY SHEARWATER.— Seen occasionally throughout the summer, generally a half mile or more off shore but on one occasion between Forrester and Lowrie islands.

Fulmarus glacialis glupischa. PACIFIC FULMAR.— Frequently seen at a little distance from shore during late July and August. All birds noted were in dark plumage.

Oceanodroma furcata. FORKED-TAILED PETREL.— Probably 10,000 pairs nesting on Petrel Island, seemingly the only place on the reservation where petrels nest. *O. furcata* is outnumbered by the next species at least five to one. Their nesting localities are practically identical, though *furcata* seems slightly more partial to the grass covered slopes than to the more open ground among the timber. *O. furcata* also nests considerably earlier than the next, eggs being found most plentifully June 5 to 15.

The night of June 10 was spent on Petrel Island. From 10.30 p. m.



FORKED-TAILED PETREL ON NEST (EXCAVATED).



HORNED PUFFIN ON NEST.

until 2 A. M. the air swarmed with petrels of both species. There is a considerable difference in their notes while in the air, and the notes of the white-rumped bird were in a preponderance of about three to one. Many of this latter species were not in the air, however, but were in burrows and in crevices in the rocks in pairs, this being the height of their courting season. Their cooing love notes could be heard emanating from the ground during the entire night.

Oceanodroma leucorhoa kædingi. KÆDING'S PETREL.—The white-rumped petrel of Forrester Island is exactly the same as the bird that nests on St. Lazaria Island, Sitka Bay. In previous articles on the birds of that reservation (Bird-Lore, XIV, 1912, pp. 419-426; Condor, XVI, 1914, pp. 71-91), I referred this petrel to the form *O. beali* described by Emerson (Condor, VIII, 1906, p. 54).

Through the kindness of the authorities of the United States National Museum, I secured for comparison with St. Lazaria and Forrester Island birds a series of nine adult specimens of *O. leucorhoa leucorhoa* from the north Atlantic, six specimens from the Aleutian Islands and Bering Sea and four specimens from near Midway Island, Ter. Hawaii. Also through the courtesy of the Oregon State Game Commission, I obtained twelve breeding specimens of *O. leucorhoa kædingi* from Three Arch Rocks, off the Oregon coast. The following conclusions were arrived at by a careful study of the above mentioned material in comparison with series from St. Lazaria Island and Forrester Island.

Average measurements.	Wing.	Tail
Nine specimens, north Atlantic.....	6.24	3.45
Six specimens, Aleutians & Bering Sea.....	6.22	3.14
Twenty specimens, Sitka Bay.....	6.05	3.04
Twenty specimens, Forrester Island.....	6.03	3.05
Twelve specimens, Three Arch Rocks.....	5.98	3.01

From the above measurements it will be seen that the southeastern Alaska birds are much nearer *kædingi* than *leucorhoa*. The birds from Bering Sea and the Aleutian Islands are nearer *leucorhoa* but with a tendency toward *kædingi*. There are exceptional specimens from both St. Lazaria and Forrester Islands that measure nearly as large as the average of *leucorhoa*. For these two latter reasons it would seem that *kædingi* must be regarded as only subspecifically distinct from *leucorhoa*; therefore I have used the trinomial. The measurement of the forking of the tail which has been extensively used by some writers is very variable. The two races *O. beali* from Sitka Bay, and *O. beldingi* from Netarts Bay, Oregon, described by Emerson (l. c., p. 54) seem to be founded on characters too minute to be worthy of recognition. The birds from Sitka and Forrester Island possibly average slightly lighter on the back and darker on the under parts than specimens from the Oregon coast but in several specimens at hand these differences cannot be detected.

I estimated the number of these birds nesting on Petrel Island at 50,000 pairs. Their burrows were abundant both on the grassy hillsides and on top of the island among the timber. They began laying about June 20 and the nesting season was at its height June 29.

Phalacrocorax pelagicus pelagicus. PELAGIC CORMORANT.—About one hundred pairs of these birds nested on the reservation during the past season and there were probably as many more immature birds that did not nest. The principal nesting colony, consisting of about fifty pairs, was at the northeast end of the main island. Occasional nests were also noted at other points on the main island, on Petrel Island and on Cape Horn and Sea Lion Rocks. The birds were nest building during the entire month of June and the first eggs were noted June 26, on which date one nest contained three eggs, all other nests nearby being empty as yet. A week later nearly all the nests contained eggs. The first young were seen July 22.

At least two thirds of the eggs and young of the cormorants were destroyed by the crows, which were always most abundant in localities where the cormorants were nesting.

Nettion carolinense. GREEN-WINGED TEAL.—A bird of this species shot near camp August 13 and another seen the same day.

Histrionicus histrionicus. HARLEQUIN DUCK.—Occasional throughout the summer. Pair of adults in breeding plumage seen at Lowrie Island June 14. A search for a nest was unsuccessful.

Ardea herodias fannini. NORTHWEST COAST HERON.—One seen at north end of island July 28. Rather common on Dall and Prince of Wales Islands.

Lobipes lobatus. NORTHERN PHALAROPE.—Abundant on the ocean during late July and August.

Ereunetes mauri. WESTERN SANDPIPER.—Single bird seen at north end of island July 15. Common at south end of Dall Island during late August.

Numenius hudsonicus. HUDSONIAN CURLEW.—One seen at northeast end August 13.

Ægialitis semipalmata. SEMPALMATED PLOVER.—Single bird appeared on the beach near camp the morning of July 31 and remained most of the day.

Hæmatopus bachmani. BLACK OYSTERCATCHER.—About fifty pairs nesting on reservation. Nest containing three eggs noted June 29. Three young about two days old seen the same day.

Summary of breeding water birds.

Lunda cirrhata. Tufted Puffin.....	70,000
Fratercula corniculata. Horned Puffin.....	2,200
Cerorhinca monocerata. Rhinoceros Auklet.....	40,000
Ptychorhamphus aleuticus. Cassin Auklet.....	4,000
Synthliboramphus aleuticus. Ancient Murrelet.....	40,000

<i>Cephus columba</i> . Pigeon Guillemot.....	600
<i>Uria troille californica</i> . California Murre.....	40,000
<i>Larus glaucescens</i> . Glaucous-winged Gull.....	16,000
<i>Larus argentatus</i> . Herring Gull.....	440
<i>Oceanodroma furcata</i> . Forked-tailed Petrel.....	20,000
<i>Oceanodroma leucorhoa kædingi</i> . Kæding Petrel.....	100,000
<i>Phalacrocorax pelagicus pelagicus</i> . Pelagic Cormorant.....	300
<i>Hæmatopus bachmani</i> . Black Oystercatcher.....	100
Total.....	333,640

LAND BIRDS.

***Haliaeetus leucocephalus alascanus*.** NORTHERN BALD EAGLE.— Estimated numbers. Nesting birds, thirty pairs. Young in nests, sixty. Immatures of past two years, eighty. Total, 200. At the time of my arrival on the island, May 23, the young were already hatched. They had apparently not yet left the nests August 15. The eagles on Forrester Island seem to subsist nearly altogether on fish, though on a few occasions they were seen in pursuit of sea birds.

***Falco peregrinus anatum*.** DUCK HAWK.— Half dozen pairs nesting. One nest examined June 13 contained two young about two weeks old. Most of the young were flying by July 20 and hunting for themselves by the 25th. This hawk appears to feed entirely on other birds, puffins, auklets and murrelets being its chief prey.

***Cryptoglaux acadica*.** SAW-WHET OWL.— An adult female was taken June 5 as she left a cavity in a dead spruce stub. On examining the cavity, apparently an old woodpecker's nest and about eight feet from the ground, it was found to contain four eggs on the point of hatching.

The species was common at the south end of Dall Island August 25-27.

***Bubo virginianus saturatus*.** DUSKY HORNED OWL.— One of the fishermen reported seeing a horned owl in a thicket at the northeast end of the island July 10. On visiting this locality the following day the bird was not seen, but a feather was found that undoubtedly came from a bird of this species.

***Ceryle alcyon caurina*.** WESTERN KINGFISHER.— First noted August 3, when a bird flew past camp. Single bird seen August 4 and again August 8. Probably a straggler from Dall Island, where it is common.

***Dryobates villosus sitkensis*.** SITKA HAIRY WOODPECKER.— I am rather puzzled as to the exact status of this bird on the island. It was rather common in the woods until the second week in June and after August 1. Between these dates it was very rarely seen or heard. It may have retired to more dense and out of the way sections to nest but no proof of this was obtained. Cavities, apparently old nesting sites of some woodpecker, were noted occasionally but no fresh ones were found. The bird was extremely wild and no specimens were obtained but from geographical reasons it is probable that it is referable to the above form.

Sphyrapicus varius ruber. RED-BREASTED SAPSUCKER.—A single bird seen near camp May 26. For reasons pointed out by Swarth (Univ. Cal. Pub. Zool., 10, 1912, pp. 35-38) I have used the above name rather than *S. ruber notkensis* of the A. O. U. Check-List.

Empidonax difficilis difficilis. WESTERN FLYCATCHER.—Rather common in the woods all over the reservation and undoubtedly breeding, though no nests were found.

Corvus corax principalis. NORTHERN RAVEN.—Common in the timber on all parts of the reservation. I was unable to locate the nest of this bird but it undoubtedly breeds, probably in the dense timber. Fully fledged young appeared with their parents early in July.

Although this bird in outward appearance is very similar to the more southern form, *C. c. sinuatus*, its notes, actions and, apparently, its nesting habits are so entirely different that it is difficult for me to regard the two forms as only subspecifically distinct.

Corvus caurinus. NORTHWESTERN CROW.—Very plentiful, especially in the vicinity of the sea bird rookeries. Two or three nests examined were placed in spruce thickets near the beach. The young left the nests about the middle of July and joined their parents in their egg raids.

This was the one bird on the reservation in which it seemed impossible to see a single redeeming quality. It is a pest and a robber of the worst type. Although possibly doing no more damage, bird for bird, than does the duck hawk, it is much more abundant. It also lacks the speed and fighting qualities of the latter which, however misplaced, one cannot help but admire.

Loxia curvirostra minor. AMERICAN CROSSBILL.—Occasionally seen in small flocks during the early summer, becoming more plentiful about July 20. Whether or not this species breeds on the reservation, I am unable to say. No nests were found and the birds seen were always in small companies, never in pairs.

Spinus pinus. PINE FINCH.—Rare during the early summer, at which season it was noted only on Petrel and Lowrie islands. About July 9 it began to appear in the vicinity of the camp and after July 20 was abundant.

Junco oreganus oreganus. OREGON JUNCO.—During the early summer evidently confined to the scrub timber and open meadows on top of the island. First appeared in the vicinity of camp July 9 during stormy weather, at which time adults and full grown young appeared together. After this date it was common.

Melospiza melodia rufina. SOOTY SONG SPARROW.—Common in grassy locations open to the sunshine, not occurring in the dense woods or more shady portions of the island. Most plentiful on Petrel Island but occurring in smaller numbers in favorable localities on the main island, Lowrie Island and Cape Horn Rocks. The nest is difficult to locate, being placed on the ground and carefully concealed among the grass. It is built entirely of grass, coarse outside and fine inside. One found June 13 contained four newly hatched young, and another found July 22 contained an addled egg and three young just leaving the nest.

Passerella iliaca townsendi. TOWNSEND'S FOX SPARROW.—Probably the most abundant land bird on the reservation, occurring in wooded localities everywhere. Seemingly at least two broods are raised in a season. The location of the nests noted varied greatly, some being ten or twelve feet up in trees, some in brush thickets and on fallen logs and others on the ground. A brood of young left a nest near camp May 24 and fresh eggs were found as late as June 22.

Vermivora celata lutescens. LUTESCENT WARBLER.—Common in brush thickets and on grassy slopes in many different localities. Was evidently breeding during the month of June but no nests were found. In late July the adults appeared accompanied by the young and from that time on the species was very abundant in the young spruce timber.

Nannus hiemalis pacificus. WESTERN WINTER WREN.—Common throughout the wooded sections. Full grown young appeared by June 18.

Certhia familiaris occidentalis. CALIFORNIA CREEPER.—Rare. Seen occasionally in the woods throughout the summer.

Penthestes rufescens rufescens. CHESTNUT-BACKED CHICKADEE.—Fairly common during the first part of the summer. Abundant after July 10.

Regulus satrapa olivaceus. WESTERN GOLDEN-CROWNED KINGLET.—Common. During early summer kept mostly to the treetops, but by the latter part of July was plentiful everywhere.

Hylocichla ustulata ustulata. RUSSET-BACKED THRUSH.—Abundant in the timber in all parts of the reservation. From June 14 to July 2 several nests containing eggs and young were found. The locations of these varied greatly, some being low down in salmon-berry thickets, some in roots of fallen trees and others in crevices in stumps. In nearly all cases the nests were beautifully covered with green moss. Some young birds were flying by July 10 and shortly after that date they were plentiful.

Ixoreus naevius naevius. VARIED THRUSH.—Much less common than the last species but fairly well distributed throughout the timber. Fully fledged young appeared the last week in June.

NOTES ON THE ROCK DOVE (*COLUMBA DOMESTICA*).¹

BY CHARLES W. TOWNSEND, M.D.

THE two familiar birds of city streets are the European House Sparrow, or English Sparrow as it is generally called, and the Rock Dove, commonly known as Pigeon. Both are equally fearless in the presence of man and all his works, and both are equally dependent on their own exertions for a living, although both are fed more or less irregularly by the passer-by, chiefly for the pleasure afforded by the sight of the crowding, eager birds. The English Sparrow is properly included in most bird lists as an introduced species. The Pigeon, however, is seldom mentioned, because here it is domesticated or was originally introduced in this state and has since become feral.² In most cities both here and in Europe it has reverted in plumage and habits to the wild state of its ancestor, the Rock Dove, with the exception that instead of breeding in holes and fissures of rocky cliffs, it now breeds in similar situations on buildings in cities. In small towns and villages the Pigeons are generally owned and fed by individuals, and live in dovecotes. A study of the habits of the unconfined bird as seen in cities in this country, and a comparison of its habits with those of its feral progenitors seems worth while. I commend it to ornithologists living in cities who lament that they have no birds to study.

That the various fancy races or domesticated forms of the Pigeon, some 200 in all, are descended from one species, the Rock Dove, *Columba domestica*, is now well recognized, although it was formerly believed that the chief races were of separate lineage. This is not to be wondered at, when we consider the extraordinary diversity shown, not only in external plumage and form, but also in internal structure by those races, some of which, it is believed, date back to prehistoric times. One has but to glance at a pouter, a carrier, a barb, a fan-tail, a turbit, a tumbler or a trumpeter,

¹ Stejneger, Proc. U. S. Nat. Mus. X, 1887, p. 424, has shown that Linné's *C. livia* is a *nomen nudum* and that *C. domestica* of Gmelin must be used.

² See, however, O. W. Knight, Birds of Maine, 1908, p. 208, and G. M. Allen, Fauna of New England, List of Aves. Boston Soc. Nat. His., 1909, p. 226.

for example, to realize the immense plasticity of the species and the changes wrought by artificial selection through the ages. Darwin showed that all these races, although breeding true, were fertile among themselves, and that the hybrids were fertile; that the young of the different races could hardly be distinguished apart within twelve hours of hatching; and lastly that diverse races and their hybrid offspring when bred together result in Rock Doves, typical in form and plumage.

This same interbreeding has occurred in the flocks of Pigeons seen in our cities. Here the majority of the birds have the general grayish-blue color with iridescent necks and breasts, white rumps, white axillaries and lower wing coverts, two black wing-bars and black terminal or sub-terminal tail bands, typical of the Rock Dove. Albinism is not uncommon in these flocks but irregular plumage is rare, and unusual form is practically never seen. In a flock of 83 Pigeons seen on Boston Common, one bird was a full albino, four partial albinos, three were chocolate-colored and the rest nearly all in the regular plumage. A few of these were darker blue than usual with little or no white on the rumps, and a number more showed slight albinism in the wing feathers, seen only in flight. In a group of 150 birds counted at another time, one was chocolate-colored, 12 more or less albinistic and the rest nearly typical of the Rock Dove.

I am inclined to think that the prevalence of albinism in these Pigeons may be partly accounted for by the fact that there are, with rare exceptions, no hawks in cities to pick off prominently marked birds, for it is reasonable to suppose that a bird, conspicuous through albinism, would afford a more shining mark to a hawk, and would therefore be more subject to capture. This supposition is borne out by an observation related to me by Mr. William Brewster. He brought to his place at Concord a flock of Pigeons, the majority of which were more or less albinistic or else were light chocolate in color, but about one fourth of the flock were in the ordinary plumage of the Rock Dove. The flock was from time to time harried by hawks who killed a number of the birds, and the interesting part is that at the end of some three years the albinistic and chocolate-colored birds were practically all weeded out and the typical blue birds alone remained.

The Rock Dove is common wherever caves or deep fissures exist on the rocky coasts of Scotland and Ireland, in the Shetlands, Orkneys, Hebrides and Faroes. In England, according to Howard Saunders,¹ it is "very local in Devonshire, and only a few frequent the cliffs of Cornwall. It can be traced along the coast of Wales, and at one spot in Cumberland, as well as the Isle of Man, while on the eastern seaboard it is found at Flamborough Head and in Northumberland. Birds,—apparently wild,—sometimes frequent holes in cliffs inland as well as on the coast, but they are open to the suspicion of being partially domesticated individuals which have reverted to a wild state, or descendants of such." In Scandinavia the Rock Dove is rare and local and it is uncommon in the rest of Europe except in the mountains of Portugal, Spain and Italy. Darwin pointed out that as one goes south and east the rump changes in color from white to blue. Hudson² says of the Rock Dove: "In its language, flight, and habits it is indistinguishable from the bird familiar to every one in a domestic state." Selby³ says that it "is never known under any circumstances to affect the forest or perch upon a tree." Saunders⁴ says "It has a marked objection to settling on trees — a peculiarity which is still shared by its domesticated relatives." In the British Isles it nests from April to September, and lays two sets of two eggs each.

The courtship of the Rock Dove is the same in our city streets as on wild rocky coasts. It may be seen here nearly every pleasant day from January to December. The male coos long and frequently, and expresses himself in the syllables *coo-roo-coo* or *cock-a-war*, the last syllable in either case much prolonged. He stretches his neck now up, now down and, with puffed out breast, displays to full advantage his brilliant iridescent feathers. His tail is spread and scrapes stiffly on the ground and his wings are drooped slightly. At times the amorous bird advances and retreats, pirouettes now this way now that, in order that the meek and apparently indifferent female — actually slightly smaller but now very noticeably smaller — may be duly impressed. At times he makes little

¹ Manual of British Birds, 1889, p. 471.

² British Birds, 1902, p. 262.

³ The Naturalist's Library, Ornithology, 1835, vol. V, part III, p. 147.

⁴ loc. cit.

jumps into the air, and occasionally flies a few feet. At times, when not actually courting, he caresses his mate by kissing or billing and at times feeds her with "pigeons-milk." Again the happy pair preen each others feathers and search for tormenting inhabitants in a manner suggestive of monkeys or certain savages.

The fighting that goes on between rival males is an important part of the courtship, a fact that is generally overlooked in poetical accounts of the gentle, cooing dove. These cliff-dwellers on window ledges and projecting copings of high buildings may often be seen engaged in sparring with their wings. Sometimes only one, sometimes both wings are used, and the birds strike with considerable force and swiftness and deliver the blows on each others heads and necks and sometimes push or ward with one wing and strike with the other. The contest is often continued with but little advantage on either side for minutes at a time, but generally results in the weaker — not going to the wall — but being forced away from it off the ledge and having to use his weapons for flight. Sometimes the conquered one returns at once to the fray but often is obliged to content himself with a humbler station and the victor, undisturbed, struts and coos before his shy mate. The fighting is distinctly a cliff performance, with the object of pushing the rival off the ledge. Knight¹ says: "I have seen the fight protracted until one is killed or completely exhausted." On the outer edge of a Pigeon's wing is a bare spot of thickened integument.²

The nearest approach to rocky caves in cities are to be found in church towers, and these are favorite nesting sites. Open situations on window ledges and various architectural projections on buildings are, however, freely used. The nest is often built in some of the busiest streets just above the passing wagons, and I have seen one on an iron beam under a noisy elevated car station close to an arc light. The nest is unattractive by reason of the liberal amount of dung with which it is daubed and of which in many cases it is chiefly composed. The walls of the building below and in the vicinity are also spattered. To avoid this disfigurement of buildings the ledges are sometimes built up or covered at such

¹ loc. cit.

² vide Lucas. *The Weapons and Wings of Birds*, Report of U. S. Nat. Museum, 1893, p. 656.

steep angle that the birds are unable to alight, and "pigeon-proof" architecture is spoken of. Besides the dung, small sticks are used in the construction of the nest, and there is generally a scanty lining of feathers. The nests vary in size, but are sometimes built up from repeated use to a height of six or seven inches, and are about fourteen inches in outside diameter.

The number of broods raised by these wild descendants of domesticated birds varies very much and is said to be four, but their eggs may be seen in almost every month of the year. The eggs are two in number and pure white in color, characteristic of the hole inhabiting birds. Incubation lasts about two weeks and both parents take part. The young are covered with loose grayish or yellow down and rapidly grow to full size and attain a plumage very similar to that of the adult. They lack the iridescent feathers and are slightly mottled.

The feeding of the young with the so called "pigeon-milk" by both parents is an interesting phenomenon. The adult thrusts its bill deep down into the side of the bill of the squab, vibrates its wings and works its neck muscles in a pumping manner. The squab, when not actually engaged in the feeding process, waves its wings and calls in beseeching, whistling notes for more. An examination of the gullet of the adult shows a large reticulated glandular crop from which a gelatinous fluid can be squeezed. This secretion mixed with, and serving to digest the contents of the crop forms the pigeon-milk with which the young birds are fed. As the young grow, grain and other food partially digested is given.

The cliff-inhabiting proclivities of our city Rock Doves is shown by their night-roosting habits. Besides church towers, which furnish the caves, the ledges on the buildings are thus occupied. Numerous ledges on the different façades of the Court House in Boston are favorite resorts, as are also the long ledges under the eaves of Arlington Street Church and the window ledges on a building on Tremont Street opposite the Common. Whole rows of birds may be seen sleeping peacefully in these situations amid the glare of electric lights and the noise of traffic in the streets. These night roosts are favorite resting places in the day and are often more or less occupied in dark and stormy weather.

The Rock Dove also shows evidence of its former life among

rocky cliffs by its inherited objection to alighting on trees, although an interesting change has come over it in Boston at least. Thirty-five years ago I noted, as an unusual event, that a Pigeon was occasionally to be seen on the large branch of an elm tree in Louisburg Square. In my notes of March 30, 1906, I say: "Rarely alight in trees, but does so habitually in Louisburg Square, and occasionally a few on the Common." In my notes of February 9, 1907, I find the following: "Twenty years ago it was a rare thing to see a Pigeon alight in a tree; now there are several places where they commonly alight, and I have seen a flock of 50 in a tree in the Public Gardens. There are two places in the Common where these birds are in the habit of alighting. Single birds or pairs are to be seen anywhere in trees." Since then the habit has continued. The tree referred to in the Public Gardens is one with very large branches devoid of fine sprays — a Kentucky coffee tree — and I have lately counted as many as 100 Pigeons in this tree. Almost always trees with large branches are chosen but I have seen Pigeons on small branches or even on telegraph wires. This change in habit is of interest as an evidence of adaptiveness in a species. It would be interesting to know whether the same change is going on elsewhere in this country or in Europe.

The flight of this bird is worth studying and has many points of interest. If one disturbs a single individual or a flock on the ground so that the birds suddenly take flight in alarm, a loud and sharp clapping noise is usually made, apparently by the striking together over the back of the upper surfaces of the wings. Wm. Macgillivray¹ says: "When startled, they rise suddenly, and by striking the ground with their wings produce a crackling noise." The fact however, that the noise begins and continues after the birds have left the ground seems to disprove this observation. In this connection the following observation by Fielden² of another charadriiform bird, the Knot, is of interest. He says: "Immediately after arrival in June they began to mate, and at times I noticed two or more males following a single female; at this season they soar in the air like the Common Snipe, and when descending

¹ *A History of British Birds*, 1837, vol. I, p. 273.

² Fielden, H. W., *List of Birds observed in Smith Sound in 1875-76*, Ibis, 1877, 4 series, vol. I, p. 407.

from a height beat their wings behind the back with a rapid motion which produces a loud whirring noise." As Pigeons that are not suddenly disturbed rise from the ground silently, is it not possible that this loud clapping, made perhaps when the bird is frightened, may subserve a useful purpose in confusing a crouching animal stealing through the grass, and thus prevent its springing at its prey? Be this as it may, it is evident that, as in the case of the Knot, the clapping is at times a courtship action, for, with puffed out neck and breast, a male may fly with loud clapping to alight near a female.

The facts that when well under way in the air Pigeons extend their feet behind under the tail, although they carry them in front for short flights, and that they extend the bastard wing as they glide towards a perch can both be verified by any one with ordinary vision. I have already discussed these points in other papers.¹ It is interesting to speculate that this extension of the bastard wing may point back to the time when the reptilian ancestors of birds grasped with their front extremities the perch to which they were gliding.

The aerial evolutions of a flock of Pigeons are performed with as great precision as is seen in flocks of Shore Birds, Gulls, and Auks, — all relatives of Doves in the group of Charadiiformes. It would seem as if the birds possessed a common mind as each bird in a large flock suddenly turns with military accuracy first its back then its breast to the observer, while the flock sweeps on, now this way, now that, about a church tower. This sudden turning is accomplished by a rotation of the body along an antero-posterior axis through the arc of a quarter to a half of a circle. The flock, flying by an observer with the nearer wings pointed downwards at an angle of 45 degrees below the horizon, suddenly changes so that the nearer wings point upward at an angle of 45 degrees with the horizon. With this change in position or "reverse" the color of the wings appears to change from greyish blue of the upper surface to silvery white of the lower surface. Dewar² has studied these evo-

¹ The Position of Birds' Feet in Flight, Auk, XXV, 1909, p. 109.
Bird Genealogy, Auk, XXIX, 1912, p. 285.

² Dewar, J. M. The Evolutions of Waders. The Zoologist, 1912, 4 ser., vol. XVI, p. 161.

lutions in shore birds and concludes that they are protective in character, originating in attempts to evade birds of prey and afterwards employed against man. He points out the resemblance to wave movement or sea-spray and believes it to be a case of protective resemblance with the object, not of deceiving the hawk as to the reality of the birds, but of baffling pursuit,—all of which is interesting and suggestive.

At any sudden noise, like the bursting of an automobile tire or an explosion of gasoline in a muffler, a flock of Pigeons will in an instant mount into the air, no matter how busy they may have been in feeding, and fly about for some minutes before they return. A flock of Pigeons roosting on the ledges of the buildings on Tremont Street when startled by an explosion whir away but often return towards the façade only to double back again. Dr. W. M. Tyler has suggested to me that these birds are acting from fear in the same way that their feral ancestors would act if pursued by an eagle or hawk. Edmund Selous¹ says of the wild birds: "In effecting their numerous escapes, the face of the rock stood them in good stead, and they deliberately made use of it, in my opinion, for, dashing in and out, they would cling to it or double against it in places where eagles, as larger birds, could not follow them so deftly, and had perforce to check their speed." Of course the explanation may be, as Dr. Tyler also suggested, that the birds, about to return to their perches, are driven away again and again by the recurring fear. When so engaged in flight, if a second explosion occurs, the whole flock suddenly drops or darts down a few feet while still continuing its rapid course. One cannot help thinking of the similar actions of Shore Birds at the discharge of a gun. I have seen a flock of Black-bellied Plovers dart down in its flight when a gun was fired in another direction some distance off, and, no doubt, under similar circumstances a poor marksman has believed his shot had entered the flock and has wondered that no birds had fallen. The very loud automobile discharge near at hand would naturally startle any bird, but I have seen a flock of Pigeons act in a similar way when the explosion was so distant that it was but faintly heard. One could build up a fanciful theory to the

¹ *The Bird Watcher in the Shetlands*, 1905, p. 158.

effect that this action of the Pigeons was inherited from ancestors who were pursued by gunners, but this would involve the inheritance of an acquired trait that had existed during the brief time only since gunpowder was used. On the other hand it is possible that the habit has been continued by example from adult to offspring since the feral days of this bird. I have observed a somewhat similar case where a caged canary, not easily disturbed by ordinary affairs of the household, showed great terror whenever a toy balloon floated about the room. This perhaps points back to the more deep seated instinct of fear of a hawk or other large bird hovering overhead. It may be mentioned here that the Pigeon has not yet learned to estimate accurately the speed of an automobile approach. It is able to take care of itself where horses are concerned, but not infrequently lingers too long in the street and is run over or hit by the automobile while it is attempting to fly away. In this respect it resembles the domestic fowl and other animals.

In gliding either in a straight line or in curves and partial circles the wings are held as in most birds about on the same plane with the body, but at times one may see a pair of birds gliding through the air with the wings held up at an angle of forty-five degrees. This is an interesting sight and is apparently of the nature of a nuptial performance.

In alighting in a field the Pigeon frequently first circles over the ground, or, if alighting suddenly, sometimes looks about for a moment before searching for food. This is suggestive of inherited caution from wild ancestry, for the Rock Dove in its native haunts is said to be very wild and suspicious. This caution is not seen when the bird alights in a crowded street.

The typical "dove-like" walk of this bird is familiar; he advances with nodding head as if at each step his head lingered behind while the neck and body kept on. This is seen in a greater or lesser extent in various other birds that walk; it is noticeable in the Ipswich Sparrow.

The sight of a flock of Pigeons sunning themselves on a roof is a familiar one; the birds also have a habit in intervals between feeding of collecting in compact flocks and squatting close together with the tarsi and often the breasts flat on the ground. A group acting thus, all headed towards the wind, suggests the similar habit of Gulls.

I have referred in another paper¹ to the duck-like actions of a fifteen day old Pigeon when put in a tub of water and its bearing on the relationships of this bird to Gulls and Auks. Saunders² says "both wild and tame Pigeons have been seen to settle on the water like Gulls and drink while floating down stream." Mr. Wm. A. Jeffries tells me that he once saw a Pigeon alight on the surface of the Frog Pond in Boston Common. I have seen a Pigeon hovering above Charles River in Cambridge dropping its feet till they touched the water, and picking up something with its bill. This was repeated five or six times. This last named action points to the progressive or adaptive character of the bird and not necessarily to its aquatic ancestry, for I have observed similar actions in picking up food from the water on the part of such dissimilar passerine birds as Bronzed Grackles, Cedar Birds and Swallows.

The English Sparrow is the only bird with which the Pigeon is intimately and constantly associated. As a rule no notice whatever is taken by the larger of the smaller bird or *vice versa*, and both feed amicably on the same ground. On rare occasions, however, I have seen an English Sparrow pursue a Pigeon. Once I saw a Pigeon closely pursue a Belted Kingfisher as it doubled back and forth three or four times over the Frog Pond on the Common.³ In Boston I have known Crows to inflict considerable damage on the eggs and squabs of Pigeons in the rookery of the tower of Trinity Church, and a Duck Hawk feasted daily on adults from his perch on a Commonwealth Avenue church steeple, until a sportsman shot him from his attic window.

In drinking water the bill is held in the pool continuously for half a minute or more at a time, an action very unlike the sipping and holding the head up of gallinaceous birds with which Pigeons were formerly classed. Shore birds when feeding often hold the bill immersed and probably drink at the same time. I have no notes on the drinking of Auks, but I believe that Gulls drink continuously in a similar manner.

In feeding on grain scattered in the street or in horse droppings Pigeons do not scratch. On ground planted with grass seed they

¹ Bird Genealogy, loc. cit.

² loc. cit.

³ Birds of Essex County, 1905, p. 223.

chop vigorously at the ground with their bills causing the earth to fly and making in some cases holes of considerable size. In a garden where numerous strings were stretched which kept away the crows, the Pigeons alighted without fear in the network and chopped holes in the ground to obtain the seeds. On weedy lawns and fields flocks of Pigeons often alight, spread out and systematically eat the weed seeds. Saunders¹ says of the wild birds that they make amends for their fondness for grain by eating weed seeds and the roots of the conch grass (*Triticum repens*). I have seen Pigeons walking along ploughed furrows picking up and eating earthworms and various larvæ exposed. Dr. Glover M. Allen tells me that a few winters ago after a heavy snow fall he observed Pigeons clinging to the Japanese ivy vines on University Hall in Cambridge eating the ivy berries and Mr. Charles F. Batchelder reports seeing a Pigeon perched in a privet bush eating the berries.

On Boston Common it is the custom of visitors to feed the Pigeons with bread crumbs and grain as is done at St. Marks in Venice and at various other cities. The birds flock about in great numbers and alight on the hands, shoulders and heads of the feeders. This familiarity does not necessarily point to the former domesticated state of this bird, for in the same place grey squirrels respond to feeding by nuts in a similar manner, and fearlessly clamber over their benefactor, and investigate his pockets to the astonishment of the rustic visitor, who is familiar with the same animal only at a long gun-shot range. This and the photographs shown us by such men as Harold Baynes point to the millennium for the bird lover when the gun shall have vanished and live birds be treated by everybody as real friends.

¹ loc. cit.



SHIP CANAL (BUFFALO BAYOU) A FEW MILES EAST OF HOUSTON, TEX.



MIXED OAK AND PINE WOODLAND ON BUFFALO BAYOU, WEST OF
HOUSTON, TEX.

ON THE NESTING OF CERTAIN BIRDS IN TEXAS.

BY GEORGE FINLAY SIMMONS.

Plates XXI-XXVII.

THE following notes are from observations made by the writer in the southern portion of Harris County, Texas, during the breeding seasons of 1910, 1911, 1912, 1913, and 1914.

The area under consideration is in the southeastern part of the State, and lies wholly within the semitropic or Gulf strip of the Austroriparian zone. Thus we find a slight intermingling of birds of unquestionable tropical affinities with a preponderance of Lower Austral species.

Houston, where nearly all of the observations were made, is about 50 miles northwest of Galveston, which lies on the Gulf of Mexico. Buffalo Bayou runs eastward through the city 28 miles to Galveston Bay; Bray's Bayou skirts the city on the south and joins Buffalo to the east. Each of these streams is skirted on either side by heavy strips of timber, varying from a quarter to a half mile in width. This timber is mostly pine, with a general sprinkling of deciduous trees. Northeast and north of Buffalo Bayou the great southern pine woods begin, and here on these bayous we find the most southwesterly extension of such forests.

The country between Buffalo and Bray's Bayous and south of the latter is typical flat, open and almost level coastal prairie, with little vegetation and few farms or ranch houses. Sprinkled about this prairie are numerous grass-grown ponds and marshes.

The majority of the records are from two sections; the first is a narrow strip of country extending west from the city, about a mile wide, and having Buffalo Bayou as its northern boundary; the second is an expanse of prairie within a mile's radius of Pierce Junction, a small flag-station $6\frac{1}{2}$ miles south of Houston. The woodland records are from the first, while the prairie and marsh records are from the second. All distances are in miles from the flag-station at Pierce Junction and the county court house in Houston.

Little time could be spared during the breeding season to search for nests and eggs; hence the notes are by no means as complete as might be desired. Excessive rains often made it impracticable to go afield during that period, for so level is the country that for weeks after a rain water stands in the woodlands and on the prairies. Though over 50 miles from the Gulf of Mexico, Houston's altitude is but 53 feet.

With few exceptions, the notes were all taken on short afternoon walks within a few miles of the city. But as there are few nesting records for the eastern half of Texas, an expanse of territory comprising over one twenty-fifth of the United States, I feel that I am justified in publishing the more interesting of these notes in order to settle the question of the breeding of certain species in that region.

Anas fulvigula maculosa. MOTTLED DUCK.—On April 17, 1911, Captain Patrick Daly of the Houston Fire Department, while out hunting plover on the coastal prairie about a mile southeast of Pierce Junction, and driving about in a small wagon among a number of small prairie ponds, frequently mentioned in the following notes, flushed a female of this species from a nest containing eleven eggs. As is the case with all ponds in this section of prairie, the whole with the exception of a small spot near the center was thickly covered with tall grass, rushes, water plants of various sorts, and sprinkled with a few bushes or reeds, locally known as 'coffee bean' or 'senna.'

The nest itself was placed about eight inches up in thick marsh grass and rushes, over water four inches deep, and was neatly hidden by the tops of the grasses and rushes being drawn together over the nest. It was but two or three inches thick, a slightly concave saucer of dead, buffy rushes and marsh grass, supported by the thick grasses and by two small 'coffee bean' reeds. The lining was of smaller sections and fragments of the rushes and marsh grass, and a small quantity of cotton; and the eleven eggs were well, though not thickly surrounded by down and soft feathers, evidently from the breast of the parent.

From its resting place in the tall marsh grass in the neck of the prairie pond, Captain Daly transferred the nest and all the eggs to his wagon, and after covering them with a sack drove for three or four hours over the uneven ground. In the afternoon he drove back to the city, leaving the eggs at a farm house about four miles from the ponds. They were then placed under a setting hen and ten young hatched.

Then came the problem of feeding them. At first they were placed in a pen where they could have both sunlight and shade, a pan of water

and a little sand, while for food a quantity of common corn chops was thrown to them. But it was soon found that they would not touch chops; so numbers of small, tender angle worms were taken, cut into sections about a quarter of an inch long and thrown into the water where the downy young ducks could reach them. These were eagerly devoured, as was boiled rice, but before this menu was arranged six of the young *maculosa* departed this life. Three of the remaining four lived to become full-fledged adults, and are alive and healthy at the time of the writing of this note.

Another, and probably the best method of feeding the remaining young was to place in their pen a stale soup bone which drew large numbers of flies. These the young eagerly caught and devoured, soon waxing fat and luxuriant.

Ixobrychus exilis. LEAST BITTERN.—Prior to the breeding season of 1914 I had recorded but few specimens of this rare summer resident, and had never found a nest.

On May 30, 1914, while splashing through the small, marshy prairie ponds about a mile southeast of Pierce Junction, and searching hopefully for nests of the Mottled Duck and Louisiana Clapper Rail, I saw one of these birds fly up from the reeds ahead of me. It was some time before I could locate the nest, for it was evident that the bird had gone some distance through the rushes before taking wing.

But when I did find it I was fully repaid for my search, for it contained five eggs. The nest was supported by several rushes, dead reeds and the broken stem of a small persimmon sapling growing in the pond. At this point the reeds and rushes were not so thick, and the nest and eggs could easily be seen at a distance of fifteen or twenty feet. The bottom of the nest just touched the water, which was there about eighteen inches deep.

The nest itself was quite firmly built, with few loose ends projecting from the mass. It was built entirely of straight stems and twigs of a brushy reed which grows about the ponds, quite different from the flexible reeds and rushes used in the construction of the nests of the other water birds of the region. It measured about six and a half inches across the top and five inches high, being cone shaped and tapering towards the bottom. So flat was the top of the nest that it seemed the slightest jar would cause the eggs to roll off, for there were no rushes or grasses to guard the sides of the nest as in the case of the Rails and Gallinules.

The five eggs were of a pale, bluish white color, much paler than other eggs of the Least Bittern I have examined. They were well incubated, and measured: $1.19 \times .89$; $1.18 \times .90$; $1.18 \times .89$; $1.17 \times .90$; and $1.15 \times .88$.

On the same day, but in another of the small ponds or sloughs, I found a second nest of this bird, which contained nothing but shells and fragments of shells to show that the young had already left the nest. It was built of the same rusty, inflexible twigs used in the first nest.

On June 6 I made another trip to the pond last mentioned, and discovered a third nest, similar to the first two, a nest that I had doubtless overlooked in my hurried search of the previous trip. This nest was wider but not so thick as the others, and was resting on several water plants of the lily family, almost flush with the water. It was well hidden by thick reeds and grasses, and had apparently already been used.

Ionornis martinica. PURPLE GALLINULE.—A fairly common summer resident about the marshy ponds of the open coastal prairie, but I never found a nest until the season of 1914.

May 30, in the same pond with the nest and five eggs of the Least Bittern, I flushed one of these Gallinules from a nest containing five well incubated eggs. The nest itself was about eight inches in diameter, three and a quarter inches thick, and about ten inches above the water. It was placed in an isolated clump of rushes on the edge of the open water at the center of the pond, the water at that point being about thirty inches deep.

The living tules or rushes of the clump composed about half of the nesting material, the stalks being broken and bent over and the nest resting on these. The nest was composed of buffy rushes, loosely woven into a slightly concave mass.

The five eggs measured: 1.60×1.10 ; 1.53×1.08 ; 1.52×1.08 ; 1.50×1.07 ; and 1.47×1.09 .

On this trip, as well as on the next (June 6), I carefully searched all of the ponds in the vicinity, and found several nests that had already been used, as well as numbers of platforms that were evidently 'shams.' In one pond in particular, I found at least ten of these platforms about ten feet apart; they were all formed by the tops of the saw grass and rushes being bent over or broken and interlaced. From the fact that each of these platforms was stained by the white excreta of the bird, I am led to believe that the birds use them as perches during the night so as to be safe from the depredations of the smaller mammals inhabiting the region.

Gallinula galeata. FLORIDA GALLINULE.—But once have I found a nest of this Gallinule. On May 28, 1910, while examining a number of nests of the Florida Red-wing in the tall reeds and grasses on the edge of a lagoon in the San Jacinto bottoms, adjacent to Galveston Bay, I observed a platform of grasses and reeds about six inches in height. There the water was about a foot deep, while the grasses and rushes grew nearly as high as one's head.

Seeing this platform set me to searching and I soon found several more, all empty. And then, as I was about to give up the search, I flushed the Gallinule from a clump of tall rushes and grasses. The nest was cunningly concealed over but three inches of water, and built up ten inches above it; a slightly concave mass about nine and a half inches in diameter and four inches thick, and loosely composed of rushes, reeds and saw grass. It was entirely surrounded by reeds, with but one open side. Since that date I have never returned to the locality.

The six eggs in this nest measured: 1.77×1.27 ; 1.76×1.26 ; 1.75×1.25 ; 1.73×1.26 ; 1.72×1.27 ; and 1.67×1.23 .

Numenius americanus. LONG-BILLED CURLEW.—On June 1, 1910, in company with Messrs. H. G. Hill and E. G. Ainslie, I came on a marshy pond near Almeda station, thirteen miles south of Houston. Through the tall reeds and rushes we could see a number of birds on a short stretch of silt between the reeds and water on the far side of the pond, and decided to investigate. By crawling slowly through the tall grass and reeds we were able to approach within about twenty yards of the birds before they saw us. There were three adult Long-billed Curlew and seven smaller ones, almost fully fledged but barely able to fly.

The actions of the adults were especially interesting. Often one would spring into the air for a few feet, circle the pond, and relight on the silt. At other times it would merely spring into the air for a few feet, flap its wings several times and then alight, raising its wings over its back as it did so, and then refolding them.

Finally, as one of the adults flew up and circled the pond, it observed us as we lay at full length in the tall grass. At the sound of the hoarse, noisy alarm call the whole flock took wing and flew about a hundred yards, disappearing into the tall marsh grass. As I had expected, the flight of the smaller birds was exceedingly labored and heavy. After giving the alarm, the adult circled the pond again and followed the flock.

The number of birds puzzled me greatly. It is not unlikely that this flock was composed of two families, the younger birds being doubtless reared somewhere in the near vicinity.

Colinus virginianus virginianus. BOB-WHITE.—During the five breeding seasons covered by this paper I found but two nests of this fairly common resident.

The first, May 26, 1912, contained thirteen eggs, the nest being under the edge of a bale of hay in an old shed on the prairie not far from a ranch house about a mile southeast of Pierce Junction. Entrance on the north side of the bale, with the cavity of the nest slightly sunk in the ground; well lined with dead grasses. Nest quite difficult to locate and only found by flushing the bird.

The second, July 20, 1912, contained ten heavily incubated eggs. The nest was skilfully concealed in a small tangled clump containing a blackberry vine, several weeds and several thick tussocks of prairie grass, in a weedy old pasture on the edge of the pine woods, about four and a half miles west of the city. The pasture was sprinkled with such small thickets as the one that contained the nest. The nest was but fifty feet from the edge of the timber, where the pine woods were encroaching on the prairie. The nesting cavity was well arched, sunk slightly in the ground, and faced the east.

The following day, on visiting the nest, I found all of the eggs broken and scattered about in front of the thicket, perhaps the work of the parent itself, or, what is more likely, the work of some four-footed enemy.

The cavity was five and a half inches from side to side, and five inches from top to bottom; it was well lined with dry grasses.

The set containing thirteen eggs yielded the following: $1.25 \times .95$; $1.25 \times .94$; $1.25 \times .94$; $1.25 \times .94$; $1.24 \times .95$; $1.24 \times .95$; $1.24 \times .95$; $1.22 \times .93$; $1.21 \times .94$; $1.20 \times .94$; $1.20 \times .93$; $1.19 \times .94$; $1.19 \times .92$.

Tympanuchus americanus attwateri. ATTWATER'S PRAIRIE CHICKEN.—Not uncommon as a resident in the wilder portions of the prairies, but I have never found a nest. On June 7, 1913, at Aldine, a station eleven miles north of Houston, two adults and twelve downy young were observed by the side of the railroad track.

Meleagris gallopavo silvestris. WILD TURKEY.—I know of but one nest of this scarce resident for the region under consideration. On May 8, 1912, a farmer by the name of Whicker found a nest by the side of a log in the bottom woods near Penn City, thirteen miles east of Houston. The seven eggs were placed under a domestic hen, and five puny young hatched. They lived but a few days.

Zenaidura macroura marginella. WESTERN MOURNING DOVE.—Common resident in all open country. As I have found dozens of nests, general descriptions would be best.

The nests I have found on the ground, in low bushes and trees, and as high as sixty feet in tall pines. They are usually placed about six feet from the ground on the lower limbs of pine trees along the edges of the woods, in huisache trees on the prairies, in the post oak trees of the scattered motts in the open country, and in the shade and orchard trees around ranch houses. When they are placed in pine trees along the edges of pine woods, the nests are nearly always composed entirely of dead pine needles. When in trees on the prairies, the nests are shallow saucers of straws and dead grasses.

With only one exception, each nest contained two eggs. On May 21, 1911, a nest was found on the horizontal limb of a pear tree in a deserted pear orchard; it contained three eggs. One nest contained two eggs which were quite small, measuring: $.98 \times .54$ and $.97 \times .50$. The largest measured $1.17 \times .89$, and the average of a large series is $1.10 \times .80$. The nesting season extends from April 16 to July 20, though the majority of nests are found in latter April and early May. Only a few pairs rear second or third broods.

Chæmpelia passerina passerina. GROUND DOVE.—My only record for the occurrence of this bird and my only breeding record are one and the same. On June 1, 1910, I flushed a bird from a nest containing two young nearly ready to leave the confines of their birthplace. The nest itself was hardly a nest at all, for it was only a slight hollow in the ground, amid the short grass and stubble on the edge of an orchard on the prairie near Alameda, thirteen miles south of Houston, and lined with only a few tiny grasses and hairs.

Buteo lineatus texanus. TEXAS RED-SHOULDERED HAWK.—A common resident for so large a bird, but the nests are generally in such tall pines as to be practically inaccessible. Of the many nests I have found, and of the few I have been able to reach by climbing, I have found but one that was occupied.



BETWEEN THE PRAIRIE AND THE TIMBERLAND, COASTAL REGION NEAR HOUSTON, TEX.



OPEN PINE WOODS ON BUFFALO BAYOU.

On April 29, 1911, I found the nest when it contained two downy young only a day or two out of the shell. The nest was placed about thirty feet up in a small pine tree in the woods on Buffalo Bayou about eight miles west of Houston. It was a well-constructed domicile, and had evidently been used for several seasons. It was a mass of sticks, dead leaves and Spanish moss twenty-four inches high, in a crotch formed by three branches of the main trunk of the tree. It measured twenty-one inches across the top; and the cavity, which was three inches deep, was neatly lined with quite a quantity of fresh, green and fragrant pine needles.

Seven days later (May 6) the young were slightly larger, and the sheathed tips of the primaries were beginning to appear. And on May 14 they faced me with snapping beaks and showed a strong desire to claw me. Both were gaining in strength and size day by day, though one of the birds appeared smaller and more timid than the other. The tips of the primaries had appeared.

On May 27, the last day I was able to visit the nest, the young were nearly as large as the parents. With the exception of their heads they were apparently fully feathered. Their heads had a rather mottled appearance, caused by the feathers appearing amid the grayish down. Undoubtedly they would leave the nest in a day or two.

On the various trips I made to the nest, I found beside the young the remains of their food: small snakes, frogs, and on one occasion the remains of a bird, a male Louisiana Cardinal (*C. c. magnirostris*).

The other nests which I located were all in pines, from forty to eighty feet from the ground, generally in open pine woods with little underbrush.

Haliaeetus leucocephalus leucocephalus. BALD EAGLE.—Very rare resident, inhabiting the wilder country around Galveston Bay. I was shown a young bird which was taken from a nest in the bottom woods on Taylor's Bayou not far from the bay, and later viewed the nest, a massive structure seventy feet from the ground in an immense pine. This nest was destroyed by a violent storm in the latter part of 1911. Another nest has been reported to me from the north side of the bay, but I have not had the time to visit the locality and investigate.

Otus asio mcallii. TEXAS? ¹ SCREECH OWL.—April 5, 1913, in the woods on Buffalo Bayou about four and a half miles west of Houston, I found a nest in a natural hollow of an elm tree standing on the slope of the bayou; it contained four eggs, incubation far advanced. The entrance to the cavity was nine feet from the ground at a bend in the trunk of the tree; from the bend the cavity extended almost vertically down into the heart of the tree, about thirty inches deep and six inches in diameter; trunk of tree about ten inches in diameter. Only a few leaves and grasses, with a slight lining of feathers, were between the eggs and the bottom of the cavity. It was some time before I could force the female to leave the nest;

¹ Cf. Ridgway, Robert. The Birds of North and Middle America. Part VI, p. 694, footnote b.

poking her with a stick had no effect other than to make her snap her mandibles, so I was forced to use a hook and pull her out by the neck.

These four eggs measured: 1.32×1.16 ; 1.31×1.12 ; 1.30×1.19 ; and 1.30×1.17 .

Coccyzus americanus americanus. YELLOW-BILLED CUCKOO.— May 17, 1914, I found my only nest of this fairly common summer resident. It was placed on the horizontal limb of a young pine on the edge of the Buffalo Bayou woods four miles west of the city, and contained three eggs. The nest was a slight platform about eleven feet up, through which I could see with ease; it was composed of small pine twigs, about an eighth of an inch in diameter and averaging six or eight inches long, and was much more concave than I had expected. This shallow saucer was neatly, though quite thinly lined with a few pine needles, a small quantity of Spanish moss and several tiny buds.

A week later I visited the nest and found that some bird, presumably the rightful owner, had pecked a hole in one of the eggs and the nest was deserted. The three eggs measured: $1.22 \times .93$; $1.20 \times .94$; and $1.20 \times .92$.

Ceryle alcyon alcyon. BELTED KINGFISHER.— On May 28, 1910, I made an investigation of the sand banks along the south side of the Houston ship channel (Buffalo Bayou) about six miles east of the city, bent on finding the burrow of this bird, for on several occasions I had observed individuals during the breeding season in that section. There the banks were almost vertical, from eight to ten feet high, and had a narrow shelf between their base and the water's edge.

Several old tunnels were located, but as they were nearly all covered with spider webs I passed them by. Finally, after walking and scrambling about a half mile along the base of these sand banks, I came to a likely looking hole about seven feet up and about a foot and a half from the turf of the solid ground above. Several old roots offered footholds, and I was soon peering into the cavity; with the aid of a mirror I ascertained that the tunnel did not curve, and that it contained eggs. I did not attempt to dig them out, but used a make-shift hoe (a piece of wire bent on the end of a stick) and by careful work dragged out the eggs, six in number, together with a small amount of rubbish on which they were laid. The parents did not appear until I had already secured the eggs.

This set of six measured: 1.35×1.08 ; 1.35×1.02 ; 1.33×1.09 ; 1.33×1.08 ; 1.32×1.09 ; and 1.30×1.07 .

Dryobates borealis. RED-COCKADED WOODPECKER.— In a certain section of the pine woods on Buffalo Bayou, about eight miles west of Houston, I had occasionally noted Red-cockaded Woodpeckers, and was convinced they nested in that locality. But it was not until May 25, 1912, that I had an opportunity to thoroughly investigate the locality.

I had spent several hours searching before I saw the bird, clinging to the side of a dead pine in a small clearing densely covered with thickets. And by the side of the bird was a likely looking hole. On my approach the bird

left the tree, and during the time I was at the nest stayed a considerable distance away, now and then uttering its short, shrill note.

I had some difficulty in reaching the base of the tree; but to climb the twenty-one feet to the cavity was the work of a moment. Removing the front, I found the eggs to be two in number, nest stained and well incubated, and laid on a small quantity of pithy pine chips.

The two eggs measured: $.91 \times .69$ and $.87 \times .69$.

Melanerpes erythrocephalus. RED-HEADED WOODPECKER.—During the seasons covered by this paper I located several excavations of this Woodpecker, but the majority were in dead pines too large and unsteady to attempt to climb. It was not until May 27, 1912, that I located a cavity containing eggs. The birds had selected a dead pine on the edge of a patch of timber by the side of a railroad track on the southern edge of Houston, and thirty feet from the ground had chiseled a domicile. The pine was quite rotten and swayed dangerously, but the bird did not leave the nest until I was within four or five feet of the cavity. Three eggs, evidently fresh, formed the set. Two days later I returned with a companion, this time bent on chopping into the cavity, but found that the eggs had disappeared.

Colaptes auratus auratus. FLICKER.—This Woodpecker is quite rare in Texas, and the only previous nesting record I can now recall is that of J. A. Singley from Lee County.

During June of 1911 I was encamped at Sylvan Beach, on the shores of Galveston Bay, about twenty-eight miles east of Houston. On the 11th, while crossing the picnic grounds, I was extremely surprised to observe one of these birds. I followed it to where it lit on a sweet-gum tree near the pavilion, noting that there was a hole in the stub of a branch broken off close to the trunk, about twenty-five feet from the ground.

The next day, June 12, I returned, climbed to the cavity, and removed a section from the front. The cavity was only ten inches deep, but was quite roomy, and contained seven slightly incubated eggs, nest stained and laid on a few chips from the rotten limb in which the nest was situated.

The set yielded the following measurements: $1.20 \times .88$; $1.19 \times .87$; $1.18 \times .86$; $1.18 \times .83$; $1.15 \times .86$; $1.14 \times .80$; and $1.12 \times .85$.

Chordeiles virginianus chapmani. FLORIDA NIGHTHAWK.—Though this species is a common summer resident on all the open prairies, and evidently breeds commonly, I have but once found its egg. On June 4, 1913, about a hundred and fifty yards east of the flag-station at Pierce Junction, I flushed a Nighthawk from a single egg on a bare, hard-baked spot on the open prairie, several miles from the nearest timber. Returning a few days later I found that the egg had disappeared.

Myiarchus crinitus. CRESTED FLYCATCHER.—A not uncommon summer resident in the vicinity of Houston. In May, 1911, a pair of these birds occupied the joint and elbow of a stove-pipe hanging loosely by wires against the side of a small house on the edge of the Buffalo Bayou woods about six miles west of Houston. On the 20th I took a stepladder and

climbed up to investigate, causing the birds to desert the nest. Later the pipe was taken down and cleaned out, and the nest found to contain three eggs. The nest itself was a mass of rubbish of all sorts: cedar bark, twigs, grasses, feathers, pine needles, and dead leaves, and was lined with horse hair, feathers and cast off snake skin.

I found another nest of the bird on June 6, 1914, which contained five eggs. An old lard bucket lying on its side in a tiny trough in a well shaded sheep-pen on Taylor's ranch had been half filled with rubbish of various sorts: grasses, cedar bark, snake skin, straws, chicken and guinea feathers, etc., and the eggs had been laid in a hollow in the material near the back of the bucket. To me this nest was especially interesting from the fact that Taylor's ranch is on the open prairie about a mile south of Pierce Junction, and at least four miles from the nearest timber. Quite a number of shade trees surround the house and sheep-pens, but I never would have expected this Flycatcher at such a place.

The five eggs measured: $.98 \times .67$; $.94 \times .67$; $.91 \times .68$; $.90 \times .67$; and $.89 \times .68$.

Cyanocitta cristata florincola. FLORIDA BLUE JAY.— Though this bird is a common resident, I have found but two nests, one of which was accidentally destroyed before the eggs were laid.

The other was discovered May 6, 1911, by watching the birds carry mud to be used in its construction. I did not climb to the nest until May 14, thinking the birds were still building the nest, and hence was surprised to find that it contained three eggs very heavily incubated.

The nest was forty-eight feet from the ground, on a three-inch limb about six feet from the trunk of the pine tree in which it was situated, and was composed of twigs and a little Spanish moss, plastered together with wet clayey mud, and lined with rootlets. The birds were quite shy and quiet, in sharp contrast to their conduct at other times of the year. This nest was about a hundred yards north of the house where my first Crested Flycatcher's nest was found.

These three eggs measured: $1.07 \times .81$; $1.05 \times .79$; and $1.04 \times .81$.

Sturnella magna argutula. SOUTHERN MEADOWLARK.— During the breeding season these birds are quite common on the prairies, but their nests are very difficult to discover and it was not until the season of 1914 that I was able to locate even one.

It was on May 30, 1914, that my first nest was discovered. I was walking slowly across the grassy prairies about a mile north of Pierce Junction, when the bird flushed from almost under my feet leaving its arched or domed nest and four heavily incubated eggs for my inspection. The nest was cunningly concealed in a small clump of grass on a slight knoll, and was thus several inches above the surrounding surface, which was under water from the recent heavy rains. The nest inside measured four inches from side to side, four inches from front to back, three and a half inches from top to bottom, and the entrance was four and a half inches across. The specks on the eggs were all grouped at the extremity of the larger end.

June 6, 1914, I was shown a nest in a small pasture back of Taylor's ranch house, a mile south of Pierce Junction. It was exactly similar to the one above described, but faced the west where the first faced the north. It was in a small tussock of grass on the closely cropped surface, and contained three young fully fledged.

On June 11, I flushed a female from another domed nest on the prairie, a half mile north of Pierce Junction. The nest was well concealed under a tussock of grass, slightly sunk in the ground, well lined with dry grasses, and contained four fresh eggs.

Set No. 1 measured: $1.20 \times .82$; $1.10 \times .80$; $1.04 \times .81$; and $1.03 \times .78$; while the eggs from nest No. 3 yielded the following: $1.11 \times .79$; $1.10 \times .79$; $1.09 \times .77$; and $1.06 \times .76$.

Passerherbulus maritimus sennetti. TEXAS SEASIDE SPARROW.—Not an uncommon resident in the salt marshes near the bay, but I have only once recorded the bird in the vicinity of Houston.

June 1, 1910, found Messrs. Howard G. Hill, E. G. Ainslie and myself walking southward from Houston across the open coastal prairie. A half mile north of Pierce Junction we stopped at a small marsh to check off a few of the more common species on our list, and in tramping through the rushes and tall grass I flushed one of these Sparrows from a nest on the moist ground in a clump of the thick grass. The nest was composed of coarse dry grasses, lined with finer, and contained three well fledged young. The nest was not a domed structure, but was more on the order of the nests of the Florida Red-wing (*Agelaius phœniceus floridanus*) which surrounded it, for some of the nesting material was entwined about the stalks of the grass. Inside, the nest measured two and a fourth inches in diameter by one and a half deep. Both parents were present, and though nervous were not at all shy, for they often approached within three or four feet of us, perching for a moment on one reed and then on another.

Peuceæ æstivalis bachmani. BACHMAN'S SPARROW.—On April 25, 1914, Mr. George B. Ewing (my companion on some hundred-odd field trips) came to me with the information that he had that morning found a nest the like of which he had never seen. In company with a party of surveyors in the woods about nine miles east of Houston and two miles north of Buffalo Bayou, he was tracing a line through the timber when he discovered the nest with three eggs under a small brushy sage-bush in a clearing.

We visited the locality, and though several of the birds were observed, the first nest was the only one found. The nest was *not* arched or roofed over, as I had read in the manuals, but more perfectly fitted the description of the nest of the Pine-woods Sparrow. It was perfectly round, with the rim everywhere of equal height, and was set down on the ground amongst the short grass and stubble. It was a well-constructed nest, composed entirely of dry grasses, and was lined with fine grass tops and a few long horse hairs. As it lost its shape on being carried back to the city in Ewing's knapsack during the afternoon, I was not able to take its measurements.

Although the day was misty and rainy the nest and eggs were quite dry in the shelter of the bush, so that an arched nest would not have helped matters to any considerable extent.

After being emptied of their contents, the eggs lost their faint pinkish tinge and became a dead white; the shell was smooth of texture and had very little gloss. They measured: $.78 \times .61$; $.75 \times .61$; and $.73 \times .62$.

Cardinalis cardinalis cardinalis. CARDINAL.¹—Common resident, but though I have found numerous nests in the thickets and moss-covered trees along the bayous after the nesting season is over, my occupied nests have been few.

May 29, 1910, I found my first nest. It was placed in a blackberry thicket on a farm about four miles west of the city, and contained two eggs. April 29, 1911, nest No. 2 was found in the open woods on Buffalo Bayou about eight miles west of the city. It was placed on the horizontal limb of an oak sapling, twelve feet from the ground, and was composed of twigs, corn husks and gray Spanish moss; inside, it measured one and three-quarter inches deep and three inches in diameter. It contained four slightly incubated eggs.

Nest No. 3 was discovered in a patch of cut-over woods on the north side of the bayou about nine miles west of the city; it was placed in a post-oak sapling five feet from the ground, and was composed of moss, plant fibre, corn husks, and pieces of newspaper. The lining was of smaller strips of corn husks and plant fibre. The three eggs which the nest contained were advanced in incubation. Date, May 6, 1911.

Nest No. 4 was six feet from the ground in a small oak sapling in a clearing of the Buffalo Bayou woods about six miles west of Houston, and on April 20, 1912, contained three eggs. It was composed of Spanish moss, pieces of broom weed, and dead leaves, and was lined with dry grasses. Nest No. 5 turned up on May 11, 1912, and contained three eggs. It was in a pear orchard on the farm where nest No. 1 was found, and was placed six feet from the ground on the tip of a limb. It was composed of Spanish moss, and lined with firmly-woven strips of corn husks about a quarter of an inch wide.

Nest No. 6 was an unusually small, neat structure, and when found on July 21, 1912, contained four newly hatched young. It was in a small oak on the edge of the orchard where No. 5 was found, and I feel sure belonged to the same pair of birds. The nest was composed of the usual corn husks and grasses, but contained no moss; it was firmly woven, and placed in a fork twelve feet from the ground; inside, it measured two and a half inches across by one and three-quarter inches deep.

Probably the most interesting nest of the lot was No. 7. I did not discover it until August 17 (1912), evidently some time after it had been

¹ These birds belong in all probability to the form which Bangs has described as *C. c. magnirostris* from Louisiana, cf. Proc. N. E. Zool. Club, IV, p. 5. March, 1903.

deserted. It was placed four feet up in a small peach tree in the orchard where the last two nests were found, and appeared to be an unusually high nest. It contained fragments of two Cardinal eggs and one egg of the Dwarf Cowbird. The nest was collected for the reason that the outer layer was composed of at least a half dozen cast-off snake skins, and on pulling it apart to determine the exact amount of that material used I was extremely surprised to find that it was a two-story structure. The lower floor contained two Dwarf Cowbird eggs imbedded in the nesting material.

The last nest, No. 8, was found on April 21, 1914, in a small thicket on Taylor's ranch, one mile south of Pierce Junction. It was placed two and a half feet up in a small Mexican mulberry, and contained three eggs, which were destroyed several days later by heavy rains.

One of the deserted nests which I found was placed thirty feet from the ground in the open woods on Buffalo Bayou, in easy view.

The eggs cannot with certainty be distinguished from those of the other subspecies of Cardinals, though some of the eggs are quite different. Set No. 1 measured: $.90 \times .72$ and $.88 \times .71$. Set No. 2 measured: $.86 \times .63$; $.82 \times .65$; $.82 \times .65$; and $.77 \times .61$. Sets 3, 4 and 5 in their respective order, yielded the following: $1.13 \times .72$; $1.04 \times .71$; $.98 \times .73$; $.93 \times .71$; $.90 \times .70$; $.89 \times .71$; $1.01 \times .78$; $.99 \times .75$; and $.98 \times .76$.

Guiraca cærulea cærulea. BLUE GROSBEAK.—This bird is a very rare summer resident in the vicinity of Houston, and I have found but one nest. On May 17, 1913, it was found in a small marshy place of an orchard on an old farm about four and a half miles west of the city. The male and female were both present, but were not at all noisy and showed no alarm. The nest was three and a half feet up in a small bush in a damp thicket, and was composed of grasses, corn husks and a few withered leaves. It was lined with fine brown rootlets and a few horse hairs; on the outside it was four and three-quarter inches in diameter; inside, two and a half inches in diameter by two inches deep.

The four eggs which the nest contained measured: $.87 \times .63$; $.86 \times .63$; $.85 \times .62$; and $.82 \times .62$.

Passerina ciris. PAINTED BUNTING.—Rare summer resident; only one nest was found, and that on May 17, 1913, in a small bush in the thicket where I found the nest of the Blue Grosbeak, and not over fifty feet from that nest. The female flushed, and revealed four of its eggs and one egg of the Dwarf Cowbird. It was three and a half feet up in a small crotch, well hidden, and composed of weeds, grasses, strips of bark, leaves, and a few small twigs of grape-vine; the lining was of fine dry grasses. It was indeed a neat and compact little nest.

The four Bunting eggs measured: $.80 \times .58$; $.79 \times .56$; $.78 \times .58$; and $.77 \times .56$; and the egg of the Dwarf Cowbird: $.75 \times .59$.

Spiza americana. DICKCISSEL.—Common summer resident on the prairies, and though I have several times found fragments of their egg shells I have found but one nest. On May 21, 1911, in the small marsh a half mile north of Pierce Junction, it was discovered, almost on the ground

in a small bush and well hidden. It was a compact structure, composed of grasses, weed stems, fragments of the dry marsh grass, and a few dead leaves, and was lined with finer dry grasses.

The four eggs which it contained measured: $.88 \times .64$; $.84 \times .66$; $.83 \times .65$; and $.80 \times .61$. The first specimen is quite pointed at the smaller end, while the last three are quite equally rounded at either end.

Piranga rubra rubra. SUMMER Tanager.— Though a fairly common summer resident in the vicinity of Houston, particularly in deciduous woods, I have been able to locate but one of its nests. On July 6, 1912, I discovered the domicile of this bird, about twenty feet from the ground in an oak tree in a patch of oak woods on Buffalo Bayou about five and a half miles west of Houston. It was built in the smaller branches of the tree, near the extremity of the limb, and it was only by climbing above it that I was able to examine the contents, three young nearly ready to leave the nest. The nest itself appeared to be a very carelessly built structure, composed of a few grass stems, bark strips, pieces of dry leaves and weeds, and was lined with fine grass stems and a few catkins. Both parents were present, and very nervous; the female remained quiet while the male continually uttered its call of *pit-tuck, tuck*.

Geothlypis trichas trichas. MARYLAND YELLOW-THROAT.— Only one nest of this fairly common summer resident was found. On June 1, 1911, in a two-acre marsh a half mile north of Pierce Junction, I came on one of these birds which acted as if it had a nest nearby, so I lay down to watch. The bird, a male, was quite nervous, and it was some time before he would approach the nest; finally, after I had lost him for a moment, he appeared with an insect in his bill and flew to a tall clump of rushes about a hundred feet away. I was soon at the place, parting the stems, and it was but a moment until I located the nest. As I parted the rushes surrounding the nest, the three fully fledged young which it contained hopped from it and scattered in the surrounding grassy jungles, where I had some difficulty in catching them. The nest itself was wedged in between the stalks of the rushes about three inches above the slush of the marsh, and was composed of very coarse dry grasses and lined with the finer dry grass tops. Inside it measured one and forty-five hundredths inches in diameter and an inch and a half deep.

Icteria virens virens. YELLOW-BREADED CHAT.— Very rare, and I have found but one nest. On May 8, 1910, a nest containing four eggs was found in low underbrush by the orchard of the farm where the nests of the Blue Grosbeak and Painted Bunting were found, and not over thirty feet from either of those nests. It was three feet up in a small thicket in a damp spot, and was composed of dry grasses, strips of bark, a few weeds and leaves, laid in layers. It was lined with finer grasses and a few rootlets; inside, it measured two and a half inches across by two and a quarter inches deep.

The four eggs measured: $.92 \times .69$; $.92 \times .68$; $.91 \times .70$; and $.87 \times .67$.

Bæolophus bicolor. TUFTED TITMOUSE.—On May 20, 1911, I located my first nest of this common resident. It was in an old Woodpecker hole thirty feet up in a tottering pine stump in a clearing in the Buffalo Bayou woods about nine miles west of the city. I could not examine it, for it was impossible to make my climbers hold in the soft wood, but I felt sure it contained young as one of the parents carried an insect in its bill.

On March 22, 1913, while wandering through the woodlands along the bayou about four and a half miles west of Houston, I found a cavity containing five eggs. The dead oak stood in open woods not a hundred yards from the line dividing the prairie and the timber lands. The nest was in a natural cavity, between the bark and wood of the stub of a five inch limb, about ten feet from the ground. It was a mass of rubbish of all sorts: pieces of dead elm leaves, horse hair, cast-off snake skin, small chips of the oak bark, cow hair, pieces of dead grass, small green lichens, weeds and plant fibres, and was back in the body of the tree eleven inches from the entrance. So closely did the bird sit that I was forced to pull her out by the tail. She was sitting with her head towards the heart of the tree, in a space scarcely large enough for her body.

The five eggs measured: $.73 \times .56$; $.72 \times .56$; $.72 \times .55$; $.71 \times .56$; and $.70 \times .56$.

Hylocichla mustelina. WOOD THRUSH.—Very rare during the summer months in deciduous woods, and breeds.

On April 29, 1911, I discovered a nest in easy view on a bare limb of a small oak sapling in open oak woodlands on Buffalo Bayou about six miles west of the city. It was twelve feet from the ground and set firmly on a horizontal fork three feet from the trunk, and was composed of grasses, weed stems, inner fibre of Spanish moss, and fine rootlets; it contained large quantities of mud, and was shaped into a very neat bowl, the bottom almost flat and the sides perpendicular. No mud showed outside, though the sides of the nest were very thin, but the inside was as smooth as a piece of pottery, none of the nesting material showing through the wall of mud. Into this neat bowl had been placed a lining of fine rootlets and grass stems. The nest measured two and three-quarter inches in depth externally, two inches deep inside, four and three-quarter inches in diameter externally, and three and a quarter inches in diameter inside.

The nest contained one of the Wood Thrush's blue eggs and one egg of the Dwarf Cowbird. On May 6, I returned and found both eggs in fragments on the ground beneath the nest. On both trips the birds were present; the nest was deserted with the destruction of the eggs.

THE BIRD LIFE OF TRINIDAD ISLET.

BY ROBERT CUSHMAN MURPHY.

Plates XXVIII-XXV.

EAST of the coast of Espirito Santo some seven hundred miles lies a fairy island. Alone in the tropical ocean, piled up in peaks as fantastic as tossing waves, and overhung with pennons of torn clouds which seem to flutter from the summits, Trinidad has exercised a strange charm upon the imaginations of all who have but seen its silhouette on the borderline of sky and sea. During four centuries it has been a landmark in the trade routes of the South Atlantic, often sought by sailing vessels as a check upon their nautical reckonings. Before the days of steamers it was a veritable signpost at a crossroads of the sea, yet few indeed are the travelers who have set foot upon its crumbling shore. Pirates in the old times, whalers, treasure-seeking adventurers, ill-fated colonists, in their turn have come to Trinidad and gone; the island seems unflinching to forbid the encroachment of permanent habitation. None who have felt its presence can speak or think of it unstirred; even the prosaic pages of the 'South Atlantic Pilot' become alluring at the account of Trinidad, and the Director of the British Antarctic Expedition of 1901, though he surveyed the islet with the critical eye of science, was deeply impressed by "the dream-like appearance of this remarkable cluster of volcanic peaks in the early tropical dawn."

Trinidad was discovered early in the sixteenth century by the Portuguese admiral, Tristan da Cunha; consequently it appears on most old maps of the western hemisphere. Captain Edmund Halley, afterwards Astronomer Royal to George the First of England, and of popular fame through his comet, visited the island in April, 1700, while conducting a voyage for the study of magnetic variation. Halley landed on April 15 in search of water, which he soon found. On the seventeenth he moored his vessel, the *Paramore Pink*, off the western end, with "the high steep Rock like a Ninepin E. S. E. Whilst the Longboat brought more water on



board," he writes, "I went ashore and put some Goats and Hogs on the Island for Breed, as also a pair of Guiney Hens I carried from St. Helena. And I took possession of the Island in his Majesty's name, as knowing it to be granted by the King's Letters Patents, leaving the Union Flag flying.

"The Water of the Island being very fine and good I empty'd my Cisterns of their brackish St. Helena Water," continues the astronomer's account. "The Watering place we used was a little to the southward of the high Steep Roek, where the water run all the time we were there with a plentiful stream, but the Shoar being very rocky much endammaged our Cask."

Halley's goats and hogs were destined to have an overwhelming effect upon Trinidad, a subject to which I shall return below. The astronomer's claim to the island did not prevent a subsequent Portuguese attempt at colonization. In 1781 the English likewise tried to found a settlement, an enterprise terminated within three months, presumably by shortage of water. The ownership remained in doubt until 1895, when a dispute between Great Britain and Brazil regarding the possession of Trinidad as a possible coaling station, was decided by an international court in favor of Brazil, on the merits of original discovery by the Portuguese.

Narratives of brief calls at Trinidad may be found among many worm-eaten volumes of old voyages. For information regarding pirates and buried gold Mr. Knight's 'Cruise of the *Alerte*' should be consulted. The indomitable British sea-fighter and novelist, Captain Marryat, once crossed the island's mysterious mountains, and afterwards incorporated his experiences in his first novel, 'Frank Mildmay.' Whalers, which differ from merchantmen in that they are never in a hurry, still stop at Trinidad and lie off-shore while their crews lower boats and spend the day fishing in the prolific coast waters. Among other visitors have been naturalists of passing scientific expeditions, whenever they may have found the sea sufficiently quiet to permit landing.

Trinidad lies in latitude $20^{\circ} 30' S.$, longitude $29^{\circ} 22' W.$, at the edge of the southeast trade-winds. Its width is hardly more than a mile and a quarter, a distance great enough, however, to require at least one day's laborious and perilous journeying over the single practicable mountain route. According to Prior, *l. c.*, rock

samples from Trinidad, "as well as many of the geological features of the island, such as the remarkable peaks of phonolite associated with basaltic lavas, suggest analogies between Trinidad and the Island of Fernando Noronha, off the coast of Brazil, a thousand miles to the north, so that it appears possible that the two islands owe their origin to a very similar, if not contemporaneous, volcanic outbreak." Over all the island the brittle, standing rock has assumed grotesque forms through extreme weathering. In the words of Mr. Knight, Trinidad "is rotten throughout, its substance has been disintegrated by volcanic fires and by the action of water, so that it is everywhere tumbling to pieces." Tremendous physiographic changes are brought about by the collapsing of outworn mountain sides. One of these changes is vividly described by Knight in the 'Cruise of the *Alerte*.' The author, with a companion, was vainly searching for a ravine through which he had descended to the northeastern coast of Trinidad nine years before. Eventually he found the way, which, however, was no longer a ravine. "The mountain on which we stood," he writes, "had fallen away, leaving a precipitous step some fifty or sixty feet in height, and from this step there sloped down to a depth, I should say, of quite 1,500 feet a great landslip of broken rocks, the *débris* of the fallen mountain. This landslip appeared to have taken place not long since. It was composed of rocks of all sizes and shapes, almost coal black, piled one on the other at so steep an angle that it was extraordinary how the mass held together and did not topple over. It was indeed in places more like an artificial wall of rough stones on a gigantic scale than a landslip."

Rainfall is rather plentiful at Trinidad, but the porous soil sucks up much of the water of the springs before it can flow to the sea, and recurring drought is one of the chief objections to human colonization. Another serious handicap is the island's boisterous shore, for the waves render landing almost continuously impossible during the winter months of June, July, and August, as well as during a large proportion of the remainder of the year. Southwest winds raise the heaviest seas, but the effects of far away *pamperos* are frequently manifested by huge breakers even when the weather is locally serene. During northerly winds there is a good lee, and relatively quiet water, along the southwestern coast. The wind-

ward beach of Trinidad is perpetually strewn with wreckage, for many a fine square-rigger, since the days of treasure-ships and slave-traders, has been lost among the outlying reefs. During favorable weather vessels may obtain drinking water at two places, on opposite sides of the island — the Cascade, and the river by the old Portuguese settlement. Explicit directions for watering are given by Captain Amasa Delano.

Probably the first naturalist to set foot upon Trinidad was the veteran botanist, Sir Joseph Hooker, in 1839, during the voyage of the *Erebus* and *Terror*. The vegetation, like most insular floras, comprises rather few species. Moreover, according to Hemsley, the flora is of recent origin as compared with that of St. Helena. Less than twenty species of vascular plants are known, of which several are ferns. The tree-fern, so conspicuous on the plateaus and higher slopes, is an endemic species, *Cyathea Copelandi*. The lower limit of its zone of growth was determined by the naturalists of the *Discovery* to be at an altitude of about eleven hundred feet. There are a few sparse grasses and sedges, a widespread, tropical, tangling bean (*Canavalia*), a sage, and several mosses and lichens including a tree-infesting *Usnea*. But the most striking element in the vegetation of Trinidad is its great groves of dead trees of the genus *Casalpinia*. Records of the old mariners say that the island was once heavily forested, even to the pinnacles of the Sugarloaf Mountain and the Ninepin. All its trees, however, have long since been dead, the last mention of living forests harking back to the eighteenth century. Captain Marryat, whose picturesque and truthful account of Trinidad appeared in his first work of fiction in 1829, relates the following observations regarding a valley among the island's hills:

“Here a wonderful and most melancholy phenomenon arrested our attention. Thousands and thousands of trees covered the valley, each of them about thirty feet high; but every tree was dead, and extended its leafless boughs to another — a forest of desolation, as if nature had at some particular moment ceased to vegetate! There was no underwood or grass. On the lowest of the dead boughs, the gannets, and other sea-birds, had built their nests in numbers uncountable. Their tameness, as Cowper says, ‘was shocking to me.’ So unaccustomed did they seem to man

that the mothers, brooding over their young, only opened their beaks in a menacing attitude at us, as we passed by them.

“How to account satisfactorily for the simultaneous destruction of this vast forest of trees was very difficult: there was no want of rich earth for nourishment of the roots. The most probable cause appeared to me, a sudden and continued eruption of sulphuric effluvia from the volcano; or else, by some unusually heavy gale of wind or hurricane, the trees had been drenched with salt water to their roots.”

The wood of these gnarled trees is hard and imperishable, so that a similar condition obtains today, excepting that most of the trunks have fallen to earth. Knight's account is not unlike that of Captain Marryat; his conclusion also is the same:

“The mountain slopes were thickly covered with dead wood — wood, too, that had evidently long since been dead; some of these leafless trunks were prostrate, some still stood up as they had grown. . . . When we afterwards discovered that over the whole of this extensive island, from the beach up to the summit of the highest mountain — at the bottom and on the slopes of every now barren ravine, on whose loose-rolling stones no vegetation could possibly take root — these dead trees were strewn as closely as it is possible for trees to grow; and when we further perceived that they all seemed to have died at one and the same time, as if plague-struck, and that no single live specimen, young or old, was to be found anywhere — our amazement was increased.

“ . . . Looking at the rotten, broken-up condition of the rock, and the nature of the soil, where there is a soil — a loose powder, not consolidated like earth, but having the appearance of fallen volcanic ash — I could not help imagining that some great eruption had brought about all this desolation; . . . I think this theory a more probable one than that of a long drought, a not very likely contingency in this rather rainy region.”

Admitting a general impoverishment of vegetation, Copeland has suggested a still more probable agency than recent volcanic action. He asks whether the goats, introduced by Halley in 1700, may not have destroyed the trees of Trinidad, as happened, according to Darwin, to the trees of St. Helena. It has been pointed out that such a theory would involve both a change of climate and

the extermination of the goats themselves, a theory in harmony with the facts, for water is undoubtedly scarcer at Trinidad than a hundred years ago, while the last record of the goats is that of Sir James Clark Ross, who saw one in 1839. A third of a century earlier, in 1803, Captain Delano saw "plenty of goats and hogs," and "some cats" (the only record).

Other mammals of the island are mice, possibly introduced. Excepting birds, the remaining vertebrates are sea turtles, which lay their eggs in the warm sand of the beaches, and sea snakes,¹ reported by Knight as inhabiting the tidal pools. Crabs (*Gecarcinus lagostomus*) are by far the most abundant terrestrial animals, swarming over the whole island, their burrows everywhere undermining the soil. These saffron-colored crustaceans made a profound impression upon the imagination of Mr. Knight, who soon found that he could not lie down to sleep without being attacked by hordes of the creatures, which, he writes, "might well be the restless spirits of the pirates themselves, for they are indeed more ugly and evil, and generally more diabolical-looking than the bloodiest pirate who ever lived." At night the only resource, he states, was to rise and slaughter a large number of the crabs, when the others would devour "their dead brethren, making a merry crackling noise all round as they pulled the joints asunder and opened the shells." The common tropical rock crab, *Grapsus maculatus*, is found along the coastline of the island. Other living creatures collected or mentioned by various visitors are earth-worms, flies, roaches, ants, earwigs, moths, dragon-flies, and five species of spiders.

About sunset of April 7, 1913, I sighted Trinidad, forty miles to the northward, from the masthead of the whaler *Daisy*. Early next morning the gray pile lay right in our path, with the rocks of Martin Vas barely visible in the east. The order for lowering the boats was given; we left the *Daisy* in the offing, and pulled ahead, fired with enthusiasm, toward the white-lined coast. Three Man-o'-war Birds were winding in and out between the topgallant

¹ Perhaps, however, Knight's "sea snakes" are morays. Copeland, *l. c.*, p. 276, records the capture, "in den Wassertümpeln des Riffs," of "einen seltsam gefleckten Aal, weiss und schwarz." The description fits the Atlantic spotted moray (*Gymnothorax*).

masts of the brig. An inquisitive Booby flew between two of the oarsmen in our whaleboat, and the Noddies (*Anous*) were scarcely less familiar. The White Terns (*Gygis*), and the several kinds of native petrels, were also very numerous, but they kept their distance, through indifference rather than fear. During the row toward shore the thunder of surf rang louder and louder in our ears, the sound rebounding from many rocky walls. The air was perfectly calm, but a southeasterly ground swell heaped up a tremendous surge of waters on the ironbound coast, which was formed either of the precipitous cliffs themselves, or of beaches about a yard wide completely strewn with sharp blocks of the mountain. The line of breaking water was, nevertheless, so narrow that at some places we could safely come within twenty feet of shore.

We approached the island at the Ness (*cf.* map), a peninsula of somewhat columnar rock which suggests a bit of the Giants' Causeway. From here we skirted the western end, ultimately rounding North Point, but nowhere finding a landing place. Whenever the whaleboat's prow was pushed close to the rock in a sheltered angle, the whole craft rose and fell in such a dizzy and appalling manner that several of our seasoned whalers became seasick.

From the brig and the whaleboat I was able to enjoy a good view of the island's skyline and general topography through its length of four or five miles. At the southeastern end is a ridge-roofed promontory of brick-red volcanic tufa, terminating in the cliff of South Point, which is pierced by an archway. Knight has aptly styled this headland "Noah's Ark." According to the 'South Atlantic Pilot,' the surf sometimes breaks two hundred feet above its base. Overtowering Noah's Ark is the Sugarloaf (1160 ft.), which greatly resembles the conical mount of the same name at Rio Janeiro. The rock is gray phonolite, so worn and grottoed by pluvial action that its texture is like the cut surface of a Swiss cheese. Under this mount, says tradition, "there was an immense treasure buried, consisting principally of gold and silver plate and ornaments, the plunder of Peruvian churches which certain pirates had concealed there in the year 1821." Northwest of the Sugarloaf lies a green valley, with several clumps of shrubs. The mate of the *Daisy* told me that there is a cluster of stone-

marked graves on the northern side of the valley. The highest point of Trinidad, 2020 feet on the Admiralty chart but 3000 according to the 'South Atlantic Pilot,' is near the center of the island. The summits of the ridges are more than serrate, being a succession of needle-like pinnacles. At the western end of the island stands one of the most remarkable rock structures in the world, the Ninepin of Halley, known also as the Monument, and the Priest, a cylindrical tower of dark gray stone, doubtless a phonolitic dike, rising from the ocean to a height of nearly nine hundred feet. In common with all the bare steeps of this isle, the surface of the Ninepin is pitted and undercut into designs like arabesques. In outline and proportion the great column may be compared with the two distal phalanges of a man's index finger. Leaning slightly less than the Tower of Pisa, planned on the grandest scale of Nature's architecture, its utterly inaccessible wall furnishes nesting chambers for tens of thousands of feathered sprites, which sit within their niches like saints about a cathedral spire. No sight had ever seemed so impressive as I gazed from the small boat straight upward to the Ninepin's lofty summit, enveloped in a cloud of midge-like birds.

Since landing was out of the question, we began fishing with considerable success off the West Point, just outside the line of breaking sea. The bottom was very rocky, varying in depth from three to seven fathoms. Many of the captured bottom fishes were brilliantly colored. The largest species, excepting sharks, was a red-spotted garupa (*Epinephalus?*), in several instances over four feet long and weighing fifty or sixty pounds. Several kinds of trigger-fish (Balistidæ) proved abundant. Here, as at Fernando Noronha, we lost many of our prizes because of sharks, the lines often coming inboard with nothing but fishes' heads on the hooks. Even one of our largest garupas was nipped in half. We succeeded in hooking and harpooning a number of cat sharks (*Ginglymostoma*), the ugly mouths of which harbored curious, extensible leeches. Larger sharks were about the brig all day, and a Booby which was shot and wounded so that it fell into the water, first had its legs bitten off, and was then devoured as one morsel. At the surface of the sea near shore were schools of needle-gars (*Hemirhamphus*). The mandible of this small fish is long, resembling the beak of a

swordfish, but the upper jaw is very short. They have an especially curious appearance when they open their mouths widely to feed, the seemingly useless bill merely passing beneath a bit of food. Our sailors threw scraps of fat into the water alongside the whaleboat, and captured many of the needle-gars with their hands. Altogether we caught approximately two hundred fishes, representing nine species, of which two have proved new to science. Seventeen species are known from Trinidad, but the whole number of native fishes is doubtless far greater, and the abundance of individuals almost beyond exaggeration.

While we were fishing, a number of flat, triangular flies, *Pseudofersia spinifera*, a species which lives as a parasite among the feathers of the Man-o'-war Bird, flew into the boat. They scuttled sidewise like crabs, adroitly dodging capture, and seemed bent on getting on the *under* side of whatever they alighted upon, whether a gunstock, one's hand, or a thwart of the boat. These flies were the only insects we saw.

Birds were about in countless hosts, filling the air and covering the rocks. The Noddies (*Anous stolidus*) were incredibly confident and curious, hovering round our heads, even alighting upon them, and peering into our faces so closely that one had to look at them cross-eyed. It was the simplest matter to catch them in the hand as they fluttered among us. Four of them I banded with aluminum rings of the American Bird Banding Association — numbers 7941, 7943, 7945, 7947; may their wearers once again entrust themselves within the clutches of a naturalist! But the Noddies were not one whit more abundant than the exquisite Love Birds (*Gygis*). At Trinidad there are perhaps more of these terns than anywhere else in the world. They were flying mostly in pairs, and pairs also were sitting together in many rocky niches. Most delicate and wraith like of birds are these White Terns; when they fly against the glare transmitted from a bright sky, the dark line of their wing bones is projected like an x-ray shadow through the milk-white feathers.

Boobies soared among the pinnacles a thousand feet above us. Man-o'-war Birds, flying overhead, seemed all head, wings, and tail. There are two species at Trinidad, and both were more interested in the brig offshore than in our tiny whaleboats. The

Man-o'-war Birds are notorious pirates in their feeding habits, but I saw a troop of the smaller species (*Fregata ariel*) fishing for themselves. Half a dozen of them hovered in a row over a school of small surface fish, and faced in a direction opposite to that in which the fish were moving. While the birds poised close over the water they beat their big wings slowly. Then at the right moment they struck downward, swinging their long bills like scimitars back under their bodies, the hooked tip seizing a fish from the rear. They seemed to catch three or four a minute, and yet made no commotion among the moving school of their victims. One Man-o'-war Bird was caught on a fishhook from the *Daisy*.

Trinidad's endemic petrels, of the genus *Æstrelata*, were as numberless as the Noddies. Arminjon's Petrel, which was nidificating or perhaps only resting, in water-worn cells of the rock, made up the bulk of these birds. They frequently quarreled with one another in air, chattering not unlike terns. They were perfectly fearless, but disinterested. Specimens shot had not long since bred, for the abdomens were bare. The black species, *Æ. trinitatis*, seemed somewhat less common. During the forenoon I had shot one of the latter with the right barrel of my gun, in the vicinity of two small rocks near the Ninepin, when a very white petrel flew swiftly toward us from the sea. Intuitively, in that momentary glimpse, I recognized a bird with which I was not familiar. A fortunate, long shot, straight up from the shoulder, brought it hurtling to the water, and we reached it sooner than the sharks. It proved to be a species new to science, more beautiful than all its congeners, clad in a black-flecked cloak like ermine. I have named it *Æstrelata chionophara*, the Snowy-mantled Petrel.

All the birds that we saw were, of course, sea birds — none others have been found at Trinidad. But through the whole day, while our little boat skirted the seething edge of ocean, I gazed longingly at the tree-ferns far above, and could not help thinking that there may have been unknown land birds there, among the spires of the fascinating, unattainable mountains.

Annotated List of Birds.

1. **Numida (meleagris?)** Linné. Nothing further has ever been heard of Halley's "Guiney Hens" beyond the fact that he freed a pair on Trinidad in April, 1700. The same lack of history applies to a domestic cock and two hens brought from England by Sir James Clark Ross in 1839, and placed ashore "with a view to add somewhat to the stock of useful creatures."

2. **Puffinus gravis** (O'Reilly)? A large white-breasted shearwater, believed to have been of this species, was seen by Nicoll (Three Voyages, p. 61) within half a mile of shore at the islets of Martin Vas, twenty-six miles east of Trinidad, on January 5, 1906.

Puffinus gravis occurs as a rover all over the tropical and south temperate Atlantic. It has been collected by the writer, during the month of March, due south of Trinidad in latitude 39° S. It has been suggested that the species may breed on the island of Tristan da Cunha or one of its outliers.

3-5. **Æstrelata arminjoniana** Gigl. & Salvad. *Æstrelata arminjoniana*, Gigl. & Salvad., Ibis, 1869, p. 62. Giglioli, Distr. Fauna Vertebr. Oceano, 1870, p. 42. *Æstrelata mollis*, Saunders, Proc. Zool. Soc., 1880, p. 164. *Æstrelata arminjoniana*, Salvin in Rowley's Ornith. Misc., Vol. I, 1876, pp. 234, 252, pl. 31. Salvin, Cat. B. XXV, p. 413. Lowe, Bull. B. O. C., XIX, p. 98. Wilson, Ibis, 1904, p. 213. Sharpe, Ibis, 1904, p. 215. Nicoll, Bull. B. O. C., XVI, p. 102; Ibis, 1904, p. 41. Godman, Monogr. of Petrels, 1908, p. 229, pl. 65. *Æstrelata arminjoniana*, Nicoll, Ibis, 1906, p. 671. *Æstrelata wilsoni*, Sharpe, Ibis, 1904, p. 216. Nicoll, Ibis, 1906, p. 671; Bull. B. O. C., XVI, p. 103. *Æstrelata alba*, Brabourne & Chubb, Birds So. America, I, 1912, p. 31.

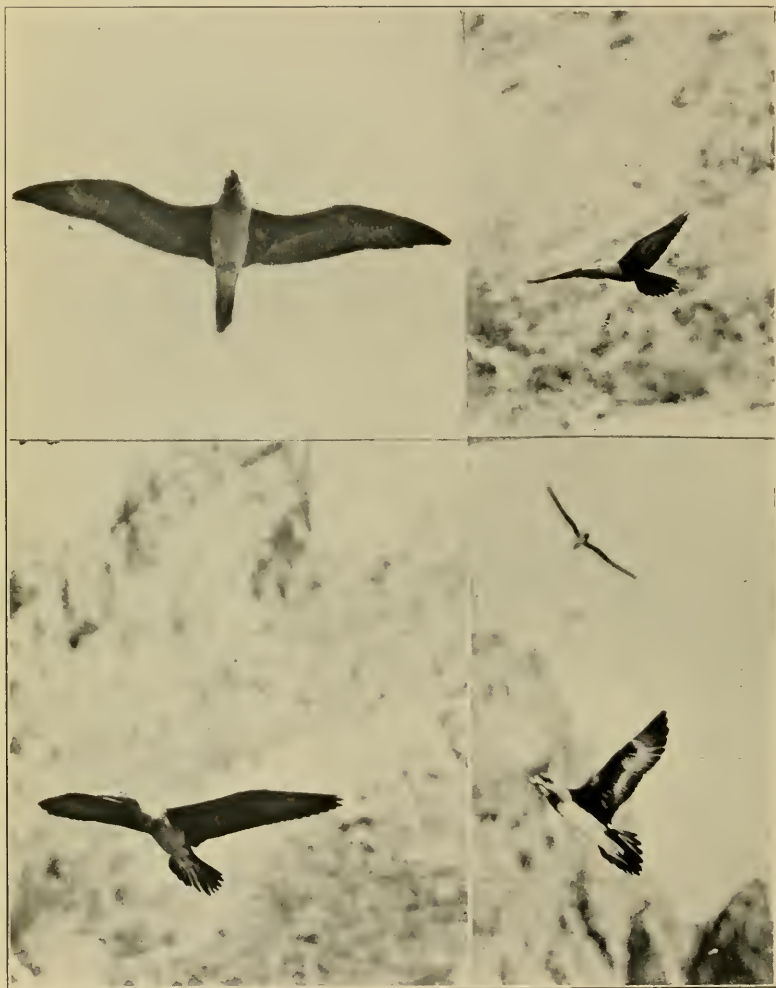
Æstrelata trinitatis Gigl. & Salvad. *Æstrelata trinitatis*, Gigl. & Salvad., Ibis, 1869, p. 65. *Pterodroma trinitatis*, Gigl. Distr. Fauna Vertebr. Oceano, 1870, p. 40. *Æstrelata trinitatis*, Salvin in Rowley's Ornith. Misc., I, 1876, p. 253, pl. 32; Cat. B. XXV, p. 413. Wilson, Ibis, 1904, p. 213. Sharpe, Ibis, 1904, p. 215. Nicoll, Bull. B. O. C., XVI, p. 103; Ibis, 1906, p. 671. Godman, Monogr. of Petrels, 1908, p. 232, pl. 66.

Æstrelata chionophara Murphy. *Æstrelata chionophara*, Murphy, Auk, XXXI, 1914, p. 12, pl. 2.

Nine specimens of petrels were collected at Trinidad, of which five are referable to the species *arminjoniana*, three to *trinitatis*, while the other has been made the type of a new species, *chionophara*. It is remarkable that no example of the gray-breasted phase of *arminjoniana*, the phase described by Dr. Sharpe as *Æstrelata wilsoni*, was either collected or observed during our day about the island.

These three species of closely related, endemic petrels, are the only Tubinarae known from Trinidad, since the record of *Æstrelata mollis* (Saunders, P. Z. S., l. c.) was based upon an incorrect identification.

Brabourne and Chubb, l. c., perhaps following a suggestion made in Rowley's Ornithological Miscellany, have synonymized *arminjoniana* with *Æstrelata alba* of Gmelin. In justification of this step the authors allege



ON LEFT; IMMATURE BOOBIES, PROBABLY *Sula piscator*.
ON RIGHT; UPPER, NODDY (*Anous stolidus*); LOWER, TRINIDAD PETREL
(*Estrelata arminjonianus*).

"Rio Plata" to be the type locality given by Gmelin, Syst. Nat. I, 1789, p. 565. In this citation an error has evidently been made, for Gmelin, nowhere mentioning Rio Plata, simply follows Latham, Synopsis, III, 1785, p. 400, where it is stated that the species "Inhabits *Turtle* and *Christmas Islands*." Pending further light on the subject, *Æ. alba* must therefore continue to stand as a doubtful synonym of *Æ. neglecta*.

We first saw *Æstrelata arminjoniana* on April 4, 1913, in latitude 25° S., longitude 30° 40' W., nearly four degrees south of Trinidad. This species became increasingly common on the fifth, sixth, and seventh of the month, as we approached its headquarters. *Æ. trinitatis* was seen only on April 8, in the immediate vicinity of the island, and neither bird was noted again, although I kept a sharp lookout for several days after we had proceeded on our northward journey.

The validity of the species *trinitatis* has long been questioned, Salvin (Cat. B. Brit. Mus.) and others considering it merely a dark form of *arminjoniana*. It has lately been noticed by both Wilson and Nicoll that *trinitatis* breeds at a higher altitude on Trinidad than *arminjoniana*, and this fact, together with the apparently constant color differences of plumage and feet, is the present warrant for granting specific distinction to the two birds. The evolution of several well-differentiated representatives of one circumscribed section of a genus, whether they be true species or merely color phases, is an interesting and rather common phenomenon in the genus *Æstrelata* (*viz. jamaicensis* and *neglecta*), and indeed among *Tubinares* in general. As regards the relationships of the petrels inhabiting the small oceanic island of Trinidad, it is not improbable that the parti-colored forms (*arminjoniana*, "*wilsoni*," *chionophara*) are of relatively recent origin, and that this small group of birds is still specifically unstable. Such a hypothesis can at least be made to fit the facts, although a final decision must be reserved until a large series of specimens, representing every stage of growth, can be studied. Assuming the uniformly colored *trinitatis* to be nearest the parental stem, I find that I can formulate the following progressive arrangement, partly on the basis of my own specimens, partly on published information:

- a. Downy young of all the species, so far as known, dark gray.
- b. *trinitatis*, immature. Bill black; tarsi and feet black; plumage uniformly blackish-brown; concealed portions of the feathers light gray with dark shafts.
- c. *trinitatis*, adult. The same, except that the concealed portions of the feathers are pure white, including the shafts.
- d. *arminjoniana*, immature (dark "*wilsoni*" phase). Bill black; "tarsi and basal half of the toes very dark brown" (Nicoll), distal half of toes black; dorsal plumage like that of *trinitatis*; breast dark gray.
- e. *arminjoniana*, older than the last but not fully mature — or possibly the mature bird in fresh plumage? (light "*wilsoni*" phase). Bill black; tarsi, and basal half of web and two inner toes, flesh color; distal half of foot black; breast more or less dark, sometimes showing only on the ex-

treme tips of the white feathers; a broad, mottled collar of gray crossing the throat and upper breast.

f. *arminjoniana*, fully mature. Similar to the last, but with a pure white throat, breast, and belly, the only dark on the under surface being on the collar, lower flanks, and crissum.

g. *chionophara*, adult. Bill flesh color, with a dark unguis; tarsi and feet flesh color; entire under surface, excepting lower flanks and tips of under tail-coverts, white; back white with dark feather shafts and rhomboid speckles.

In all my specimens of the three species, the dark plumage of the pileum, back, wings, and tail, is of exactly the same color, excepting that one example of *arminjoniana* is somewhat slaty on the back, owing to wear and disintegration of the feathers.

Among the five specimens of *arminjoniana* and the three of *trinitatis*, there is considerable individual variation in the depth of the bill; *chionophara* has a more slender bill than either of the others, although it is equally long. *Chionophara* has relatively the shortest tarsus and the longest foot.

Future study may yet demonstrate that *arminjoniana* and *trinitatis* are one species; possibly even *chionophara* may also be included, or may prove to be a freak. The last bird is of such striking distinction, however, that the only just course was to describe it and give it a name. Mr. Fuertes' drawing (Auk, XXXI, Pl. II) is a beautiful likeness. It also shows the bird in the correct resting position for an *Æstrelata*, and the background is quite suggestive of its habitat.

Measurements of the specimens are appended. The birds marked "breeding" had large brood-patches, and had evidently been incubating. The testes of the males, however, were non-active and partly pigmented, as might be expected in the month of April of Tubinares which breed in the southern hemisphere.

Measurements of Skins.

	Exposed culmen	Tarsus	Middle toe and claw	Wing	Tail
<i>Æ. arminjoniana</i>					
R. C. M. 1974 (in alcohol)					
1975 ♂ ad.	31	38	49.5	277	114
1977 ♂ breeding	30	37.5	48	290	113
1976 ♀ breeding	29	36	48	279	111
1978 ♀ breeding	29	37	47	268	109
Average of 4	30	37	48	279	112
<i>Æ. trinitatis</i>					
1979 ♀	30.5	35	48	276	111
1980 ♀	31	35.5	46	273	104
1981 ♀	28	34.5	45	272	108
Average of 3	30	35	46	274	108
<i>Æ. chionophara</i>					
1982 ♀ ad (type)	30	33	51	285	115



LEFT TO RIGHT: *AESTRELATA CHIONOPHARA* (1982), *A. ARMINJONIANA* (1975)
AND *A. TRINITATIS* (1979).

6. ***Sterna fuliginosa*** Gmelin. The Sooty Tern doubtless occurs at Trinidad, for Nicoll, 'Ibis,' 1906, p. 673, records it as inhabiting the rocks of Martin Vas.

7. ***Anous stolidus*** (Linné). *Anous stolidus*, Nicoll, Ibis, 1906, p. 670.

In spite of the enormous numbers of Noddies noted by our party at Trinidad, there seems to be no earlier specific record than that of Nicoll, who found these birds abundant, and breeding, on the occasion of his landing in January, 1906. None was collected during the visit of the *Discovery* in August, 1874, and Dr. Wilson, Naturalist of the *Discovery*, reports that on September 13, 1901, the "small, black, Tern-like bird . . . was by no means frequently seen and was not familiar or inquisitive; consequently no specimen was obtained." (Ibis, 1904, p. 210.)

From these data the conclusion may be drawn that this conspicuous species is common on the rocks and over the shore waters of Trinidad only during the season of southern summer. It is not unlikely that a migration to and from distant islands, or continental coasts, occurs during the months between May and December.

Unfortunately there is only one example of the Noddy among my Trinidad specimens, an immature bird with worn contour feathers but new quills. Its measurements agree with those of specimens from Dry Tortugas, Florida.

8. ***Micranous leucocapillus*** (Gould). One record from Martin Vas Rocks, January 5, 1906. (Nicoll, Ibis, 1906, p. 673).

9. ***Gygis crawfordi*** Nicoll. *Gygis candida*, Saunders, Proc. Zool. Soc., 1880, p. 163; Cat. B. XXV, p. 151. Wilson, Ibis, 1904, p. 210. *Gygis alba*, Sharpe, Ibis, 1904, p. 217. *Gygis crawfordi*, Nicoll, Bull. B. O. C., XVI, 1906, p. 102; Ibis, 1906, p. 669. Murphy, Auk, 1915, p. 48. "Little snow-white tern," McCormick, 'Voyages,' l. c., p. 24.

This recently recognized species is the Atlantic representative of the genus, breeding on Fernando Noronha, Ascension, Trinidad, and St. Helena, but far more numerous on Trinidad than anywhere else. All the naturalists who have visited Trinidad have mentioned it. Sitting birds, eggs, and gray downy young in various stages of growth, have been observed in April, August, September, and January. Therefore this tern breeds practically throughout the year, "from sea-shore to the extreme summit of the island," laying a single beautifully marked egg on the rock, or on a stump or branch of a dead tree. According to Nicoll, the young exhibit great tenacity in clinging to their precarious perches.

10. ***Sula piscator*** (Linné). *Sula piscator*, Saunders, Proc. Zool. Soc., 1880, p. 163. Ogilvie-Grant, Cat. B. XXVI, p. 434. Nicoll, Ibis, 1906, p. 672. *Sula piscatrix*, Sharpe, Ibis, 1904, p. 214.

This Booby breeds apparently throughout the year. Excellent photographs of the bird and its nesting site have been published by both Murray and Nicoll (see references), while Knight gives an account of the nesting colonies in the ravines on the island's northeastern coast. Flying fish are known to make up part of the bird's food.

North of the Equator, on April 23, 1913, an immature Booby, probably of this same species, flew around the *Daisy* just after sunset and finally alighted on the prow of the stern whaleboat. It paid little attention to the helmsman, and was not disturbed even by the noise and riot of a rat-hunt on board. About dusk it worked its head down between the scapular feathers, its bill pointing straight down its spine, and slept soundly. The gentle motion of the ship did not disturb its balance; it swayed slightly, but rested firmly on both feet. At half past five next morning it was disturbed by a sailor entering the stern boat to get a bucket, and flew off.

Two other Boobies, *Sula cyanops* and *Sula leucogaster*, have been taken at Ascension, Fernando Noronha, or elsewhere in the tropical Atlantic, but neither species has yet been recorded from Trinidad.

11. ***Fregata minor nicolli*** Mathews. *Fregata aquila*, Saunders, Proc. Zool. Soc., 1880, p. 163. Ogilvie-Grant, Cat. B. XXVI, p. 447. Sharpe, Ibis, 1904, p. 215. Nicoll, Ibis, 1906, p. 673. *Fregata minor nicolli*, Mathews, Austral Avian Record, II, No. 6, 1914, p. 118. Rothschild, Novit. Zool. XXII, 1915, p. 145.

The recent study by Mathews, together with prompt corrections and elaborations by Rothschild, have split up the Man-o'-war Birds into five species, of which *F. minor* is represented by five races ranging through the Indian and western Pacific Oceans, and northward in the Atlantic to Trinidad. *Fregata aquila* is now stated by Rothschild to be confined to the type locality of Ascension Island, while the Trinidad form, based on the study of a series (apparently about twelve specimens), has been described by Mathews as a subspecies of *F. minor*.

Man-o'-war Birds, of either this or the following species, are said to nest in large numbers on the crags near the North Point of Trinidad. They have been found incubating in August, but, according to Nicoll, were not breeding in January, 1906.

12. ***Fregata ariel*** (Gould) **subsp.?** *Fregata ariel*, Sharpe, Ibis, 1904, p. 214. Nicoll, Ibis, 1906, p. 673. 'Atlantic form' of *Fregata ariel*, Mathews, Austral Avian Record, II, No. 6, 1914, p. 121.

Two specimens of this small species have been brought to the British Museum from Trinidad — an immature example collected by the explorers of the *Discovery*, and an adult male obtained by Nicoll.

All which I saw were immature birds. I have none in my collection, but a specimen caught on a fish hook was skinned by the captain of the *Daisy*, and is now, I believe, in the Milwaukee Museum. I find in my notebook the following incomplete description of this specimen, together with a mention of its small size: — Head and neck white; a chestnut stripe running from the mentum down the front of the neck to the upper breast, forming a solid spot on the throat; back, wings, breast, flanks, tail, upper and under tail coverts iridescent greenish-black, the feathers of the scapular and interseapular regions edged and tipped with brown; a scale like row of brown feathers with darker shafts and whitish edges, extending along the wing from wrist to elbow; belly white; feet flesh color; bill horn color;

sex undetermined. The specimen was invested with a Mallophagan parasite (*Lipeurus gracilicornis minor*) taken also from Tropic-birds (*Phaëthon lepturus*) at Fernando Noronha.

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EARLY RECORDS OF THE WILD TURKEY. V.

BY ALBERT HAZEN WRIGHT.

(*Concluded from p. 224.*)

Michigan, Wisconsin, Indiana, and Illinois.

IN this area the wild turkey held its own against two centuries of civilization's advances. The first note comes in 1658-1660 when Peter Esprit Radisson (l. c. pp. 152, 212) finds in the country of the "Pontonatemicks" (Lake Superior region) "there are so many Tourkeys that the boys throw stones at them for their recreation." Of this same region, he again says "many have Turkeys." The Jesuit Relations speak of the turkey in this region in several accounts. In 1661 and 1662 they assert that in the Mississippi valley ¹ "Turkeys and fowls fly in flocks as Starlings do in France." In 1669-70, Marquette, when in the Illinois country, finds ² "There is fine hunting of . . . Turkeys, . . ." Along the Mississippi River, the Relations of 1672-74 say ³ "Turkeys strut about, on all sides," and of Illinois River they hold that "Turkeys are found there in greater numbers than elsewhere." On Marquette's Voyage,

¹ The Jesuit Relations. . . . Vol. XLVII, p. 143.

² *ibid.*, Vol. LIV, p. 189.

³ *ibid.*, Vol. LVIII, pp. 99, 107.

1673-77, we find that they, on the upper Mississippi reached ¹ "the parallel of 41 degrees 28 minutes," "Turkeys had taken the place of game." In the Illinois country, "There was more snow there then elsewhere as well as more tracks of animals and Turkeys" and they here find themselves "in a fine place for hunting cattle, deer and turkeys, which are excellent. . . ." According to Allouez,² "they hunt. . . . Turkey" in Illinois, and, for the same region, Binnetau in 1699 records, "Game is plentiful such as ducks. . . . Turkeys." In 1698, Hennepin mentions Turkey-Cocks for the head of the Illinois River. When along the Mississippi, he says ³ "I observed they have tame Poultry, as Hens, Turkey-Cocks, and Bustards, which are as tame as our Geese." "The country affords all sorts of Game as Turkey-Cocks. . . ." and "in our way we kill'd seven or eight Bustards or Wild Turkeys, which in these Countries encrease mightily." In general, "There are to be had. . . . Turkies, which are of an extraordinary bigness."

In 1703, La Hontan holds ⁴ "The River of the Illinese is intituled to Riches, by vertue of the benign Climate, and of the great quantities of. . . . Turkeys that feed on its brinks." In 1712, Marest records that along the Illinois River,⁵ "Turkeys are likewise found here in abundance and they are as good as those of France." In 1750, a letter from Vivier finds in the Illinois country that ⁶ "Wild turkeys abound everywhere, in all seasons, except near the inhabited portions." In the same year the mission at Detroit purchased turkeys from the natives at several different times.⁷ Twenty-eight years later (1778) Hutchins records in Illinois that ⁸ "*Savannahs* or natural meadows, are both numerous and extensive; yielding excellent grass, and feeding great herds of Buffaloe, . . . Turkies. . . ." Lastly in 1791, J. Long, the Indian interpreter gives the Chippeway name for Turkey as ⁹ "Weenecobbo." The following year (1792) John Heckewelder made a journey to the

¹ *ibid.*, LIX, pp. 111, 171, 173, 177.

² *ibid.*, LX, p. 163; LXV, p. 73.

³ Hennepin, L. 1. c., pp. 93, 94, 123, 137, 149; continuation, p. 137.

⁴ La Hontan, l. c., pp. 134, 112.

⁵ The Jesuit Relations, Vol. LXVI, p. 225.

⁶ *ibid.*, Vol LXIX, pp. 143, 145, 257.

⁷ *ibid.*, LXX, pp. 59, 63, 43.

⁸ Hutchins, l. c., p. 44.

⁹ Early Western Travels, Vol. II, p. 263 (orig. p. 223).

Wabash.¹ "Wild turkeys and deer were seen in great numbers on the banks of the Ohio." Below Vincennes on one October day they took five turkeys. Opposite Louisville at another time they shot four more and the same success was experienced at several other places.

At the beginning (1801) of the next century Matthew Carey says that in the Northwestern and Indiana Territories,² "Turkies. . . . are in greater plenty here, than the tame poultry are in any part of the old settlements in America." Not until 1816, do we discover the next pertinent note. David Thomas in the Wabash country at first writes that³ "We had been taught to expect that turkies were very numerous, but we have been disappointed, for certainly we have not seen half a dozen full grown in all the Western Country." Later, he holds that "at that (above) time it appears that these fowls were hatching or secreted with their young." "*Wild Turkies* abound in this country." The next year 1817, Samuel R. Brown records that⁴ "Wild turkies abound in the hilly districts" of Illinois. "The woods (of Indiana) abound with deer, bears, wolves and wild turkies." "In travelling seven miles through the woods of Dearborn county I counted two bears, three deer and upwards of one hundred turkies; more than half of the latter however are young ones, just beginning to fly." In Michigan he also notes this species.

In the early days of Illinois, Morris Birkbeck⁵ tells us that when the stock of provisions failed, the wild turkey was one of the last resorts. Its pursuit also served the pioneer with plenty of strong exercise. The same author in his "Letters" writes⁶ "We are now feasting on wild turkeys. We have not sat down to dinner for the last month, I believe, without a fine roast turkey. They weigh about twelve pounds, and are sold five for a dollar. Some weigh

¹ Penn. Mag. Hist. and Biog., XII, pp. 166, 173, 176.

² Carey, Matthew. American Pocket Atlas. 2nd edit. Phila., 1801, p. 76.

³ Thomas, David. Travels through the Western Country in the Summer of 1816. . . . Auburn, 1819, pp. 161, 162, 210.

⁴ Brown, S. R. The Western Gazetteer; Auburn, N. Y., 1817, pp. 30, 48, 78, 169.

⁵ Birkbeck, Morris. Notes on a Journey in America, 3rd edit., London, 1818, pp. 123, 149.

⁶ Birkbeck, M. Letters from Illinois. Phila., 1818, p. 63.

twenty-five pounds — I have heard of thirty. They are fat and tender: better I fancy, than Norfolk turkeys; but I must not be too positive on this nice point." In 1817, Fordham when in Illinois and Indiana, narrates how "game is as plentiful as in other parts of the U. S. east of the Mississippi,"¹ turkeys being among the forms he mentions. Two years later, 1819, Faeron finds² turkeys in tolerable quantities in Illinois, and in Michigan Dana reports³ them in plenty. Hulme in a "Journal of a Tour in the Western Countries September 30, 1818–August 8, 1819" remarks that⁴ "On our way to Princeton (Ind.), we see large flocks of fine wild turkeys, . . . Some of the inhabitants who prefer sport to work, live by shooting these turkeys. . . ." In the same year, Richard Flower says that at Albion, Illinois, one can secure,⁵ "a fine turkey (for) a quarter of a dollar," and, in another series, he notes "turkeys in plenty, having purchased four for a dollar the preceding week." Along the Wabash River in 1819, John Woods tells how⁶ "they killed . . . some turkeys: these they were obliged to eat without bread, but once they procured a few potatoes at a cabin." In Illinois, he says, "The birds are turkeys, . . ." "Turkeys are of a large size; we bought many during the winter for 25 cents each. At that time they were in general, thin, but in the spring, they get very fat; we bought one in April that weighed more than 20lb. for 1s 8½ d." In 1819, W. Faux reports turkeys from Vincennes and Princeton, Ind. At the latter place, he records⁷ "turkeys in sickening abundance." Later, in his account, he says, "Colonel Boon and his party, being without bread for six months, used wild turkey to their meat as a substitute." In one instance, he gives the prejudiced view of an Englishman who retorts "You talk about your wild turkies and your game, but they are not there; game is more scarce than in England." At Bain-

¹ Fordham, E. P. *Personal Narrative*, . . . Edited by F. A. Ogg. Cleveland, O., 1906, pp. 119, 143.

² Faeron, H. B. *Sketches of America*. . . . 3rd edit., London, 1819, p. 257.

³ Dana, E. *Geographical Sketches on the Western Country*: . . . Cincinnati, 1819, p. 262.

⁴ *Early Western Travels*, X, p. 49 (orig. p. 279).

⁵ *Ibid.*, X, p. 108 (orig. p. 30), 124 (orig. p. 13).

⁶ *Ibid.*, X, pp. 263 (orig. p. 147), 291 (orig. p. 196).

⁷ *Ibid.*, XI, pp. 143 (orig. p. 136), 210 (217), 228 (238), 256 (272), 263 (282).

bridge, O., on September 5, 1819, Adlard Welby, another Englishman sees the wild Turkey,¹ "which seemed to resemble exactly our dark tame breed." At the mouth of the Ohio, 1819, Nuttall finds² "The whole country here, on both sides of the Mississippi and the Ohio, . . . abounds with various kinds of game, but particularly deer and bear, turkeys. . . ." The Expedition of Major Stephen H. Long on May 27, 1819, records³ the turkey at Shawneetown on the Ohio. Schoolcraft (l. c., 114) in 1821 on the Wabash River says, "The turkey. . . often appear, to enliven this part of the river (Mississineva River)." In another work he records that at Prairie di Chien⁴ "the wild turkey, . . . are also common along this part of the Mississippi, . . ." On his excursion of 1822-23, W. H. Blane (l. c., p. 239) at Carmi, Ind., "passed on a single day's ride. . . five gangs of wild turkeys." In "Remarks made on a Tour to Prairie du Chien. . . in 1829" (p. 166) Caleb Atwater gives the Sioux name for Turkey, as "Zezeha, Zezecha tunka." In 1832 Timothy Flint (l. c., p. 384) writes, "Wild turkeys have been supposed by some, to abound as much on the waters of White River, as they do in the settled regions. Hundreds are sometimes driven from one cornfield." The same year, Vigne (l. c., p. 61) finds "Wild turkeys are there very plentiful," in Indiana and Illinois. In the winter of 1832-33, Maximilian Prince of Wied says,⁵ "The most interesting of the birds in this part (New Harmony on Wabash) is the wild turkey, which was extremely numerous, and is still pretty common. A large cock was sold at Harmony for a quarter of a dollar. A young man in this neighborhood, who supplied the place with this delicate game, had often ten or fifteen hanging about his horse at the same time." Later, he writes "my informant had killed. . . great numbers of wild turkeys." "In our excursions we often visited some others of the numerous islands in the Wabash, being particularly attracted by the loud cries of the

¹ *ibid.*, p. 208 (orig. p. 62).

² *ibid.*, XIII, p. 72 (orig. p. 41).

³ James, Edwin. *Account of expedition from Pittsburgh to the Rocky Mountains. . .* 2 vols. Phila., 1823, Vol. I, p. 32.

⁴ Schoolcraft, H. R. *Travels in Central Portions of the Mississippi Valley.* New York, 1825, p. 71.

⁵ *Early Western Travels.* Vol. XXII, Part I, p. 168 (77), 178 (81), 191 (89), 192 (90).

wild turkey; their voice is exactly similar to that of the European turkey. We could hear them scratching among the dry leaves on the ground, in search of food. If we surprised them, they were generally too far off for our fowling-pieces, loaded with small shot, for they ran away with extraordinary rapidity. Turkey Island seemed to be a favourite place of resort. At the upper end of the island drifted wood was frequently piled up to such a height, that it was difficult to clamber over it, and among this wood there were generally many otters. Here we often found wild turkeys, . . . ; and it is really a fine sight to see a flock of these wild turkeys fly across the river, . . .” At Black River, Wabash country, “we were unsuccessful in our chase of the wild turkeys, of which we sometimes saw whole flocks fly across the Wabash.”

In 1834, H. R. Schoolcraft in the “Natural History of Michigan,” writes that,¹ “The *gallipavo meleagris*, or wild turkey, pursues its food in the vast ranges of the new counties of the peninsula, and is still found in the vicinity of this city. It does not extend its summer migrations to the extremity of the peninsula, and has never been seen north of it.” The following year, 1835, Chas. Fenno Hoffman writes,² “Here the numerous deer-runways, with the flocks of wild turkeys. . . showed us that we were upon the favorite hunting-ground of the Pottawattamies.” The same year Patrick Sbirreff (l. c., p. 434) finds turkeys in endless numbers in Illinois. Four years later, 1838, Jas. Hall records that³ “Wild turkeys are still abundant. They are shy and difficult to shoot, but our hunters kill great numbers of them. In the spring they are found in pairs, but during the rest of the year in flocks consisting of the old pair and the last brood. Fine turkeys may be bought of the hunters for twelve and a half cents apiece.” In 1830–1840 turkeys were plentiful⁴ in Michigan. In this region,⁵ “A turkey was generally roasted by hanging it up before the fire by a string attached to a beam above. A dripping pan was placed under it and

¹ Schoolcraft, H. R. *Historical and Scientific Sketches of Michigan.* Detroit, 1834, p. 189.

² Hoffman, Chas. Fenno. *A Winter in the West by a New Yorker.* N. Y., 1835, 2 vols., Vol. I, p. 202.

³ Hall, Jas. *Notes on the Western States.* Phila., 1838, p. 124.

⁴ Mich. Pioneer and Historical Colls., Vol. 6, p. 475.

⁵ *ibid.*, Vol. XIV, p. 436, XIII, p. 548.

it was basted and turned till done. Though cooked by primitive means, a turkey roasted in this manner is equal in flavor to the best that improved methods can produce." Finally, in Michigan we have this note. "Wild turkeys were often seen by the score by the early settlers, and some few have been seen till quite recently (1888). In the Wabash region in 1855 Beste, an Englishman, says,¹ "We met a peasant carrying a rifle over one shoulder, and in the other hand, a black wild turkey."

Missouri, Iowa, and Minnesota.

Most of the printed records of the wild turkey in this region come after 1800. When at Lake Pepin, J. Carver in 1766-1768, finds in November,² "Great numbers of fowl frequent also this Lake and rivers adjacent, . . . and in the groves are found great plenty of turkeys and partridges." In 1804, Captain Clarke traversed this region and on one occasion,³ "went out to hunt and killed a small turkey." In another instance when the party was only 4 days' trip west of St. Louis, the record says, "passed the mouth of Mine River; saw several turkeys on the shores." In 1808-1816, Henry Ker (l. c., p. 40) and his party when on the Mississippi "were visited by a few of the Osark tribe of Indians, who came to us in canoes, bringing with them a few turkies; . . ." In 1806, Zebulon Montgomery Pike starts on a trip up the Missouri and Osage Rivers, and through Kansas to the Pawnee River on the Republican River. At Gasconade River, July 24, he⁴ "killed . . . three turkeys." Thereafter, they continue to kill turkeys throughout the trip. In one instance he pities some poor fellows to whom he gives whiskey, "they having had only two turkeys for four days."

In 1809-1811, Bradbury says,⁵ "With . . . turkeys, the town of

¹ Beste, J. R. *The Wabash; etc.* 2 vols. London, 1855. Vol. 2, p. 50.

² Carver, J. *Travels through the Interior Parts of North America, in the Years 1766, 1767 and 1768.* London, 1778, p. 55.

³ Gass, Patrick. *Journal of the Voyage and Travels of . . . Capt. Lewis and Capt. Clarke . . . During the Years 1804, 1805, 1806.* 4 edit. Phila., 1812, pp. 27, 262.

⁴ *The Expeditions of Zebulon Montgomery Pike.* New edit. Edited by Elliott Coues. N. Y., 1893, Vol. II, pp. 366, 368, 370, 373, 381, 394, 395, 399.

⁵ Bradbury, John. *Travels in the Interior of America in the Years 1809, 1810 and 1811. . . .* Liverpool, 1817, p. 261.

St. Louis is frequently supplied by a tribe of the Shawnee nation of Indians, who live about seventy miles west of that place. They usually charge a quarter of a dollar for a turkey or a quarter of venison." In 1811, H. M. Brackenridge when not far from Fort Osage up the Missouri writes,¹ "While Castor was out, he saw a *white turkey*, but was not so fortunate as to kill it. I am told that they have sometimes been seen of this color: but I suspect it is *Rara avis in terris, nigroque simillima cygno.*" He finds that, "In the settlements, and for a considerable distance up the Missouri, turkies stalk through the woods, in numerous flocks, but are rarely met with where the open country commences."

In 1812, Major Amos Stoddard holds that² "these forests (Upper Louisiana) also according to the best accounts, contain about a hundred and thirty species of birds. The most useful of them are several kind of duck. . . . and turkey."

In 1816, John D. Hunter (l. c., pp. 170, 383, 425, 432) says, "Wild turkey, prairie hens, etc. . . . are inhabitants of this country." He tells how a band of Indians may often approach a hostile party by gobbling like a turkey cock and their enemies be not aware of their intent or presence. In another instance, he states that when Indians choke, they thrust a turkey feather down the throat to induce vomiting. Finally, he describes at length, the "Soo-ke-He-Ah (or) young turkies' feed." "Turkey pea — There are two highly nutritive articles bearing this name, which grow in the western country in great abundance, but which are entirely different in character from the one now under consideration. One variety is however called by the graziers on the frontiers Pea vine, which from its great abundance and nutritive properties constitute a highly valuable grazing article. The other has a single stock, grows to the height of eight or ten inches, and bears a small pod. It is found in rich loose soils, appears amongst the first plants in the spring, and produces on the root small tubers of the size of a hazelnut, on which the turkies feed. . . . But the substance now under notice grows to a foot or foot and a half in height, and adorns the

¹ Brackenridge, H. M. *Views of Louisiana together with a Journal of a Voyage up the Missouri River in 1811.* Pittsburgh, 1814, pp. 216, 59.

² Stoddard, Major Amos. *Sketches Historical and Descriptive of Louisiana.* Phila., 1812, p. 231.

borders of the prairies, where in July it almost uniformly bears a great profusion of beautiful blossoms, which are white, fringed with red on their margins. These are subsequently followed by a luxuriant crop of small peas, of which the wild turkies are extremely fond, from whence their name. . . ."

Shortly after, 1818, H. R. Schoolcraft visits the Osarks. Around the Great and Little North Forks of the White River, he finds that ¹ "At the early hours in the morning, the wild turkeys appeared in large flocks, with their plumage glistening in the light." When at Wall-cave valley, November 13, 1818, he says "As the evening approached, a flock of turkeys, coming in from the plain to the top of the cliff above the cavern, flew down on to the trees directly in front of us, sheltered as we were from their sight, and afforded a fine opportunity for the exercise of sportsmanship." Throughout the trip, turkeys suffice for many a meal, and, in one case, Schoolcraft relates the enjoyment of a "turkey-pie, with a crust of Indian meal." The following year, 1819, the same author records that ² "The wild turkey is still common on the bottom lands, and during the heat of the day in the open post oak woods."

In 1818, Estwick Evans observes the bald eagle and the turkey in the rôles of pursuer and prey.³ "Whilst in the Missouri Territory, and not far from the bank of the river, a bald eagle, perched upon a tall and blasted oak, attracted my attention. . . . Whilst I was admiring the strength of his form, and the majesty of his aspect, a wild turkey flew from a neighbouring tree and alighted on the ground. The eagle immediately pounced upon his prey; but ere he could effect his object the turkey was shot. I might too, have killed the eagle, but admiration and awe prevented me. I felt that he was the emblem and the inspiration of my country; and at that moment, I would not, for ten thousand worlds like ours, have cut a feather of his wing." In 1820, Stephen Watts Kearny in "A Narrative Account of the Council Bluff, St. Peters Military Expedition" notes that they ⁴ "passed the Wakendaw River on

¹ Schoolcraft, H. R. *Scenes and Adventures in the Semi Alpine Region of the Osark Mountains of Missouri and Arkansas.* Phila., 1853, pp. 59, 66, 79, 80, 85, 98, 99, 121.

² Schoolcraft, H. R. *A View of the Lead Mines of Missouri.* New York, 1819, pp. 36, 37.

³ *Early Western Travels*, VIII, p. 311 (orig. p. 205).

⁴ *Mo. Hist. Soc. Colls.*, III, 1908, p. 52.

the West at which point we saw large flocks of Turkeys." About the same time, Stephen H. Long (l. c., pp. 96, 111, 373) finds that at Franklin on the Missouri, "Most of the deer . . . , as well as the turkies have fled from this part of the country, though but a few years since they were extremely abundant." and that at Isle au Vache (100 miles above Osage) there were great numbers of turkies.

In 1832, Timothy Flint (l. c., 305, 94) writes that in Missouri "Wild turkeys furnish admirable sport to the gunner" and of the Mississippi at the Falls of St. Anthony he says, "Its broad and placid current is often embarrassed with islands, often containing from five hundred to a thousand acres, and abounding with wild turkeys. . . ." The same author in a previous work (1826) finds that ¹ "There is a great abundance and variety of wild fowl, and turkeys, . . ." at Jackson, Missouri. In 1832-33, Latrobe records that ² "Turkeys were plentiful in the woods" of Missouri. About this same time, Maximilian, Prince of Wied, states that ³ "wild turkeys were not often found" at St. Charles on the Missouri. Near Gasconade River, he says "our hunters fired unsuccessfully at a flock of wild turkeys." At Osage on the Missouri, he writes, "Some of my people, attracted by the cries of the wild turkeys, were tempted to land, but returned without having met with any success. I happened to have taken no piece with me, which I much regretted for a wild turkey-cock came out of a bush about ten paces from me, and stood still, looking at me, while his splendid feathers shone in the sun," and at Boyer's Creek near Council Bluffs, he notes "We had a fruitless chase after some wild turkeys." At Missouri City, he finds that "Wild turkeys are still met with." A year later (April 4, 1834), John K. Townsend at Big Spring, Mo., records that ⁴ "We then gave up the pursuit, and turned our attention to the turkies, which were rather numerous in the thicket. They were shy, as usual, and, when started from their lurking places, ran away like deer, and hid themselves in the underwood.

¹ Flint, T. *Recollections of the Last Ten Years Passed in Occasional Residences and Journeyings in the Valley of the Mississippi.* Boston, 1826, p. 248.

² Latrobe, C. J. *The Rambler in North America.* 1832-1833, 2 vols. New York, 1835, Vol. I, p. 100.

³ *Early Western Travels*, XXII, pp. 240 (orig. p. 113) 241 (114), 247 (117); XXIV, pp. 107 (465), 120 (472).

⁴ *ibid.*, XXI, p. 129 (orig. p. 16).

Occasionally, however, they would perch on the high limbs of the trees, and then we had some shots at them. In the course of an hour we killed four, . . ." In his *Travels 1834-1836*, C. A. Murray (l. c., p. 73) notices this form at Keokuk. In 1837, A. Wetmore writes¹ "The game of Missouri, the ranks of which are thinned as settlements advance, consists of . . . , turkeys etc." In Saline County, he says "Turkeys and grouse here give animation to the prairie scenery and furnish the table with some of the choicest luxuries of life." Finally, in 1846, Wm. J. A. Bradford holds that² "The wild turkey is found in great numbers on the wooded bottom lands" of the Upper Mississippi.

Kansas, Nebraska, Colorado and the Northwest.

If we do not consider Coronado of the 16th century, the record begins in 1724, when M. de Bourgmont made a trip from Fort Orleans to the Missouris, Canzas and Padoucas. On the 16th of October, 1724, he says³ "Besides the larger game, these groves (at River of the Canzas) afforded also a retreat to flocks of turkeys."

About the beginning of the nineteenth century, Alexander Henry writes of one of Big Belly Indians⁴ "who had a turkey-cock's tail, great numbers of which they get from the Schians, and which serve them as fans." On the return, the Lewis and Clarke expedition when passing down the Missouri River, records the turkey at the mouth of the Platte River.⁵ "At two in the afternoon we stopped to hunt, and soon killed two deer and a turkey." Shortly after, Pike takes a trip from a Pawnee Village through Kansas and Colorado to Pike's Peak, October 1-November 30, 1806. At Lamar he says⁶ "killed one turkey, the first we have seen since we left the Pawnees"; at Florence, "killed . . . six turkeys"; at Royal Gorge of the Arkansaw, "Heard 14 guns at camp . . . found

¹ Wetmore, Alphonse. *Gazetteer of the State of Missouri*. St. Louis, 1837, pp. 29, 219.

² Bradford, Wm. J. A. *Notes on the Northwest, etc.* New York and London, 1846, p. 19.

³ Du Pratz, M. *Le Page*, l. c., p. 69.

⁴ Coues, Elliott. *The Manuscript Journals of Alexander Henry and David Thompson, 1799-1814*. 3 vols. N. Y., 1897, Vol. I, p. 355.

⁵ Gass, Patrick. l. c., p. 260.

⁶ Pike, l. c., Vol. II, pp. 442, 462, 463, 464, 471, 474.

that cause of my alarm was their shooting turkeys, killed . . . nine turkeys." Later, at this latter place, he kills others, and, along the Arkansaw, he says he "Saw great quantities of turkeys. . . ." Five years later, 1811, on May 7, Brackenridge (l. c., p. 225) near the mouth of the Platte River, notes "On my return to the boat, killed some pigeons. . . . and saw a flock of turkeys." In 1819 or 1820, Long (l. c., Vol. I, p. 419) when near the sources of the Grand River says "Nothing is more difficult than to estimate by the eye, the distance of objects seen in these plains. . . ., we discovered as we thought, several large animals feeding in the prairie, at the distance of half a mile. These we believed could be no other than bisons, and after a consultation respecting the best method of surprising them, two of our party dismounted and creeping with great care and caution, about one fourth of a mile through the high grass, arrived near the spot, and discovered an old turkey, with her brood of half grown young, the only animals now to be seen." The year following, 1821, Jacob Fowler states that on October 8, near Arkansas River ¹ "Some of the Hands killed 10 turkeys." A month later, November 3, 1821, at Hartland, Kearney Co., he notes that "On this island the Hunters killed Some turkeys and Seen Some more. the first We Have SEEN above the little arken-saw. . . ." Finally, on November 17, 1821, he remarks that at La Junta, "no buffelow or turkeys."

In 1833, Maximilian, Prince of Wied, gives us several notes for this region. When near the mouth of the Kansas, he says ² "He (McKenzie) brought us several turkeys which had been lately shot." At Cedar Island, 1075 miles from the mouth of the Missouri, he holds that "This may be considered the limit to which the wild turkey extends on the Missouri. It is true that this bird is now and then, found higher up, even on the Yellow Stone River; but these are exceptions, for beyond this place the woods are too open and exposed. The Indians on the Upper Missouri, readily barter for the tails of these fine birds to use them as fans and ornaments,

¹ The Journal of Jacob Fowler, etc. 1821-22. Edited by Elliott Coues. N. Y., 1898, pp. 16, 33, 48.

² Early Western Travels, XXII, Part I, pp. 251 (Orig. p. 119) 296 (144); XXIII, Part II, pp. 102 (249), 103, 261 (339); XXIV, Part III, pp. 74 (446), 109 (465), 226, 248, 275, 276, 285, 293, 295, 300.

and Mr. McKenzie, accordingly took a great supply with him." Of this trade with the Black feet Indians, he says, "The Company now sends to its trading posts, the tail of the wild turkeys, which are much in request" for fans. At Mandan, N. D., he asserts that "For an arrow wound he (Indian) fastened in his hair the wing feather of a wild turkey." At old Fort Clarke, he discovers dogs gaily clothed with feathers. "In the middle of this mass of feathers, the outspread tail of a wild turkey... was fixed." Near Weeping Water, Kansas, he frequently espies turkeys. He states that "We set out early and passed Weeping-water River, landing several times to pursue the wild turkeys, whose note attracted us to their retreats. We often saw these proud birds in the lofty trees, perched up beyond the reach of small shot." Finally, he gives the following Indian names for the wild turkey:

Dacota (Sioux)	sisitscha-kanka (<i>s</i> soft; <i>kan</i> in the throat).
Mandans	máhnú (<i>a</i> rather full, almost as if with superior <i>o</i>).
Minnitanis or Grosventres	sihs-kiehtia (run together; <i>ich</i> with the point of the tongue; <i>ti</i> and <i>d</i> separated).
Omahas	sihsikah.
Oto	wæ-ink-chontjeh (first <i>e</i> barely audible; <i>ch</i> guttural; <i>j</i> French).
Saukis, Sakis,	pánáh (first <i>a</i> unlaut).
Sacs	
Wasaji or Osage	suhka.

In 1833, September 25, Nathaniel Wyeth in his trip to Oregon, reports killing a turkey just west of Black Snake Hills and Rubideau Fort. In another place, he says he saw several turkeys.¹ A short time later, C. A. Murray (l. c., Vol. II, 45) records that at the mouth of the Kansas River "A lad (of the company) took a ramble with his fowling-piece, and saw some turkeys, . . . but he could not get near enough for a shot." In 1837, Washington Irving writes that² "An Indian trader, well experienced in the

¹ Young, F. G. The Correspondence and Journals of Captain Nathaniel J. Wyeth, 1831-36. In Sources of the History of Oregon, Vol. I, Parts 3-6, pp. 217, 218.

² Irving, Washington. The Rocky Mountains; etc. 2 vols., Phila., 1837, Vol. I, p. 38.

country, informs us that within ten years that he has passed in the far west, the bee has advanced westward above a hundred miles. It is said on the Missouri, that the wild turkey and the wild bee go up the river together: neither are found in the upper regions. It is but recently that the wild turkey has been killed on the Nebraska, or Platte and his travelling competitor, the wild bee appeared there about the same time." A few years later, Fremont on the Little Blue River (Neb.?) describes it as follows:¹ "The stream was about fifty feet wide and three or four feet deep, fringed with cottonwood and willow, with frequent groves of oak tenanted by flocks of turkeys."

In 1846-1847, the Emory Reconnoissance meets the wild turkey on several occasions. Of the Valley of Purgatory, the report has it that² "the hills are bare of vegetation, except a few stunted cedars; and the valley is said to be, occasionally, the resort of grizzly bear, turkeys. . . ." In Lieutenant Abert's Appendix of this report are several notes on this form. He gives it amongst the birds seen from Bent's Fort to Santa Fe, and holds "our road leads through a region that abounds with the deer. . . and the turkey." Along the Purgatory River, "dense thickets, composed of plum and the cherry interwoven with grape vines, formed impenetratable thickets, where. . . wild turkey, found a secure shelter." Here "turkeys are very abundant," and, "they told us that. . . they daily killed great numbers of. . . turkeys." Also at Wakaroose river, Kansas, he records that "Some of our hunters went out and killed several wild turkeys (*Meleagris gallopavo*.)" In 1848, J. Q. Thornton says the wild turkey is found east of the Nebraska River.³ In "The Overland stage," Messrs. Root and Connelley assert that⁴ "There was an abundance of wild game in the '60's. In eastern Kansas large numbers of wild turkeys. . . were seen. Along the Little Blue River there were also many wild

¹ Fremont, J. C. Rept. of Exploring Expedition to the Rocky Mts. in the year 1842 and to Ore. and North California in the years 1843-1844. Washington, 1845, p. 15.

² Emory, W. H. Notes of a Military Reconnoissance from Fort Leavenworth in Missouri to San Diego, in California, etc. New York, 1848, pp. 21, 405, 432, 437, 439, 524, 390.

³ Thornton, J. Q. Oregon and California in 1848. N. Y. 1855, Vol. I, p. 41.

⁴ Root, F. A., and Connelley, W. E. The Overland Stage to California. Topeka, Kansas, 1901, p. 87.

turkeys." Finally, in 1868, Zinke finds that¹ "As to feathered game; on lucky days you may get a wild turkey," in the Rocky Mts.

Arkansas, Oklahoma, Texas and the Southwest.

In this, the last section to be considered, the turkey has always been a familiar form from Coronado's day to the present. In 1723, Bernard de la Harpe finds it in the land about the Red River and asserts that the country of the Arkansas and Tayas has an abundance of turkeys.²

Some hundred years later, 1818, Schoolcraft remarks³ the cheapness of wild turkeys at 25 cents in the White River country of Arkansas Territory, and, in 1817, Brown (l. c., p. 174) tells how "50 miles from its mouth (Grand Saline or Newsewetonga) the prairie grass is encrusted with salt; the Indians collect it by scraping it off the prairie with a turkey's wing, into a trencher." The following year, 1819, Thos. Nuttall in "Travels into the Arkansas Territory" discusses the feather mantles of the Osage Indians.⁴ "Nearly all those whom De Soto found inhabiting Florida and Louisiana, on either side of the Mississippi, . . . dressed themselves in woven garments made of . . . ; and in colder seasons of the year, they wore coverings of feathers, chiefly those of the turkey. The same dresses were still employed in the time of Du Pratz. These feather mantles were, within the recollection of the oldest men, once used by the Cherokees, as I learnt whilst among them. There is, therefore, nothing extraordinary in the discovery of these garments around the bodies which had been interred in the nitre caves of Kentucky. Presents of these 'mantels' as they are called by Purchas, now succeeded by European blankets, were perpetually offered De Soto, throughout the course of his expedition, and are still made use of by the natives of the north west coast."

In the southwestern country, the Long expedition 1819-1820, encounters the turkey frequently. In the Arkansas River system,

¹ Zinke, T. B. *Last Winter in the United States.* London, 1868, p. 250.

² French, B. F. l. c., Part III, pp. 69, 74.

³ Schoolcraft, H. R. *A View of the Lead Mines, . . .* p. 251.

⁴ *Early Western Travels.* XIII, pp. 258-259 (orig. pp. 193-194).

the hunters were regularly sent out for it and often returned with as many as seven. In the Red River region the ¹ "game grew so abundant, that we had it at any time in our power, to kill as many bison . . . and turkies, as we might wish." "The grapes and plums so abundant in this portion of the country are eaten by turkies. . . ., as we conclude from observing plumstones in the excrement of these animals." In the Pawnee territory, they record this form and at the Falls of the Canadian River (near Great North Fork). "Turkies were very numerous." On the Red Fork, they find "a seasonable supply of four turkeys." Some years later, Timothy Flint tells how James O. Pattie of Kentucky ² "saw (in 1824) great numbers of . . . turkeys" in Socoro County, N. M. In the beginning of 1825, he reports fat turkies along the banks of San Francisco River and along its tributary, Bear Creek.

In 1826, W. B. Dewees at San Antonio de Bexar, Texas, says ³ "On the first evening, we encamped about an hour before sundown, and my friend and myself strayed away from the camp for a short time and while absent, succeeding in killing a couple of very fine turkeys. . . . we had driven them to take refuge in a tree, where we had shot them with our rifles." In 1832-33. Latrobe (l. c., Vol. I, pp. 142, 143, 160, 166) finds that "turkeys. . . . were plentiful in the vicinity of the camp (Western Creek Agency at Saline near Verdigris River), . . . so that abundance reigned there." At Bald Hill near Arkansas, he says "We noticed the tracks of innumerable . . . turkeys, . . ." On the Red Fork, he notes an "abundance of turkeys." On the North Fork of the Canadian River, he claims that they "killed in its neighborhood. . . . twenty turkeys, . . ." Finally, his last note is of the Arkansas River which is "frequented by . . . turkeys." "A Visit to Texas, etc. New York, 1834" records (pp. 92, 209) that "There are wild turkies and smaller birds." "The turkies chiefly resort to the woods." Its author on a trip from Brazona to San Felipe tells how they "had plenty of . . . wild turkey, . . ." In 1836, Edward, in his list of birds, writes ⁴

¹ James, Edwin. l. c., Vol. II, pp. 49, 59, 63, 118, 119, 127, 141, 155, 159, 217, 225.

² Early Western Travels. XVIII, pp. 86 (52) 88 (54) 90 (55) 108 (71).

³ Dewees, W. B. Letters from An Early Settler of Texas. Compiled by Cora Cardelle, Louisville, Ky., 1852, Letter IX.

⁴ Edward, David B. The History of Texas; etc. Cincinnati, 1836, p. 75.

"Among the birds fit for food, are the wild turkey, (commonly found in the woods, and near the edges of the prairies) . . ." In 1837-1838, Daubeny records at Little Rock, Ark., that he¹ "saw two wild turkeys on Saturday, but at too great a distance to give us a chance of shooting either." On a trip from Little Rock to Hot Spring, April 11, he writes, "we accompanied our host in a chase after a wild turkey, which I had a great ambition to kill and stuff for our Museum at Oxford. The females were decoyed by imitating the gobble of the turkey-cock, in which the back settlers are very expert, but on this occasion the stratagem was tried unsuccessfully; for though we saw several, and chased them through the wood, we never got within gunshot of any one. My man made several other attempts, but always in vain.

In Josiah Gregg's "Commerce of the Prairies" we have under "Animals of the Prairies" the following:² "About the Cross Timbers and indeed on all the brushy creeks, especially to the southward, are quantities of wild *turkeys* which are frequently seen ranging in large flocks in the bordering prairies." Westward of Spring Valley near the Canadian, he says "every nook and glade swarmed with deer and wild turkeys, . . ." In another instance he states that "In some of the mountains (of New Mexico), wild turkey are very numerous." In 1847 (January 14), Abert's party of the Emory expedition (Emory, l. c., p. 505) "saw wild turkeys" at Valverde, New Mexico. In 1849, R. B. Marcy reports that on the Divide near the Canadian River,³ "We have seen many antelopes and turkeys during the last few days." Seventeen days later in June, he reports for the Canadian river region; "I killed a turkey this evening, which is the first we have seen for a week."

The following year the report of S. G. French appears and therein he notes that⁴ "It might be well to remark that, in all the streams between San Antonio and the San Pedro, fish are abundant, and that in their vicinity deer and turkeys are found." About the

¹ Daubeny, Charles. *Journal of A Tour through the United States and in Canada, Made During the Years 1837-38.* Oxford, 1843, pp. 154, 157.

² *Early Western Travels.* XX (orig. Vol. II) pp. 282 (232), 115 (28), XIX (orig. Vol. I), pp. 328 (195), 325 (191).

³ Marcy, R. B. l. c., pp. 179, 183.

⁴ French, S. G., Report of. *From Reports of Reconnaissances of Routes from San Antonio to El Paso.* 31st Congress, 1st Sess. Ex. Doc. No. 64, 1850, p. 52.

same time, Washington Irving makes several notes of the turkeys in this southwest country. In the Osage country, he records it and also along the Arkansas River. At the Red Fork, he finds¹ "a number of turkeys." Later, he says the party "came to a halt, in a beautiful grove of elms, on the site of an old Osage encampment. Scarcely had we dismounted when a universal firing of rifles took place upon a large flock of turkeys, scattered about the grove, which proved to be a favorite roosting-place for these simple birds. They flew to the trees, and sat perched upon their branches, stretching out their long necks, and gazing in stupid astonishment, until eighteen of them were shot down." In Deep Creek or Little North Fork, he writes, "The rich woody bottom in which we were encamped, abounded with wild turkeys, of which a considerable number were killed."

In his "Expedition from Texas to Santa Fe," George William Kendall frequently encounters turkeys. At San Antonio, Texas, he reports² "We put up two or three turkeys near the branch, but the underbrush was so thick it was impossible to get a shot at them." Of the valley of the Brazos, he says that it "teemed in every species of game... elk, . . . , wild turkeys, . . ." On the Red River, he speaks of them at length. "We continued our march until we reached the dry bed of a mountain stream, upon the banks of which we encamped for the night. A flock of wild turkeys had taken shelter under the banks, running off as we approached their roost. Although contrary to strict orders, nothing could restrain our men from banging and blazing away at the turkeys as they sped across the prairie — fifty rifles and muskets being discharged at them before they were out of sight. Two or three only were killed by the volley and running fire which ensued and they were but half grown, and so extremely poor that they did not furnish a meal for half a dozen men." Of the same region, he again writes, "By-and-by a brood of wild turkeys, which had been hunting for their supper at the base of the rocky steeps, flew over our heads, and sought their roost in a large cotton-wood which overhung the river.

¹ Irving, Washington. *The Crayon Miscellany*. Revised edit. New York, 1861, pp. 49, 68, 70, 108, 133, 134, 157, 191, 194.

² Kendall, George William. 2 vols. N. Y., Vol. I, pp. 54, 102, 256, 260.

The sharp crack of a rifle soon announced the doom of one of the flock,”

In 1860, Domenech tells us that in the western part of Texas between the Rio Seco and Rio Blanco¹ “Partridge, quail, wild turkeys . . . have made of this spot their favorite sojourn.” Ten years later, 1870, William A. Bell reports that at Turkey Mountain (not far from Las Vegas)² “the wild turkeys had all been either shot or driven away by the officers of Fort Union.” Lastly, H. M. Chittenden remarks that³ “on the lower Missouri and in the south west the wild turkey abounded, and was extensively used for food” in the days of the early fur trade of the West.

In this recital, the effort has been to interweave these early records without paraphrase. At times they are decidedly ungrammatical, some bordering on fiction, others bizarre in the extreme; yet they all ought to be added to the turkey literature and may supplement the material so frequently rehashed in recent years.

¹ Domenech, Abbe Em. *Seven Years' Residence in the Great Deserts of North America.* 2 vols. London, 1860, Vol. I, p. 134.

² Bell, Wm. A. *New Tracks in North America.* 2nd edit. London, 1870, p. 122.

³ Chittenden, H. M. *The American Fur Trade of the Far West.* 3 vols. N. Y., 1902, Vol. II, p. 835.

GENERAL NOTES.

The Red-throated Loon (*Gavia stellata*) in Jackson Park, Ill.— On February 21, 1915, where the waters of the Yacht Harbor join those of Lake Michigan in Jackson Park, a specimen of the Red-throated Loon in winter plumage was seen. The weather was rather cool, being from 48° to 51° Fahrenheit. A light steady rain was falling with a moderate southeast wind. The bird had a badly hurt left leg and wing. These injuries prevented it from diving, for this would naturally be the first thing to which it would resort upon being frightened. As it could neither fly, dive, nor swim rapidly, we were at times within ten feet of it and directly above it.

The Red-throated Loon is considered an unusually rare winter visitant here. 'Birds of Chicago Area' (Woodruff, 1907) gives the following notation regarding this species: "The Red-throated Loon seemingly can be admitted to the bird fauna of the Chicago Area only as a rare winter visitant." As far as we have learned this is the only record for Jackson Park, although it is quite possible that others have been seen in previous years.— L. L. MACKENZIE, W. W. LYON, *Chicago, Ill.*

Another European Widgeon in Virginia.— On Christmas Day, 1914, Messrs. Chas. J. and Laurence Rumsey, of Ithaca, N. Y., were duck-hunting at Virginia Beach, Va. After the main flight of the morning was over, a single bird came to the decoys and was shot. This bird proved to be a first-year male European Widgeon (*Marca penelope*). It was in nearly complete winter plumage, though the back and flanks were still rather plentifully sprinkled with the dull feathers of the post-juvinal plumage, and the white wing-spot was only suggested by one white covert in each wing. The specimen was fortunately saved and presented to me, and is now in my collection.

This note is submitted for record as it is interesting to know whether or not this European species is becoming increasingly abundant in America. Two others,— Princess Anne Co., Va., January 5, 1915, and Currituck Co., N. C., January 27, 1915, are recorded by Mr. H. H. Bailey in 'The Oologist' for March, 1915.— LOUIS AGASSIZ FUERTES, *Ithaca, N. Y.*

Snow Geese and Swans in Massachusetts.— On November 20, 1914, five Lesser Snow Geese (*Chen h. hyperboreus*) were shot at Robbin's Pond, East Bridgewater. These birds, two adults and three young, were mounted by C. Emers on Brown. Three other Snow Geese are said to have been taken at Robbins Pond in 1913.

On November 21, two swans were seen by the gunners at Oldham Pond, Pembroke. They circled around a number of times and then headed towards Silver Lake where they were also seen.— J. C. PHILLIPS, *Wenham, Mass.*

Wilson's Snipe Wintering in Nova Scotia.— Mr. R. W. Tufts of Wolfville, Kings County, Nova Scotia sent me a Wilson's Snipe (*Gallinago delicata*) which he shot at Wolfville, February 17, 1915. He said this bird (which proved to be a male) was discovered in a sheltered spring swamp or bog, which never wholly freezes and where the grass shows green even in the severest winter weather. The bird was in fine condition, being well protected with fat.— JOHN E. THAYER, *Lancaster, Mass.*

Spotted Sandpiper and Water.— In 'The Auk' for April, 1915, p. 227, Mr. L. L. Jewel speaks of a crippled Spotted Sandpiper (*Actitis macularia*) diving and swimming under water. I have found this to be a regular habit in young of the species at Mastic, Long Island. I remember distinctly the last one I banded at this place, a bird not yet able to fly, which, when pursued took to the water. I reached down and grabbed it below the surface where it was swimming with its wings.

In this connection I would like to relate a boyhood experience which I do not remember ever to have published. While crossing a small bay at Far Rockaway, Long Island, a Spotted Sandpiper was observed flying excitedly about close to the surface. Its actions were inexplicable until suddenly a hawk swooped to it from out of the sky somewhere. The Sandpiper dropped upon the surface where it lay limp as though dead. After making one or two more unsuccessful swoops the hawk departed. When approached the Sandpiper first sat up like a little duck, then rose and flew ashore.— J. T. NICHOLS, *New York City.*

Gray Sea Eagle off Nantucket.— I should like to record what appears to be the "farthest south" record for the Gray Sea Eagle (*Haliaeetus albicilla*). This bird, which is in immature plumage, flew aboard the Dutch steamer 'Arundo,' as she was passing Nantucket light ship, on November 14, 1914. It was secured alive by the captain, and is now living in the New York Zoölogical Park.— LEE S. CRANDALL, *Assistant Curator of Birds, N. Y. Zoöl. Park.*

Young Kingbirds on a Cherry and Dragon-fly Diet.— I was watching a pair of Kingbirds feeding their young in a nest built in a pine about fifteen feet from the ground. A telephone-wire passing nearby furnished a temporary resting place for the parent birds, and at the same time gave me an excellent opportunity of noting the various kinds of insects which were dropped into the gaping mouths of the young birds about ten or twelve days old. The exact species of insects could not be identified, but among various kinds of flies, moths and butterflies, to my amazement a large green dragon-fly with great head and eyes, measuring across the wings at least four inches, was jammed wings and all, into the mouth of one of the little ones. After a few moments, as if for dessert, a large red cherry fully one-half inch in diameter was rammed home in the same manner, and

in another minute or two another cherry met a similar fate. I watched these birds with some curiosity, and saw them about four days later leaving the nest apparently all well, and none the worse for the strenuous ordeal.—
WM. L. BAILY, *Ardmore, Pa.*

The Bohemian Waxwing (*Bombycilla garrula*) at Ithaca, N. Y.—

While walking over the campus of Cornell University at noon on November 28, 1914, we observed a flock of about a dozen Cedar Waxwings in a group of trees that included a berry-laden mountain ash (*Pyrus americana*). An hour later we had stopped to watch the birds again, and were discussing the points of difference between the notes of our two species of Waxwings. At that moment the characteristic notes of *Bombycilla garrula* most opportunely caught our attention, and their author was presently distinguished among the rest of the Waxwings by means of its larger size and its white wing markings. In order that others might share in the pleasure of seeing such an unusual visitor, we summoned by 'phone Messrs. A. A. Allen, L. A. Fuertes, and A. H. Wright, and all were enabled to make observations on the bird under very favorable conditions.

Its actions accorded with the proverbial gentleness and amicability of the Waxwings. It allowed a Cedar Waxwing to perch beside it and feed upon the same cluster of mountain-ash berries; and twice a berry seemed to be passed from one to the other. It was somewhat restless, and once it circled swiftly around a nearby house, swerving from side to side in an erratic course suggesting that of a Teal.

The following prominent characters served to distinguish the Bohemian Waxwing from the other species in the field: its larger size; the white markings in the wing, conspicuous whether the bird is flying or at rest; the larger patch of black on its chin; its generally grayer coloration; and its chestnut-rufous under tail coverts.

Furthermore, its notes are very diagnostic. Though similar in general form to the "beady notes" of *B. cedrorum*, they are less shrill, are more leisurely uttered, and have a more noticeable rolling sound. They are also more distinct, there being a comparatively greater interval between each syllable in the series. The call has been represented by Seebohm as *cir-ir-ir-ir-re* (quoted in Sharpe's 'Hand-book to the Birds of Great Britain,' Vol. I, p. 177) and by Cameron as *zir-r-r-r* ('The Auk,' Vol. XXV, 1908, p. 47), but neither rendering seems to express exactly the decidedly sibilant quality of *each* syllable.

The bird was collected by Dr. Allen, and sketched in the flesh by Mr. Fuertes. It proved to be an adult male in full plumage. The skin has been placed in the collection of the Cornell University Museum. This is the first specimen recorded from the Cayuga Lake Basin.

On the following morning another Bohemian Waxwing was reported in the same place by Mr. H. H. Knight.—LUDLOW GRISCOM AND FRANCIS HARPER, *Ithaca, N. Y.*

Prothonotary Warbler at South Vineland, N. J.—On June 19, 1914, while studying birds in the Maurice River swamp, about two miles west of South Vineland, New Jersey,—a swamp with which I have been long familiar—I had the pleasure of observing a Prothonotary Warbler (*Protonotaria citrea*) under conditions which left no doubt as to the bird's identity. For several seasons past I had observed a male Redstart (*Setophaga ruticilla*) during the month of June in a certain portion of the swamp and went there on this occasion to determine whether or not this species was breeding. On arriving at the spot I not only found the male Redstart but also the female and soon noticed the latter carry food to its young—a bird just able to fly—in a small water birch tree near by. The Redstarts kept up an incessant chirping and soon other birds in the neighborhood joined in with their notes of alarm, creating quite a disturbance. Presently a new note was heard, well back in the swamp, which I took for the alarm call of the Water-Thrush (*Sciurus n. noveboracensis*) although I knew that it was hardly probable that such was the case, it being far too late for such an occurrence. I waited quietly; the bird continued chirping and drawing nearer, and I was soon able to see the bright yellow bird at a distance of about fifteen feet. I observed it for a number of minutes while it continued to hop about and utter its Water-Thrush like note of alarm. The bird appeared quite excited and I searched a number of likely looking stumps for a nest but without result, nor did I see more than one bird. After a short time the bird disappeared in the thick undergrowth. I was positive that I had seen a Prothonotary Warbler which I believe is a very rare bird in this locality, and on looking the matter up in Chapman's 'Warblers of North America' found that the alarm note of this species is very difficult to distinguish from that of the Water-Thrush and this fact I think cleared up any possible doubt as to the bird's identity. The only other bird inhabiting this region that could possibly be mistaken for the Prothonotary is the female Hooded Warbler and although this bird has a very sharp note of alarm it does not in the least resemble that of the Water-Thrush.

The swamp at the place mentioned extends for about a quarter of a mile on each side of the river. The vegetation of course is, like that of all south Jersey streams, very thick and difficult to explore. The warbler was observed in that portion quite close to the river which is covered most of the time with a few inches of water although during droughts it is comparatively dry, with water in small pools only.—JULIAN K. POTTER, Camden, N. J.

Brown Thrasher Wintering in Mass.—There are one or two records of the Brown Thrasher (*Toxostoma rufum*) having been seen in Massachusetts late in the winter or during one month of the winter. On January 3 I saw an individual, which I took to be a male, sitting in some low bushes beside the Boston and Albany R. R. tracks on the Brookline side of the Parkway near the Longwood station. He seemed to be in good

health and while secretive was fairly tame and up to the present writing (February 28) he has remained within a hundred yards of the place where I first found him. A pair of Thrashers nested here last summer and, I suppose, it is more than likely this bird was one of the pair. There has been cracked corn scattered near the thicket in which he makes his home and there is a large chunk of suet in a tree near by, but I have not seen him touch either, and have watched him scratching among the dry leaves and feeding on the ground. Several friends have seen and watched the Thrasher with me. The following are the dates on which I have seen him.: January 3, 14, 17, 24, 31, February 7, 12, 21, 28.—CHARLES B. FLOYD, *Brookline, Mass.*

Birds Observed in Trinity Churchyard, New York City.—While in New York on October 15, 1914, I attended the noon day peace services at old Trinity Church, after which I took a stroll about the churchyard, and noted the following birds contentedly feeding undisturbed by the noise and bustle of lower Broadway:—

Junco.—Two Juncos observed in company of a small flock of English Sparrows feeding on the lawn.

White-throated Sparrow.—One seen scratching among the dead leaves, under some shrubbery.

Song Sparrow.—One observed feeding on the ground, under the shrubbery.

Hermit Thrush.—Three seen running about on the ground or perched on top of a tombstone.

Brown Creeper.—One observed diligently scrambling up an old scarred and weather-beaten tombstone, peering into every crack and crevice for some tender morsel.

Overshadowed by "sky-scrapers" and flanked by surface and elevated street cars, Trinity Churchyard is about the last place one would expect to find any birds other than English Sparrows.—JOS. E. GOULD, *Norfolk, Va.*

Type Locality of Lewis's Woodpecker and Clarke's Nutcracker.—In looking through the 'Original Journals of the Lewis and Clark Expedition' edited by Dr. R. G. Thwaites (1905), I find several mentions of Lewis's Woodpecker and Clark's Crow on the journey out to the Pacific. Then on the return trip under date of May 27, 1806, when encamped on the northeast side of the Kooskooske River west of the Bitter Root Mts. in Idaho, Lewis writes as follows: "The Black Woodpecker which I have frequently mentioned and which is found in most parts of the Rocky Mountains as well as the Western and S. W. mountains, I had never an opportunity of examining until a few days since when we killed and preserved several of them." An excellent description follows.

In the entry of the following day at the same place he writes "Since my arrival here I have killed several birds of the *corvus* genus of a kind

found only in the rocky mountains and their neighborhood. I first met with this bird above the three forks of the Missouri and saw them on the heights of the Rocky Mountains but never before had an opportunity of examining them closely, the small *corvus* described at Fort Clatsop is a different species, [= *Perisoreus*] though until now I had taken it to be the same, this is much larger and has a loud squawling note something like the mewling of a cat." A good description follows.

As Alexander Wilson described these birds from specimens brought home by the expedition it follows that the locality where the specimens were shot becomes the type locality not that at which the species were first seen, as given in the A. O. U. Check-List.—WITMER STONE, *Acad. Nat. Sciences, Philadelphia*.

RECENT LITERATURE.

Levick's 'Antarctic Penguins.'¹—Since the return of the various Antarctic expeditions of the last few years the general public, through lectures, motion pictures and publications, has come to have a better knowledge of the life history of Penguins, than most of the best informed ornithologists possessed a decade ago. The life history of these curious birds is well worthy of the attention it has received and cannot help but fascinate all who are interested in the study of wild life. Dr. G. Murray Levick who accompanied Capt. Scott on his ill-fated expedition has presented the story of the Penguins in a most attractive way in the little volume before us, based on his experiences with the Adeline Penguins (*Pygoscelis adeliae*) at Cape Adare. The book is well written, well printed and illustrated by 74 admirable half-tones from photographs.

What corresponds to the 'spring' migration of the Penguins began on October 13 when the first arrival from the north reached the breeding ground, and in the course of a week thousands upon thousands of the curious birds had landed and waddled across the ice and snow to the rookery many of them ascending a thousand feet to the highest part of Cape Adare.

The Adeline Penguin builds a nest of pebbles upon which the two eggs are laid and incubated alternately by the parent birds. Until this time neither males or females leave the rookery and consequently get no food though the males eat snow from adjacent drifts. The fasting period lasts 27 days or more, and afterwards there is a continuous stream of dirty incubating

¹ Antarctic Penguins. A Study of their Social Habits. By Dr. G. Murray Levick, R. N., Zoologist to the British Antarctic Expedition (1910-1913). New York: McBride, Nast & Company, 1914. Svo, pp. 1-140, figs. 1-74. \$1.50 net.

birds waddling down to the water, nearly half a mile distant, and fresh, clean birds coming back from their bathing and feeding to take their turns on the nests. When the young are hatched the parents have the double task of feeding themselves, and carrying back food enough for their rapidly growing chicks, and to quote Dr. Levick "so distended were their stomachs that they had to lean backward as they walked to counterbalance their bulging bellies." The young of course are fed by regurgitation directly from the stomach of the parent. Dr. Levick presents most interesting accounts of the mating, fighting, stealing of building material and other activities of the rookery as well as the actions of the birds in the water, their diving and leaping in and out onto the ice, and their play on the ice cliffs and floes. The birds showed no fear of man and one could walk through the rookery at pleasure.

The student of animal behavior will find much interesting material in Dr. Levick's book and many interesting statements are accompanied by most convincing photographs of the birds going through their performances. Probably no birds offer such opportunities for the study of nesting communities and of the peculiar habits that have arisen from the close association of such multitudes of individuals.

An appendix describes the Skuas (*Megalestris maccormicki*), and their habits — those robbers of the rookeries who depend largely for food upon the eggs and young which an inadvertent parent Penguin may leave for a moment unguarded. There is also a short account of the Emperor Penguin (*Aptenodytes forsteri*).

Altogether Dr. Levick's book is unique, and will appeal to all ornithologists, — whether their specialty be, habits, behavior, oölogy or photography — as well as to the public at large for whom these strange, erect, man-like little birds have a strange fascination. — W. S.

Miller on Ptilosis, with Special Reference to the Feathering of the Wing.¹ — Mr. Miller is doing excellent work on the structure of birds with regard to their systematic relationship. We shall need much additional data before a satisfactory classification shall be drawn up and any facts on comparative structure are welcome. In the present paper he considers the ptilosis of the wing in various birds which have been received in the flesh from the New York Zoölogical Park. Many points of interest are brought out which contradict current statements, as for instance the presence of an aftershaft in some parts of the plumage of the Osprey, the absence of which was considered a subfamily character, and the absence of the eleventh primary in the Pigeons, a group said by Gadow to possess eleven primaries. In commenting upon relationships Mr. Miller also calls

¹ Notes on Ptilosis with Special Reference to the Feathering of the Wing. By W. DeW. Miller. Bull. Amer. Mus. Nat. Hist., XXXIV, Art. VI, pp. 129-140. March 19, 1915.

attention to color combinations the importance of which as a character has been several times emphasized by the reviewer.

In his remarks on the ptilosis of *Podargus* and the *Trochilidæ* we notice no reference to the papers of Dr. Hubert Lyman Clark in 'The Auk,' 1901, p. 167 and 1906, p. 68. Mr. Miller will find some of his statements already recorded there. While it is satisfactory to have previous work verified, reference should be given to it, and we think these two papers must have escaped Mr. Miller's eye.

In a footnote on p. 134 occur some comments on generic names of Parrots. Among other things Mr. Miller fails to see how the names proposed by Kuhl for "sections" of certain genera can be rejected as has been advocated by Mr. Gregory Mathews (*Novitates Zool.*, XVIII, p. 11). We heartily agree with Mr. Miller that no distinction can be made between subgenera and "sections" and that these names must be recognized. In the case of *Conurus*, however, Mr. Miller apparently overlooked the fact that, as Mr. Mathews explains, Lesson fixed as the type of this genus a species of *Palæornis*, which action transfers the name *Conurus* to this old world group necessitating the adoption of *Aratinga* for the South American Conures.—W. S.

Cory on New South American Birds.¹—Mr. Cory describes twenty-one new forms in the present paper, based on material obtained by the various Field Museum South American expeditions. They are as follows: *Crypturus tataïpa peruviana* (p. 293), Central Peru; *Nothoprocta ambigua* (p. 293), Otusco, Peru; *Odontophorus plumbeicollis* (p. 294), Ceara, Brazil; *Columba rufina andersoni* (p. 294), Boa Vista, N. Brazil; *C. r. tobagensis* (p. 295), Tobago; *C. plumbea propinqua* (p. 295), Moyobamba, Peru; *C. subvinacea zullia* (p. 295), Zulia, Venezuela; *Aramides cajanea venezuelensis* (p. 296), Encontrados, Venezuela; *A. c. peruviana* (p. 296), Moyobamba, Peru; *Cerchneis sparverius peruviana* (p. 296), Chachapoyas, Peru; *C. s. distincta* (p. 297), Boa Vista, Brazil; *C. s. margaritensis* (p. 297), Margarita Island; *C. s. ochracea* (p. 298), Colon, Venezuela; *Otus choliba margaritæ* (p. 298), Margarita Island; *Speotyto cunicularia arubensis* (p. 299), Aruba Island; *S. c. beckeri* (p. 299), Bahia, Brazil; *S. c. intermedia* (p. 300), Pacasmayo, Peru; *Podager nacunda minor* (p. 300), Boa Vista, Brazil; *Nyctidromus albicollis obscurus* (p. 301), Yurimaguas, Peru; *Caprimulgus hirundinaceus crissalis* (p. 301), Bahia, Brazil; *Threnetes longicauda* (p. 301), Ceara, Brazil.—W. S.

Shufeldt on the Tree Ducks.²—This paper consists of an extended description of the skeleton of *Dendrocygna* compared with those of certain

¹ Descriptions of New Birds from South America and Adjacent Islands. By Charles B. Cory. *Field Mus. Nat. Hist. Publ.* 182, Ornith. Series, Vol. 1, No. 8. February 23, 1915, pp. 293-302.

² Contribution to the Study of the "Tree-Ducks" of the genus *Dendrocygna*. By R. W. Shufeldt. *Zool. Jahrbüch.* 1914, pp. 1-70, pl. 1-16.

ducks, geese and swans. The author's conclusions are the same as those he reached on a previous occasion, being those held by "the most eminent ornithologists and avian taxonomers of the Old World" -- that *Dendrocygna* belongs with the ducks and not with the swans or geese with which the A. O. U. Check-List associates the genus. Dr. Shufeldt's criticism of the classification of the latter work shows that he has not read the preface where the reasons for maintaining the original sequence of groups are given. A "Check-List" need not be a "Phylogenetic System" and the A. O. U. Committee clearly states that the sequence followed does not represent present day classification. No less than 14 double page half-tone plates of the osteology of *Dendrocygna* and allied genera are used in illustration of Dr. Shufeldt's paper as well as two crude colored plates of tree ducks.—W. S.

Shufeldt on Fossil Birds in the Marsh Collection.¹— In this paper Dr. Shufeldt presents the results of his studies of the avian fossils in the Marsh collection in the Yale University Museum and certain of Marsh's types of fossil birds in the Academy of Natural Sciences of Philadelphia. Prof. Marsh left much material unidentified and from this Dr. Shufeldt has described a number of new forms. viz: *Telmatornis rex* (p. 27), New Jersey Cretaceous; *Botauroides* (gen. nov.) *parvus* (p. 33), *Eoecornis* (gen. nov.) *ardetta* (p. 39), *Falco falconella* (p. 40), and *Grus marshi* (p. 41), all from the Eocene of Wyoming; *Colymbus oligoceanus* (p. 54), *Larus pristinus* (p. 54), *Limicolavis pluvianella* (p. 55), and *Phalacrocorax marinavis* (p. 56) from the Oligocene (?) of Oregon; *P. mediterraneus* (p. 58) and *Phasianus americanus* (p. 58) from the Oligocene of Colorado and Oregon respectively; *P. mioceanus* (p. 60), Nebraska Miocene, *Sula atlantica* (p. 62), New Jersey Miocene, *Tympanuchus lulli* (p. 69), Post-pliocene of New Jersey; *Colinus eatoni* (p. 70), Kansas, *Gavia pusilla* (p. 70), Wyoming (?), *Phasianus alphilda* (p. 71), Wyoming, the last three with no horizon recorded. A new genus *Minerva* (p. 43) is proposed for *Aquila antiqua*.

Dr. Shufeldt has added materially to the list of North American fossil birds, but there are two nomenclatural points in his valuable paper that call for comment. One is the naming "provisionally" a species *Colymbus oligoceanus*. After the numerous discussions of rules of nomenclature that have been going on of late years we thought that one point was pretty generally understood, i. e. that it was impossible to name a species *provisionally*. A name once published stands or falls on the original diagnosis no matter how poor or incomplete it may be. Another species is called by Dr. Shufeldt *Phasianus americanus*, but this name has been previously used by Audubon (*Orn. Biog.* V, p. 335, 1839). The name was proposed for a bird seen and described by J. K. Townsend; what it was it is diffi-

¹ Fossil Birds in the Marsh Collection of Yale University. By R. W. Shufeldt. *Trans. Conn. Acad. Arts and Sciences*, Vol. 19, pp. 1-110. February, 1915.

cult to say, but the name seems to have a status in nomenclature and hence renders Dr. Shufeldt's name invalid. We would propose as a substitute **Phasianus roberti** nom. nov. after Dr. Robert W. Shufeldt.—W. S.

White on an Expedition to the Interior of Australia.¹—This paper treats of the scientific results of a trip, on camel back, of 1300 miles undertaken by Capt. and Mrs. White primarily for the purpose of adding to the knowledge of the avifauna of interior Australia. Their route lay north from Oodnadatta, the railroad terminus 700 miles north of Adelaide, and extended to the headwaters of the Finke and Todd Rivers. "A dry and awful country which, when the rain comes, blossoms like the rose, but in a short space of time (about eight weeks) once more subsides into its normal state of drought." Capt. White adds "The dreary aspect and the solitude of this vast country followed us like a nightmare as we travelled south." Collections in various departments were made and are treated by specialists, the narrative and the account of the birds being by Capt. White. One hundred and eighteen species and subspecies are listed, six of which have been described as new by Mr. Gregory M. Mathews in the 'Austral Avian Record.' The stomach contents of sixteen species are described by Mr. Arthur M. Lea.—W. S.

Cassinia, 1914². The editor of the Delaware Valley Club's publication, Mr. Robert Thomas Moore, has brought out another exceedingly interesting number, though its appearance is somewhat delayed. While the policy of restricting the scope of 'Cassinia' to the states bordering on the Delaware is wisely continued, the character of the articles demonstrates the unlimited possibilities of intensive study in a limited area.

Dr. Spencer Trotter contributes to the series of biographical papers a discussion of 'Old Philadelphia Bird Collectors and Taxidermists' in which a disappearing type is considered from personal acquaintance with such examples as Chris. Wood, John Krider, etc. John D. Carter shows the possibilities of close observation on Delaware River birds even though only a short time each day may be available for the purpose. George Spencer Morris gives a delightful account of the Tacony Valley where his home is located and about which are centered all his early ornithological associations.

Henry Oldys has a paper on 'Individual Variety of Bird Songs' suggested by a paper by Mr. Moore in last year's issue of 'Cassinia' and Dr. Cornelius Weygandt writes of 'Summer in the Poconos' in his attractive style.

¹ Scientific Notes on an Expedition into the Interior of Australia carried out by Capt. S. A. White, M. B. O. U., from July to October, 1913. Trans. Royal Soc., So. Australia, XXXVIII, pp. 407-474, pll. XXI-XXXIX, 1914.

² Cassinia: A Bird Annual. Proceedings of the Delaware Valley Ornithological Club, 1914. pp. 1-80, pll. I-V. March [= April, 1915.] Delaware Valley Ornith. Club, care Acad. Nat. Sciences, Philadelphia. Price 50 cts.

The summary of the spring migration is fuller than usual owing to a material increase in the corps of observers, and there are the 'Abstract of Proceedings,' 'Bibliography' and 'Club Notes.' Under the last appears an account of the Twenty-fifth anniversary dinner of the Club on January 7, 1915, at which 66 members and seven guests were present. The average attendance at the meetings during 1914 was approximately 24.—W. S.

Publications on Bird Protection.—Mr. E. H. Forbush's annual report¹ as state ornithologist of Massachusetts is, as usual, full of interesting facts and valuable suggestions. Among other things he shows the effect of birds in checking the ravages of the army worm, the effect of the destruction of ducks, herons and other aquatic birds on the abundance of mosquito larvæ and the prevalence of diseases transmitted by these insects. Ducks at least are known to devour mosquito larvæ in quantities. The European Starling and the havoc it causes in the orchards by pecking apples and pears and devouring cherries are also considered at length.

The Alabama Bird Day Book for 1915² for which the Commissioner of Game and Fish, Mr. John H. Wallace, Jr., is responsible, is as usual admirably fitted for its purpose, replete with short sketches and poems suitable for Bird Day celebrations and illustrated by some of the Mumford color plates of familiar species. Alabama stands well in the lead among the states of the Union in furthering the observance of Bird Day.—W. S.

Bird Enemies of two Beetle Pests.—The huisache (*Acacia farnesiana*) a favorite shade tree in the southwest is damaged by a longicorn beetle (*Oncideres putator*). "It is believed that the Southern Downy Woodpecker (*Dryobates pubescens*) and probably also the Texas Woodpecker (*Dryobates scalaris bairdi*) attack the larvæ. While neither of these birds has been found with larvæ, they have been observed at work on branches that contained numerous larvæ of this insect and have left empty chambers behind."³

A click beetle, seriously injurious to corn, oats and cotton, is reported upon by entomologists of the South Carolina Agricultural Experiment Station. They report that in both 1912 and 1913 "the elytra of this beetle were recognized in the excrement of a Nighthawk, presumably *Chordeiles virginianus*. These elytra were found to be very frequent in the excrement of this bird in a field of tasseling corn where thousands of these

¹ Seventh Annual Report of the State Ornithologist [of Massachusetts] for the Year 1914, Sixty-second Ann. Rept. State Board of Agr., pp. 1-31. January 13, 1915.

² Alabama Bird Day Book. Issued by Department of Game and Fish. John H. Wallace, Jr., Commissioner; Miss Sophia Watts, Secretary. [Montgomery, Ala.]

³ High, M. M. The huisache girdler. Bull. 184, U. S. Dept. of Agric., April 8, 1915, p. 8.

beetles had congregated.”¹ Records of the Biological Survey show this beetle to be devoured by the following additional species of birds: Killdeer, Least Flycatcher, Starling, Orchard Oriole, English Sparrow, Gray-cheeked Thrush and Robin.—W. L. M.

Dissemination of the Chestnut-blight Fungus.—In ‘The Auk’ for January, 1915,² the writer reviewed a paper on birds as carriers of the chestnut-blight fungus.³ It was then remarked that “the part birds play in the general spread of the disease is so small that it will never be seriously urged as a reason for diminishing bird protection.” If further argument were needed to buttress this position, it is available in abundance in a paper by the same authors (plus one) on “Air and wind dissemination of Ascospores of the Chestnut-blight Fungus.”⁴

Two paragraphs of their conclusions are quoted: “In and near badly diseased chestnut groves or forests the number of ascospores falling on each square foot of exposed surface following a period of rain, as indicated by exposure plates, is very large and is sufficient to offer abundant opportunity for new infections.”

“All of these experiments point to air and wind transport of the ascospores of the chestnut-blight fungus as one of the very important methods of dissemination. . . . It can now be said with absolute certainty that following each warm rain of any amount ascospores are carried away from diseased trees in large numbers. Since they have been obtained in large numbers at distances of 300 to 400 feet from the source of supply, the conclusion of the authors that they may be carried much greater distances is justified. During dry periods wind dissemination of ascospores does not occur at all or sinks to a very insignificant minimum.”

If the blight is freely distributed by so omnipresent an agency as the wind, the part that birds play in the dissemination must be reckoned as comparatively unimportant.—W. L. M.

The Ornithological Journals.⁵

Bird-Lore. XVII, No. 2. March–April, 1915.

Bird-Life in Southern Illinois. III. Larchmound: A Naturalist’s Diary. By Robert Ridgway.

A Mysterious Bird of the Marsh. By Verdi Burtch.—A study of the Bittern with excellent photographs.

¹ Conradi, A. F. & Egerton, H. C. The spotted click beetle (*Monocrepidius vespertinus* Fab.). Bull. 179, Dec. 1914, p. 7.

² Vol. XXXII, No. 1, p. 119.

³ Journal Agr. Research, II, No. 6, Sept., 1914, pp. 405–422.

⁴ Journ. Agr. Research, III, No. 6, March, 1915, pp. 493–525.

⁵ The name of the editor and publisher of each journal will be found in the January number of ‘The Auk.’

Second Sectional Bird Census, 1914. Taken at Berwyn, Chester County, Pennsylvania. By F. L. Burns.— Compared with a similar census made in 1899–1901 it shows little difference in the totals which are 62 species and 1388 individuals for the earlier count, and 60 species and 1424 individuals for the 1914 census.

The Story of a Red-tailed Hawk. In Two Parts. Part II. By Mrs. A. B. Morgan.

Migration of N. A. Kinglets. By W. W. Cooke. Plumage notes by F. M. Chapman, color plate by Fuertes.

The Educational Leaflet treats of the Towhee and is by T. G. Pearson, with an excellent color plate by Fuertes. The Audubon Society Department also contains an admirably illustrated article by W. L. and Irene Finley on the Road-runner and 'Facts about Cats' by E. H. Forbush.

Mr. Francis Harper contributes a remarkable photograph of feeding Meadowlarks to this number.

The Condor. Vol. XVII, No. 2. March–April, 1915.

Adaptability in the choice of Nesting Sites of Some Widely Spread Birds. By C. H. Kennedy.— Arkansas Kingbird nesting in open box on top of derrick, on a telephone pole and in an old Oriole's nest.

Nesting of the American Osprey at Eagle Lake, California. By M. S. Ray.

Notes on the Murrelets and Petrels. By A. Van Rossem.— Differences between *Brachyramphus hypoleucus* and *craveri* and between *Oceanodroma socorroensis* and *melania*.

Birds of a Berkley Hillside. By Amelia S. Allen.— With photographs of familiar Californian birds.

A Forty Acre Bird Census at Sacaton, Arizona. By M. F. Gilman.

Some Park County, Colorado, Bird Notes. By E. R. Warren.

The Wilson Bulletin. Vol. XXVII, No. 1. March, 1915.

June Birds of Laramie, Wyoming. By W. F. Henninger.— 105 species noted.

Birds by the Wayside, in Europe, Asia and Africa. By Althea R. Sherman.— Interesting observations on the birds of India in January in this installment.

Birds About a Country Home in Winter. By Alice Edgerton.

Comparative Periods of Deposition and Incubation of Some North American Birds. By F. L. Burns.— A compilation from manuscript notes of the author and others as well as from other sources.

The Oölogist. Vol. XXXII, No. 3. March 15, 1915.

A Nest of the Florida Red-shouldered Hawk. By Finlay Simmons.

The Rolling Call of the Pileated Woodpecker. By E. W. Vickers.— Interesting study of this bird.

List of Birds of Eastern U. S. Found in Jamaica and in Colombia in 1913. By Paul G. Howes.

Proceedings of the Nebraska Ornithologists' Union. Vol. VI, Part 2. February 27, 1915.

The Eskimo Curlew and its Disappearance. By M. H. Swenk.—A timely résumé of records with a photograph of a specimen obtained at Charles, Merrick Co., Nebraska, April 20, 1911.

The Oölogist. Vol. XXXII, No. 4. April 15, 1915.

Pileated Woodpecker. By O. Reinecke.—Near Buffalo, N. Y.

White-throated Swifts. By C. F. Schank.—Escondido, Cal.

Bulletin of the British Ornithologists' Club. No. CCIV. February 27, 1915.

Mr. Stuart Baker described (p. 61) *Laiscopus collaris whymperi*, from Garhwal, India.

The meeting was mainly devoted to a discussion of "Coloration as a Factor in Family and Generic Differentiation."

Dr. Percy R. Lowe presented the subject under six headings (1) "The distinction which must be made between colour-pattern and mere coloration"; (2) "The question of concealing coloration and vice versa, viz: brilliancy of coloration"; (3) "The constancy and persistence of colour-pattern"; (4) "The co-relation of colour-pattern with other generic characters"; (5) "Colour-pattern as a phylogenetic or generic clue"; (6) "The relation of colour-pattern to the question of 'genera-splitting' or 'genera-lumping'" (cf. Notes and News of this number of 'The Auk.')

Bulletin of the British Ornithologists' Club. No. CCV. March 29, 1915.

Dr. E. Hartert stated his opinion that *Ænanthe stapanza* and *Æ. aurita* are dimorphic forms of the same species.

Lantern slides were exhibited illustrating the faunal regions of Algeria, and the birds of the mouth of the Yenesei, N. Siberia.

The following new forms were described. By J. D. LaTouche: *Garrulus diaphorus* (p. 98), N. E. Chihli, China. By C. H. B. Grant: *Centropus grillii wahlbergi* (p. 99), Umslango, Pt. Natal; *Indicator minor alexanderi* (p. 99), Gambaga, Gold Coast; *I. exilis leona* (p. 100), Sierra Leone; *I. e. ansorgei* (p. 100), Gunnal, Portuguese Guinea, *Pogoniulus chrysoconus rhodesiæ* (p. 100), Chambesi Valley, Rhodesia, *Dendropicos fuscescens cosensi* (p. 101), Senegal; *D. lafresnayi loandæ* (p. 101), Loanda Dist.; *Thripas namaquus intermedius* (p. 101), Ugogo, German E. Africa; *Jynx ruficollis cosensi* (p. 102), Umala River, Afr.

British Birds. Vol. VIII, No. 10. March 1, 1915.

Notes on Migration at Dungeness, Kent, Autumn 1914. By H. G. Alexander.

Notes on the Habits of the Fulmar Petrel. By O. G. Pike.—With Admirable photographs.

British Birds. Vol. VIII, No. 11. April 1, 1915.

The Blakeney Point Ternery. By Wm. Rowan.—Well illustrated.

Avicultural Magazine. Vol. VI, No. 5. March, 1915.

The Kingfisher and Snipe in Captivity. By G. E. Rattigan.

My Hummingbirds and How I Obtained them. Anon.

Rare Birds in Continental Zoos. By G. Renshaw.

Avicultural Magazine. Vol. VI, No. 6. April, 1915.

A Tame Raven. By R. Phillipps.

Bird Notes and News. Vol. VI, No. 5. Spring, 1915.

On Liberating Cage Birds.

The Birds of Shetland and Orkney.

Bird Notes. Vol. VI, No. 2. February, 1915.

Nesting of the Lesser Grey-headed Guan (*Ortalis vetula*). By R. Suggitt.

British Corvidæ. By F. Dawson Smith. (Cont'd in March.)

A Journey Across the Sierras, S. California. By W. S. Baily. (Also cont'd in March issue.)

Bird Notes. Vol. VI, No. 3. March, 1915.

Birds of the Jhelum District. By H. Whistler. (Cont'd.)

The Emu. Vol. XIV, Part 3. January, 1915.

Royal A. O. U. Fourteenth Session.

Problems of Nomenclature. By A. H. E. Mattingley.—An admirable address by the president of the R. A. O. U. in which he presents a fair consideration of all sides of the question and advocates the use of trinomials and the observance of the International Code of Nomenclature.

The Mallacoota Excursion. By A. H. Chisolm.—The annual field trip of the R. A. O. U., upon which it was possible to study such interesting birds as the Emu Wrens and Satin Bower Birds "while the ringing voices of Lyre Birds floated up from the dense fern gullies with the first hint of dawn"!

The Birds of Mallacoota. By Capt. S. A. White. A well annotated list.

Australian Cuckoos. By H. L. White.—Lists of foster parents of the various species.

Notes upon *Astur cruentus* (*Urospiza fasciata cruenta*). By H. L. White.

Descriptions of New Australian Birds' Eggs. By H. L. White.

The Young of *Climacteris leucophæa*. By J. W. Mellor.

Cuckoos and their Offspring. By S. A. Hanscombe.

Cuckoos — Ejection of Foster Parents' Chicks. By A. G. Campbell.

North Queensland Birds. By D. Le Souëf.

Cuckoos in Tasmania. By Miss J. A. Fletcher.

Missing Birds. By A. J. Campbell.

Notes on Kagus (*Rhinocetus jubatus*). By H. E. Finckh.

Ornithologische Monatsberichte. (In German.) Vol. 23, No. 1. January, 1915.

Further Additions to the Avifauna of Prussian Schlesia. By Paul Kollibay.

Ornithologische Monatsberichte. Vol. 23, No. 2. February, 1915.

Remarks on *Carduelis c. carduelis* and *C. c. major*. By Dr. E. Hesse.

Two New Species from Africa. By A. Reichenow.

Falco pyrrhogaster (p. 25), Bosum, E. Cameroon; and *Dendromus aurei-cuspis* (p. 26), Ussagara, German E. Africa.

Berajah 1914, pp. 15-22.

Contains extensive discussion of the development of down feathers of *Falco peregrinus*.

Proceedings of the Bavarian Ornithological Society. XII, No. 2. (In German.)

Two new forms from Caucasus. By A. Laubman.—*Carpodacus erythrinus kubanensis* (p. 93), Karaul Kisha; *Emberiza cia prageri* (p. 98), Psebai, both localities in N. W. Caucasus.

Miscellanea Ornithologica. By C. E. Hellmayr.—Describes as new *Parus ater prageri* (p. 119), Jagdhaus Kische, N. W. Caucasus; *Pipra aureola scarlatina* (p. 122), Fazenda Cayoá, São Paulo, Brazil; *Urosticte benjamini rostrata* (p. 125), La Selva, W. Colombia.

A Short Contribution to the Ornithology of Espirito Santo, S. E. Brazil. By C. E. Hellmayr.—Annotated list of 56 species.

On a New Grosbeak from Venezuela. By C. E. Hellmayr and J. Graf von Seilern.—*Pheuticus chrysopeplus laubmanni* (160) Galipan, Venezuela.

Revue Française d'Ornithologie. VI, Nos. 64-65. August-Sept., 1914. (In French.)

Specimens of *Fregilupus varius*. By A. Menegaux.—Photograph of four specimens in the Museum of Troyes.

Song Bird Fauna in the Environs of Vendome (cont'd.). By W. E. Coursimault.—Runs through numbers 66-67 and 69.

The Forcol [= Wryneck]. By A. Boutillieri.—A monographic account (completed in No. 66-67).

The Birds of New Caledonia. By A. Menegaux.

Revue Française d'Ornithologie. VI, No. 66-67. October-September, 1914.

The Generic Names *Mesites*, *Mesanas* and *Mesitornis*. By L. Brasil.—*Mesites* Geoff, 1838, antedates *Mesites* Schœnherr, 1838 (Coleoptera), and the substitute names were unnecessary.

Revue Française d'Ornithologie. VI, No. 68. December, 1914.

Note on the Food of the Grosbeak. By P. Paris.

Revue Française d'Ornithologie. VI, No. 69. January, 1915.

Ornithological Notes from French West Africa. Birds of Prey observe April 1913-May, 1914, on the Dakar Peninsula. By Dr. Millet-Horsin.

On *Aepyornis*. By R. Didier.

On the Uropygial Gland in Birds. By Paul Paris.

Revue Française d'Ornithologies. VI, No. 70. February, 1915.

The War and the Birds. By J. L'Hermitte.

Ornithological Notes from French West Africa. The Agni Legend of the Hornbill. By Dr. Millet-Horsin.

Report on a Collection of Birds Brought from India. By A. Engel (to be continued).—Eighty species are listed in this installment.

Revista Italiana d'Ornitologia. III, No. 3-4. July-December, 1914. (In Italian.)

On *Phylloscopus tristis* Blyth. By G. Vallon.

On the Necessity of International Legislation to Prohibit the Importation of Bird Plumage into Europe. By G. Whitaker.

Anomalies in the Coloration of the Plumage of Birds. By G. A. Carlotto.

On the Oriental Forms of the Genus *Guttera*. By A. Ghigi.— A careful monograph.

Hierophasis dissimilis. A New Mutation Form of *H. swinhoii* Gould. By A. Ghigi.— Contains much interesting information on the pedigree of these pheasants bred in captivity through several generations. The advisability of naming such forms as this is however decidedly open to question.

Ornithological Articles in Other Journals.¹

Kellogg, V. L. A Fourth Mallophagan Species from the Hoatzin. (Science, March 5, 1915.)— The nearest allies of three of these parasites of the Hoatzin are found on shore birds and storks, while species congeneric with the fourth occur on pheasants. The data do not throw much light upon the relationship of the Hoatzin but suggest an affinity with water birds rather than with the gallinaceous group.

Swarth, H. S. Albinism in the English Sparrow (Science April 16, 1915).— To the notes on albinism in the English Sparrow, a well known condition that seems to have been just discovered by certain contributors to 'Science,' Mr. Swarth adds some really valuable data. He calls attention to the adaptation of Brewer's Blackbird (*Euphagus cyanocephalus*) to altered conditions brought about by increased settlement in southern California, and to the prevalence of albinism in this species. The House Finch (*Carpodacus mexicanus frontalis*) however, which is still more "domesticated" does not exhibit such a tendency.

Chamberlain, B. R. Marsh Hawk Breeding in South Carolina. (Bull. Charleston Mus., February, 1915.)

Tyler, John G. Allies of the Farmer. (San Joaquin Light and Power Magazine, January, February and March, 1915.)— A series of popular articles on the familiar birds of the San Joaquin Valley, Cal.

Dale, Melville. August Bird Life at Pleasant Point, Ont. (Ottawa Naturalist, March, 1915.)

Clyne, Robt. Notes on Birds Observed at the Butt of Lewis (cont'd.). (Scottish Naturalist, April, 1915.)

Maxwell, Herbert. Waterfowl and the American Pond Weed (*Elodea canadensis*). (do.)— Proves an attractive food plant.

Dewar, J. M. The Sense of Direction. (Zoölogist, February 15, 1915.)— The two theories (1) knowledge of landmarks, (2) sensing position "in terms of bodily displacements in space experienced on the outward journey" are outlined. A number of observations are given which show that the latter is a more satisfactory hypothesis than the former.

Blake, J. Notes on the Birds around Cardiff. (do.)

Selous, E. Ornithological Observations in Iceland, June and July, 1912. (do.)

Patten, C. J. Aquatic Warbler on Migration Obtained on Tuskar

¹ Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

Rock: With Special Reference to the Plumage Markings as Compared with those of the Sage Warbler. (do. March 15, 1915.)

Patterson, H. H. Ornithological War-Notes from Great Yarmouth. (do.)

Finley, W. L. The Bob-White in Oregon. (Oregon Sportsman, February, 1915.)

Froggatt, W. W. Bird Notes (Australian Zoologist, Vol I, Part 2.)—Numerous notes on Australian species.

Dabbene, R. A New Bird for Argentina.—*Manacus manacus gutturosus* (Desm.). (Bolet. Soc. Physis, Buenos Aires I, No. 7, December 31, 1914.)

Hirtz, Dr. M. Critical Remarks on Madarasz's Birds of Hungary. (Glasnik hrvatskoga Prerodoslovnoga Denstia, XXVI, No. 4.)

Keartland, G. A. On the Specific Name of the Blood-stained Cooatoo, *Cacatua sanguinea* Gould. (Victorian Nat., March, 1915.)—*C. sanguinea* and *C. gymnopsis* considered to be identical.

Kershaw, J. A. A Naturalist in Northern Queensland. (Victorian Nat., March, 1915.)

Rothschild, W. and Hartert, E. The Birds of Dampier Island. (Novit. Zool., XXII, No. 1, February 12, 1915) and The Birds of Vulcan Island (do.)—These two islands lie off the northwestern coast of New Guinea; 49 species are listed from the former and 41 from the latter. *Macropygia rufa krakari* (p. 28), Dampier Isl.; *Hypocharmosyna rubrigularis krakeri* (p. 31), Dampier Isl.; *Macropygia amboinensis mceki* (p. 39), Vulcan Isl.; *Tanysiptera hydrocharis vulcani* (p. 42), Vulcan Isl. and *Monarcha chalybeocephalus manumudari* (p. 43), Vulcan Isl. are described as new.

Rothschild, W. and Hartert, E. Notes on Papuan Birds (continued). (Novit. Zool., XXII, No. 1, February 12, 1915.)—*Accipiter fasciatus polycryptus* (p. 53). 'Sogeri dist.' N. Guinea; *Colluricincla brunnea tachycripta* (p. 60), Milne Bay, N. Guinea, subsp. nov.

Hartert, E. In Algeria, 1914. A Journey to the M'Zab Country and Over the Central High Plateaus. (Novit. Zool., XXII, No. 1, February 12, 1915.)—An interesting account of a trip through this desert country and the rediscovery of several species—*Garrulus minor* Verr., *Chersophilus duponti* (Vaill), etc.

Rothschild, W. On the Genus *Fregata*. (Novit. Zool., XXII, No. 1, February 12, 1915.)—While Mathews arrangement of the forms (Austral Av. Rec., II, No. 6) is for the most part endorsed, the fact it pointed out that *Fregata minor* belongs to the bird of the East Indian Ocean, also that the large Galapagos bird is the same as that of the West Indies and being distinct from *F. minor*, this form should be known as *F. magnificens* Math.

Publications Received.¹—**Cory, Charles B.** Descriptions of New Birds from South America and Adjacent Islands. (Publ. 182, Field Mus. Nat. Hist., Ornith. Series, Vol. I, No. 8, pp. 293-302, February 23, 1915.)

¹Owing to the early compilation of Recent Literature for this number, only publications received prior to April 15 are included.—Ed.

Forbush, E. H. Seventh Annual Report of the State Ornithologist of Mass. (Sixty-second Ann. Rept. State Board Agr., pp. 1-29, repaged January 13, 1915.)

Grinnell, Joseph. Conserve the Collector. (Science, February 12, 1915, repaged, pp. 1-4.)

Grinnell, Joseph and Bryant, H. C. The Wood Duck in California. (Cal. Fish and Game, I, No. 2, repaged, January 30, 1915.)

Levick, G. Murray. Antarctic Penguins. A Study of their Social Habits by Dr. G. Murray Levick R. N., Zoologist to the British Antarctic Expedition [1910-1913]. New York, McBride, Nast & Company, 1914. Small Svo. pp. 1-140, figs. 1-74. Price, 1.50 net.

Miller, W. DeW. Notes on Ptilosis, with Special Reference to the Feathering of the Wing. (Bull. Amer. Mus. Nat. Hist., XXXIV, Art. VI, pp. 129-140, March 19, 1915.)

Shufeldt, R. W. (1) Fossil Birds in the Marsh Collection of Yale University. (Trans. Conn. Acad. Arts. and Sci., Vol. 9, pp. 1-110, February, 1915.) (2) Contribution to the study of the "Tree Ducks" of the genus *Dendrocygna*. (Zool. Jahrbüch., pp. 1-70, with 16 plates. 1914.) (3) Review of the Wild Geese of North America, Part II. (Outer's Book, March, 1915.) (4) Eggs of North American Water Birds (Introduction). (Blue Bird, March, 1915.)

Stephens, Frank. Arid California and its Animal Life. (Cal. Fish and Game Com. Report, 1914, repaged, pp. 1-8.)

Swarth, H. S. The Status of the Arizona Spotted Owl. (Condor, XVII, January 20, 1915, pp. 15-19.)

Tyler, John G. Allies of the Farmer (San Joaquin Light and Power Magazine, III, Nos. 1-3, January-March, 1915.)

Wallace, John H., Jr. Alabama Bird Day Book. Svo. pp. 1-96, numerous plates. Dept. of Game and Fish, Montgomery, Ala.

White, S. A. Scientific Notes on an Expedition into the Interior of Australia carried out by Capt. S. A. White, M. B. O. U., from July to October, 1913. (Trans. Royal Soc. South Australia, Vol. XXXVIII, 1914, pp. 407-474, pls. XXI-XXXIX.)

Abstract Proc. Zool. Soc. London, Nos. 139-141.

American Museum Journal, The, XV, No. 3, March, 1915.

Australian Zoologist, The, Vol. I, Part 2, February 22, 1915.

Avicultural Magazine, (3) VI, 5-6, March-April, 1915.

Bird-Lore, XVII, No. 2, March-April, 1915.

Bird Notes and News, VI, No. 5, Spring, 1915.

British Birds, VIII, Nos. 10-11, March-April, 1915.

Bulletin British Ornith. Club, Nos. CCIV-CCV, February 27 and March 29, 1915.

Bulletin of the Charleston Museum, XI, Nos. 2 and 3, February-March, 1915.

Bulletin Univ. State of N. Y., No. 11, Bird Day circular, 1915. [Broad-side.]

- Cassinia**, Proceedings of the Delaware Valley Ornithological Club, No. XVIII, 1914, pp. 1-80, pls. I-V. (Issued March [= April 17], 1915.)
- Condor**, The, XVII, No. 2, March-April, 1915.
- Emu**, The, XIV, Part 3, January, 1915.
- Forest and Stream**, LXXXIV, Nos. 3 and 4, March-April, 1915.
- Oölogist**, The, XXXII, Nos. 3, 4, March and April, 1915.
- Oregon Sportsman**, The, III, No. 2, February, 1915.
- Ottawa Naturalist**, The, XXVIII, Nos. 11, 12, February and March, 1915.
- Proceedings** Cal. Acad. Sci., IV, Nos. 4-5; V, Nos. 1-2, March 14 and 26, 1915.
- Proceedings** National Acad. Sci., I, No. 3, March, 1915.
- Revue** Francaise d'Ornithologie, VI, Nos. 64-65, 66-67, 68. September, November and December, 1914; VII, Nos. 69, 70, January and February, 1915.
- Revista** Italiana di Ornitologia, III, No. 3-4, July-December, 1914.
- Science**, N. S., XLI, Nos. 1056-1061.
- Scottish** Naturalist, The, Nos. 39, 40, March and April, 1915.
- Verhandlungen** der Ornith. Gesell. in Bayern. XII, Heft. 2, February 8, 1915.
- Wilson** Bulletin, The, XXVII, No. 1, March, 1915.
- Zoologist**, The, XIX, Nos. 218 and 219, February and March, 1915.

NOTES AND NEWS.

HARRY KIRKLAND POMEROY, an associate member of the American Ornithologists' Union, died of Typhoid Fever in Kalamazoo, Mich., on January 27, 1915.

Mr. Pomeroy was born in Lockport, New York, April 3, 1865, and moved to Kalamazoo, Mich., in 1872. His favorite study was Ornithology and his collection of birds' nests and eggs is one of the best in the State.

The many friends who enjoyed the privilege of Mr. Pomeroy's acquaintance will learn with deep regret of his untimely death. His kindly considerate nature and earnest helpfulness to his friends were among the many sterling characteristics that helped to endear him and make him beloved by them all.

Mr. Pomeroy was an active member of the Cooper Ornithological Club and deeply interested in western ornithology and oölogy. His excellent collection is an enduring monument to his industrious habits and studies during the leisure hours snatched from a busy outdoor life.—E. ARNOLD.

WE learn with great regret of the death of Lord Brabourne, who was killed in action on March 13, 1915, in the twenty-ninth year of his age. He had returned only recently from South America where he was collecting material for the work on 'The Birds of South America' which he was writing in conjunction with Mr. Charles Chubb and of which only one part had appeared. Lord Brabourne was an officer of the Grenadier Guards.

THE question of the limits of genera bids fair to be the most serious problem in zoölogical nomenclature. In the recent 'List of British Birds' there are 171 species and 151 generic groups which are to be found also in the A. O. U. Check-List. The two committees working under the International Code have, after making allowance for several admitted errors or arbitrary violations of rules, arrived at the same names for all but four of the species, while the latest British list differs from that of Dr. Hartert and his associates in only 3 specific cases. When three independent committees approach so close to uniformity it would seem that the International Code had solved the problems of nomenclatural discrepancy.

In the case of the 151 genera, however, we find 49 cases where the names employed are different. After making allowance as above we find that only 7 of this number are due to questions of nomenclature, i. e. to the still unsettled point as to how much difference in spelling constitutes a different word and to the recognition of certain works in systematic nomenclature.

The other 42 cases are due to difference of opinion as to the limitation of genera. One committee, for instance, considers that the Mallard, Blue-winged and Green-winged Teal, each represents a distinct genus and consequently calls them *Anas brachyrhynchos*, *Querquedula discors* and *Nettion carolinense*. Another considers that they all belong to one genus and quotes them as, *Anas brachyrhynchos*, *Anas discors* and *Anas carolinensis*. The third regards the Teal as congeneric but considers that the Mallard represents a distinct genus and we have, *Anas brachyrhynchos*, *Querquedula discors* and *Querquedula carolinensis*. It will be noticed that there is here just as much confusion and difference of opinion as could possibly be occasioned by the law of priority, the 'first species' rule of type fixation, or any of the other principles of nomenclature against which such protests have been directed; and yet this is due purely to a question of ornithology with which the rules of nomenclature and the "name jugglers" have nothing whatever to do.

Now if the name of a bird is to be used as a medium to exploit personal opinions as to the phylogeny and relationship of species we had better devise some other means of tagging a species so that some one else will know what we are talking about.

If on the other hand the name of the bird is to constitute such a 'tag' then we should by some international and arbitrary agreement decide these disputed cases so that we may have the same uniformity *ornithologically* that we seem to have at last attained *nomenclaturally*.

The great majority of ornithologists are pretty well agreed upon the great

majority of genera and there will not be so very many to be settled arbitrarily, but such arbitrary action, if we are to have a permanent and universal system of names, seems to be inevitable. Those who wish to make further subdivisions may still use the suppressed names as subgenera in any discussion or systematic monograph.

Another phase of the same question is the increasing tendency to recognize finer and finer generic divisions, a matter which has been discussed by the writer (*Jour. Acad. Nat. Sci. Phila.* XV, p. 313) and by the British Ornithologists' Club at a recent meeting (*Bull. B. O. C.*, No. CCIV, p. 68 et seq.). In some groups we have already reached the stage where a large number of genera contain but a single species each. The generic name has thus become of exactly the same significance as the specific name and is superfluous. The ultimate outcome of this sort of thing will be a nomenclature wherein each species will have a name but no clue whatever to its relationship will be found in this name.

Linnæus' idea was that the 63 genera under which he arranged all the birds known to him, represented 63 types of bird structure and when the generic name was mentioned the general character of the bird was immediately known, while the specific name indicated a form of that type of bird.

Of course we cannot go back to Linnæus or anywhere near to him, but we *must*, if a name is to be maintained *as a name*, check the further subdivision of genera. Moreover why is the discovery of a slight structural difference of such paramount importance that we should overturn our names to advertise it? Is it not just as important to emphasize relationship as divergence? Indeed we are suffering at the present time in systematic ornithology for the need of some way to indicate relationship. We shall soon be forced to erect a lot of subfamilies to indicate relationships formerly denoted by generic names which have now been degraded until they are perilously close to species.

It should be born in mind that a genus is not a definite thing in the sense that a species is; it is simply a group for convenience, sometimes it is sharply defined, more often it is not. This fact is well shown in the virtual agreement of the committees referred to above as to the number of species before them and their wide differences of opinion as to the number of genera.

It is difficult to provide a means for bringing about the desired uniformity in the limits and number of generic groups, but the necessity for such action should be strongly emphasized and widely proclaimed.

THE thirty-third stated Meeting of the American Ornithologists' Union was held in San Francisco, May 17-20, 1915. This was the first regular meeting of the Union to be held outside of the eastern cities of New York, Cambridge, Washington and Philadelphia and much credit is due to the energy and generous hospitality of the California members, which were responsible not only for the notable success of the meeting, but for its being held so far away from what might be called the 'type locality' of the A. O. U.

The eastern members who formed the regular A. O. U. excursion party comprised Messrs. John H. Sage, J. H. Fleming, and Samuel Wright; Drs. T. S. Palmer and Witmer Stone and Miss May T. Cooke. Mrs. Palmer, Mrs. Wright, Mrs. Stone and Miss Haskell were also in the party. At Chicago, Mr. W. H. Osgood entertained the party at dinner. A stop of two days was made at the Grand Cañon, Arizona, and a combined list of the birds observed in the forest around the rim of the Cañon and during the descent to the bottom, was made by the members which will appear in a subsequent number of 'The Auk.'

At Los Angeles Dr. A. K. Fisher and Dr. and Mrs. J. Dwight, Jr., who had gone on ahead, joined the party, and a number of other eastern members and their families went direct to San Francisco by other routes: these included Dr. and Mrs. C. Hart Merriam, Mr. and Mrs. Otto Widmann, Mr. and Mrs. Robert C. Murphy, John T. Nichols, T. Gilbert Pearson, Dr. W. J. Holland and Mr. and Mrs. Chas. A. Schoffner.

The members who stopped over at Los Angeles were most cordially entertained by the southern division of the Cooper Ornithological Club. A reception was tendered them at the Museum of Science and Arts, where Messrs. Daggett and Swarth exhibited the collections, while Mr. and Mrs. J. Eugene Law personally conducted the trips to Catalina Island and Mt. Lowe. Messrs. A. B. Howell, W. Lee Chambers, A. E. Colburn, E. J. Brown, and others did all in their power to make the visit enjoyable.

At San Francisco the business session was held at the California Academy of Sciences and, at various times during the stay of the eastern members, Dr. Evermann and Mr. Loomis acted as hosts to those who desired to consult the valuable collections of the Academy, especially the series of Tubinares.

The Museum of Vertebrate Zoölogy of the University of California was also a center of interest to the visitors, and Drs. Joseph Grinnell and H. C. Bryant, Messrs. Tracy Storer, W. P. Taylor and others devoted much time to explaining and displaying the wonderfully complete west coast collections which have been brought together at the Museum.

The public sessions of the Union were held in halls within the grounds of the Panama Pacific International Exposition and were well attended. President Fisher, Vice-President Stone and Mr. Joseph Mailliard, President of the northern division of the Cooper Ornithological Club, presided at the sessions.

The motion pictures of Grebes, Gulls, Murres and Golden Eagles exhibited by Mr. W. L. Finley were the most notable feature of an interesting program. The annual dinner of the Union and the luncheons, one of which was held at a Chinese restaurant, within the grounds, were enjoyable affairs and thanks to the efficient management of Mr. Joseph Mailliard and his committee of arrangements, the meeting will be remembered by those in attendance as one of the most successful in the history of the Union.

Rainy weather prevented the trip to Mt. Tamalpais on the last day of

the meeting and extremely rough water on the next day necessitated the cancelling of the Farallon trip. Dr. Evermann, however, arranged to have the Albatross cruise around the bay and a large party of A. O. U. members and friends enjoyed the trip, while others visited Mt. Tamalpais and the Muir woods. The eastern members then scattered to visit the Exposition and various parts of California, many of them being entertained by Dr. and Mrs. C. Hart Merriam at their summer home at Lagunitas.

The regular detailed account of the meeting, which could not be prepared in time for this issue, will appear in the October 'Auk.'

At the business session the proposed changes in the By-Laws whereby Members will hereafter share with Fellows the business of the Union and the election of Officers, Members, and Associates, were finally adopted.

The present officers were re-elected and Philadelphia was selected as the place of meeting in 1916, the time being left to the local committee. It was the expressed wish of all the eastern members in attendance that a large delegation from 'the coast' might be present on this occasion so that an opportunity might be provided for repaying, in part at least, the generous hospitality of California and the Cooper Ornithological Club.



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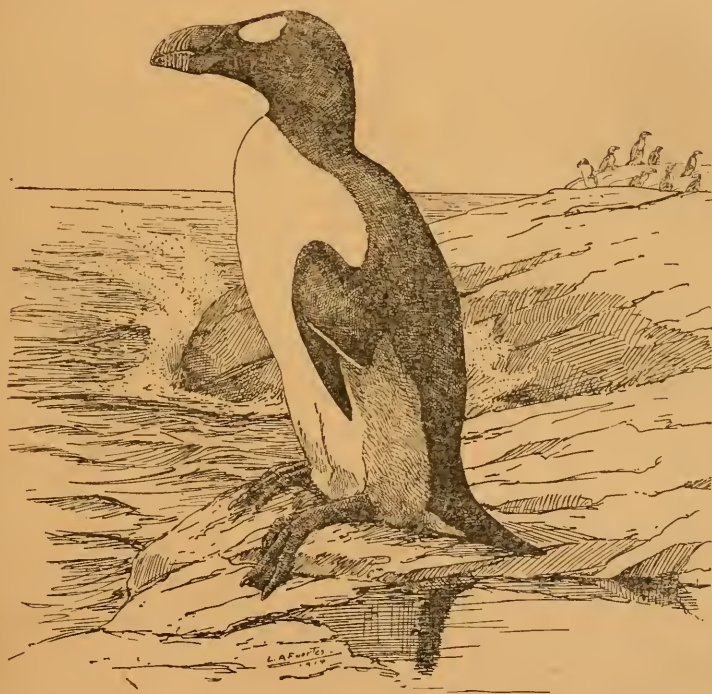
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CONTENTS

	PAGE
IN MEMORIAM: THEODORE NICHOLAS GILL. By <i>T. S. Palmer</i> . (Plate XXVI)	391
THE MORE NORTHERN SPECIES OF THE GENUS <i>Scytalopus</i> GOULD. By <i>Frank M. Chapman</i>	406
THE PLUM ISLAND NIGHT HERONS. By <i>S. Waldo Bailey</i>	424
BIRD MIGRATION IN THE MACKENZIE VALLEY. By <i>Wells W. Cooke</i>	442
LIST OF WATER AND SHORE BIRDS OF THE PUGET SOUND REGION IN THE VICINITY OF SEATTLE. By <i>Samuel F. Rathbun</i>	459
THE BIRDS' BATH. By <i>Heyward Scudder</i>	465
A FOUR-WINGED WILD DUCK. By <i>Charles Eugene Johnson</i> (Plates XXVII-XXIX)	469
NOTES ON DICHROMATIC HERONS AND HAWKS. By <i>Outram Bangs</i>	481
FOSSIL REMAINS OF THE EXTINCT CORMORANT PHALACROCORAX MACROPUS FOUND IN MONTANA. By <i>R. W. Shufeldt, M. D.</i>	485
THIRTY-THIRD STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION. By <i>John Hall Sage</i>	488
GENERAL NOTES.— Yellow-billed LOON (<i>Gavia adamsi</i>) in Colorado.— A Correction, 494; The Puffin (<i>Fraterecula arctica arctica</i>) on Long Island, N. Y., 495; A Near View of an Iceland Gull, 495; The Arkansas Kingbird (<i>Tyrannus verticalis</i>) in Eastern Minnesota, 495; Starlings (<i>Sturnus vulgaris</i>) in New Hampshire, 496; Bachman's Sparrow near Chicago, Illinois, 496; Leconte's Sparrow in Wisconsin, 497; Junco Breeding in Concord and Lexington, Mass., 497; The Indigo Bunting in Colorado, 498; Numerous Migrant Pine Warblers (<i>Dendroica vigorsi</i>) at Fort Lee, N. J., 498; Black-throated Blue Warbler in Colorado, 498; Cape May Warblers Destructive to Grapes on Long Island, 498; The Resident Chickadee of Southwestern Pennsylvania, 498; Winter Birds at Wareham, Mass., 499; Notes on Some Manitoban Birds, 500; Bird-Notes from Cambridge, Isanti County, Minnesota, 501.	
RECENT LITERATURE.— Dall's Biography of Baird, 505; Baynes' 'Wild Bird Guests,' 507; Job on Wild Fowl Propagation, 509; Laing's 'Out with the Birds,' 510; Cooke on Bird Migration, 510; Faxon on Relics of Peale's Museum, 512; Mathew's 'Birds of Australia,' 512; Recent Monographs by Oberholser, 513; Nature and Science on the Pacific Coast, 513; Murphy on The Penguins of South Georgia, 514; Chapman on New Birds from Central and South America, 515; Cory on New South American Birds, 515; Burns on Periods of Incubation, 516; Henshaw on American Game Birds, 517; Taverner on The Double-crested Cormorant and its Relation to the Salmon Industry, 517; Shufeldt on the Osteology of the Limpkin and Stone Plover, 517; Recent Publications of the Biological Survey, 518; DaCosta on the Economic Value of the Birds of São Paulo, Brazil, 518; Third Report of Food of Birds in Scotland, 519; Economic Ornithology in Recent Entomological Publications, 520; The Ornithological Journals, 521; Ornithological Articles in Other Journals, 528; Publications Received, 531.	
CORRESPONDENCE.— Methods of Recording Bird Songs, 535.	
NOTES AND NEWS.— Obituaries: Graf Hans von Berlepsch, 539; Dr. Otto Herman, 539; Egbert Bagg, 540; Ewen Somerled Cameron, 540; Prof. Frederick Ward Putnam, 541; Frank B. Armstrong, 541; Appointment of Dr. T. S. Roberts in the University of Minnesota, 541	
INDEX	543
ERRATA	568
DATES OF ISSUE	568
CONTENTS	i

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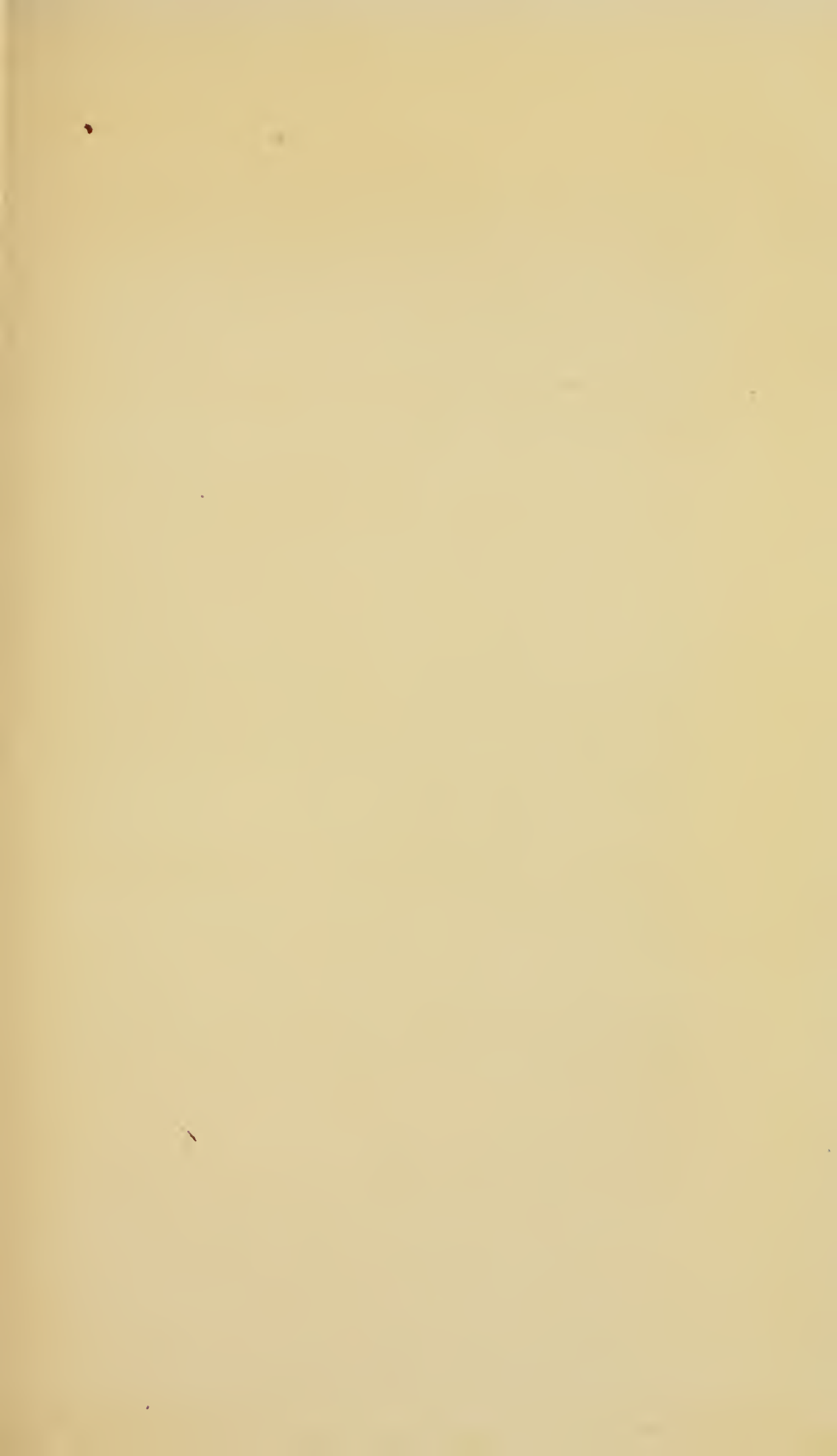
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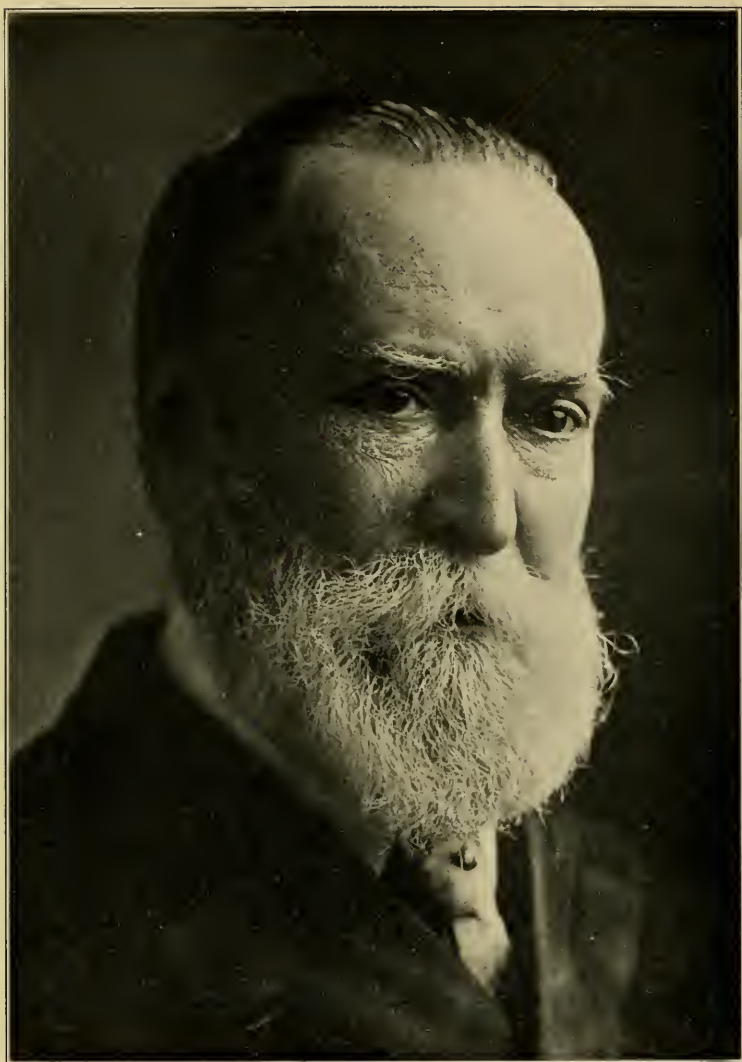
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Photograph by Harris & Ewing, Washington, D. C.

*Yours truly
Theo Gill*

THE AUK:

A QUARTERLY JOURNAL OF

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OCTOBER, 1915.

No. 4.

IN MEMORIAM: THEODORE NICHOLAS GILL.¹

BORN NEW YORK CITY MAR. 21, 1837; DIED WASHINGTON
D. C., SEPT. 25, 1914.

BY T. S. PALMER.

Plate XXVI.

THEODORE NICHOLAS GILL, 'Master of Taxonomy' — such was the characterization by Dr. David Starr Jordan of the man whom Prof. Spencer F. Baird called the most learned, and Prof. G. Brown Goode described as the most erudite and philosophic of American naturalists. His interest in various subjects was as great as his breadth of view and extended not only throughout the field of zoölogy but also into paleontology, philosophy, language, and other fields of human interest. Questions of Greek grammar, conchology, ichthyology, mammalogy, nomenclature, osteology, and the evolution and geographic distribution of organisms living or extinct all engaged his attention. He was equally at home in biography or biology, etymology or entomology, and among mollusks or mammals.

Theodore N. Gill, son of James Darrell and Elizabeth Vosburgh Gill, was born in New York City, March 21, 1837, and was educated in private schools and under private tutors. He took no

¹ Address delivered at the thirty-third Stated Meeting of the American Ornithologists' Union, San Francisco, Calif., May 18, 1915.

regular college course and although he studied law was never admitted to the bar. At an early age he became interested in natural history and especially in fishes which afterward formed the subject of his special studies. In the markets of New York which he frequently visited he was able to examine some of the rarer species which were brought in from time to time by commercial fishermen.

At the age of 20 in the winter of 1857-58 he took his first extended field trip, visiting Barbados, Trinidad and other islands in the West Indies where he collected shells and other specimens for Mr. D. Jackson Stewart. The results of this trip were worked up chiefly in the library of Mr. J. Carson Brevoort and appeared in the *Annals of the Lyceum of Natural History of New York* and the *Proceedings of the Academy of Natural Sciences of Philadelphia*. It was probably in the Brevoort library, then one of the best of its kind in this country, that he laid the foundations of that broad and intimate knowledge of books which in later years became such a distinguishing characteristic. His second collecting trip, and apparently the only other extended field trip he ever undertook, was made in the summer of 1859 to Newfoundland.

About 1860, Gill came to Washington, D. C., and took up his residence in the national capital, which was henceforth to be his home and which for more than half a century was destined to be the scene of his literary and scientific activities. Here he found congenial surroundings and settled into a life which almost never took him into the field and seldom involved trips farther than New York or Boston,¹ but his interests were world wide and were not measured by his travels. *Dum domi mansit orbem pervagabatur* (while he remained at home he wandered throughout the world). It is interesting to note that Gill reached Washington just about the outbreak of the Civil war but the events of those stirring times seemed to have had little effect on his career. Here he met Professor Baird and others who were then prominent in scientific work. Baird was Assistant Secretary of the Smithsonian Institution and had but recently completed his great works on the mammals and birds of the Pacific Railroad Surveys. Coues was a student in

¹ It is said that at one time he was offered an attractive position by Professor Agassiz at Cambridge, but decided not to leave Washington.

Columbian College and Ridgway, a boy not yet in his teens, was living at his home in Illinois and had not actively entered the field of ornithology.

Gill became associated almost immediately with Columbian College, afterward Columbian University, and now George Washington University, a connection which he maintained until his death. In 1860-61 he was adjunct professor of physics and natural history, in 1864-66 and 1873-84, lecturer on natural history, from 1884-1910 professor of zoölogy, and during the last four years of his life professor emeritus. His classes were not large but he always maintained his interest in the zoölogical department and especially in the graduate work. His services were appreciated by the University which bestowed upon him at various times four honorary degrees: A.M. in 1865, M.D. in 1866, Ph.D. in 1870, and the highest doctorate, LL.D. in 1895.

Whether Coues and Gill were officially associated in the early days is uncertain. Dr. D. G. Elliott records that about this time "when on a visit to Professor Baird in Washington, one evening, in company with my old friend Doctor Gill, I first met Elliott Coues,"¹ indicating that Gill knew Coues and introduced Elliott to him. Coues was actively interested in birds at this time and had just published his "Monograph of the *Tringæ* of North America" which he later described as the "maiden effort of a very youthful author." He was also busy with D. W. Prentiss in preparing 'A List of the Birds of the District of Columbia' which appeared in 1862. Coues took his bachelor's degree at Columbian College in 1861, graduated in medicine and received his commission as Acting Assistant Surgeon in the Army in 1863, and in the following March was detailed as Assistant Surgeon to Fort Whipple, Arizona. He was absent from Washington at various military posts for some years, and it was not until the late seventies or early eighties that he and Gill became associated in the first of their joint zoölogical publications.

Through the assistance of Professor Baird Gill received an appointment in the library of the Smithsonian Institution. In 1865-66 he served as librarian and when the library of the Smithsonian

¹ D. G. Elliott, *In Memoriam Elliott Coues*, *Auk*, XVIII, p. 5. 1901.

was transferred to the Library of Congress he acted as assistant librarian in the Library of Congress from 1866-75. This decade devoted to constant work with scientific books was invaluable in enabling him to familiarize himself with the literature of zoölogy. With his wonderfully retentive memory he stowed away many a fact and many a title which in after years he had occasion to use in the preparation of his papers. Apparently he never forgot a book which he had once handled and long afterward he could assert with confidence that a certain volume was in the Library of Congress, although he might not have seen it for many years.

At the first meeting of the American Ornithologists' Union held in New York on September 26, 1883, Doctor Gill was elected an Active Member and remained in the list for thirty years. In 1913, only a year prior to his death, he was transferred to the recently established class of Retired Fellows, and his was the first name to be enrolled in the list of Deceased Retired Fellows. He seldom attended meetings of the Union outside of Washington, but he was present at most if not all of those held at the National Capital. He seriously considered attending the special meeting in San Francisco in 1903 but finally abandoned the plan, although he had long been desirous of visiting the west coast. He frequently took part in the discussion of the more general topics but apparently contributed only one formal paper — entitled 'The Generic Names *Pediocætes* and *Poocætes*'.¹ He held no offices during his long connection with the Union but rendered valuable aid to the Committee on nomenclature at various times. His name does not appear in the list of those who assisted in the preparation of the original Code and Check-List of 1886, but the obligation of the committee is attested in a special note published in *Science*.² When the subject of the revision of the Code was considered at the meeting held in 1905, he was appointed one of the seven members to whom the task was delegated.

Gill was a member of many other scientific societies and was a regular attendant at their meetings in Washington or in nearby cities. He was elected a member of the American Association for

¹ Auk, XVI, pp. 20-23, 1899.

² VII, p. 374, Apr. 23, 1886.

the Advancement of Science at the 17th Meeting in Chicago in 1868, and became a Fellow in 1874. In 1896 he was Vice-President of Section F on Zoölogy and upon the death of the President, his life long friend, Prof. E. D. Cope, on April 12, 1897, as senior Vice-President, he succeeded to the Presidency of the meeting held in Detroit in that year. In 1873 he was elected a member of the National Academy of Sciences and represented the Academy at the International Zoölogical Congress at Boston in 1898, and at the 450th anniversary of the founding of the University of Glasgow, at Glasgow, Scotland, in 1901. He was a member of the American Philosophical Society, the Biological Society of Washington, the Cosmos Club, one of the honorary vice-presidents of the Audubon Society of the District of Columbia, a foreign member of the Zoölogical Society of London, and a member of more than 70 other scientific organizations. In 1894 he was made associate in zoölogy of the U. S. National Museum. He was one of the founders of the Cosmos Club in 1878, of the Biological Society in 1880, and of the District Audubon Society in 1897. He served as the first president of the Biological Society in 1881 and 1882, as chairman of the Committee on Publications in 1894-95, and frequently presented papers and took part in the discussion of papers presented by others. It made little difference what subject was under consideration, Gill could almost always add something to the information imparted by the speaker. On one occasion when a paper on Cretaceous fishes was presented, Doctor Gill dissented radically from the views of the author of the paper and as a result the discussion soon waxed warm. No one in the audience except the author and the critic had more than a superficial knowledge of the subject, but every one present followed with deepest interest as each participant in the debate sought to overwhelm the other with fresh arrays of facts and polysyllabic names of fossils which none save the speakers could understand.

This is not the time or the place to attempt a review of Doctor Gill's voluminous publications. The number of titles in his bibliography exceeds 500, most of them on the subject of fishes. His best known works consist of his Arrangements of Mollusks, Fishes, and Mammals, his volume on Fishes, and part of the volume on Mammals in the Standard or Riverside Natural History, the con-

tributions to zoölogy in Johnson's Universal Cyclopedia, and the Century and Standard Dictionaries. He published no great monographs in the ordinary acceptation of the term and no comprehensive work on natural history, evolution, or geographic distribution, although few men were better qualified for such a task. He devoted most of his attention to essays, revisions of groups, short papers on special subjects, notices, and reviews.

Birds received but a small part of his attention. His publications on ornithology may be conveniently divided into three groups: (a) A series of annual reviews in the 'Summaries of Scientific Progress,' 1871-1885; (b) contributions to 'Johnson's Cyclopedia,' miscellaneous essays on distribution and nomenclature; and (c) articles and notices in 'The Osprey.' These may be briefly considered in the order indicated.

In 1871 Harper and Company undertook the publication of the 'Annual Record of Science and Industry,' edited by Professor Baird, who had associated with him a number of well-known scientific men to take charge of special subjects. Abstracts and summaries of the more important articles of the year were published in Harper's Weekly and Harper's Monthly and later collected into an annual volume, prefaced by a general account of the progress of the year in each department. Doctor Gill contributed the material on vertebrate zoölogy. Each volume contained a bibliography and brief necrology, thus forming a convenient but condensed account of the progress of the year. The series was discontinued in 1878, but Professor Baird who had become Secretary of the Smithsonian Institution in May of that year arranged for the publication of a Record of Scientific Progress in the Annual Reports of the Institution. The first installment covering the years 1879-80 appeared in the volume for 1880, thus continuing without interruption the 'Annual Record' formerly published by the Harpers. To this series, extending through the years 1879 to 1885, Gill contributed the chapters on zoölogy covering the whole field from Protozoa to Primates. Necessarily the sections devoted to birds were brief and usually condensed to less than half a dozen pages. Only the more important discoveries or publications could be noticed, but they were selected from the whole field of ornithology and included extinct as well as living birds and notices of articles

on cage birds, ostrich farming, anatomy, and physiology in addition to descriptions of new species and reviews of faunal works and museum catalogues.

In the volumes for 1881 and 1882 he introduced a feature of special interest which might well be revived today, namely, a list of "Birds Added to the American Fauna," including new species and extralimital species recorded for the first time within the limits of North America. Twelve species were included in the list for 1881 (p. 487) and 21 species in that for 1882 (pp. 628-29). Such a list published in the January number of 'The Auk' would be a very convenient annual record of the new forms to be considered as additions to the Check-List.

Gill's comments on some of the articles while necessarily brief are characteristic. Thus in speaking of a paper on the classification of birds by Dr. P. L. Sclater which had recently appeared,¹ he says: "The tendency to give an exaggerated value to trivial characters still lingers. One author, for example recognizes two *sub-classes* and 26 *orders* in this most homogeneous of types, and for the little morphologically diversified Passeres not less than 53 families are provided!"² This statement suggests Gill's earlier expression of his views, in what was apparently one of his first publications on birds, which appeared in the Introduction to Baird, Brewer, and Ridgway's 'History of North American Birds.' This contribution although signed with his initials is easily overlooked, and the circumstances attending its preparation do not seem to be generally known. Gill himself states³ that one bright afternoon in August, 1873, while a guest of Professor Baird at Peake's Island, near Portland, Me., having been requested to prepare the Introduction to the 'Land Birds' then nearing completion he dictated to Baird's secretary the paragraphs which form pages xi-xiy of the 'History.' It was only natural that Baird should have invited Gill who had published two or three years before his remarkable Arrangements of the Families of Mammals and of Mollusks to undertake a similar task for the birds. Upon his return to Washington, Gill collected all the skeletons and skulls of birds available

¹ Ibis, IV, 1880, pp. 340-350; 399-411.

² Smithsonian Rept., 1880, p. 377.

³ Osprey, III, p. 91, Feb. 1899.

in the hope of working out 'anatomical characters that would co-ordinate with the external characters generally used to distinguish families.' In this effort he failed utterly and abandoned the undertaking, declining to complete the introduction in which his views on classification were so at variance with those of the authors. This introduction was finally completed by Doctor Coues. Thus began the first of several literary ventures in which Coues and Gill were associated and which finally resulted unhappily a few months before Coues' death in the severe straining if not in the breaking of a friendship of nearly forty years standing.

For present purposes the contribution of 1873 is chiefly interesting because it contains Gill's definition of birds and the brief statement of some of his views on Avian classification. This definition is remarkable from the fact that it describes a bird in a single sentence, but this sentence includes 312 words and fills the greater part of a page! As an example of word building about a single idea it is one of the most comprehensive in the annals of ornithology. The first few lines carrying the description through the brain will suffice to illustrate his ability in writing definitions:

"Birds are abranchiata vertebrates, with a brain filling the cranial cavity, the cerebral portion of which is moderately well developed, the corpora striata connected by a small anterior commissure (no corpus callosum developed), prosencephalic hemispheres large, the optic lobes lateral, the cerebral transversely multifissured," etc.

This definition recalls the anecdote mentioned by Doctor Lucas¹ in connection with the publication of the Century Dictionary some years later. Coues was in charge of the preparation of the zoölogical terms and Gill associated with him prepared chiefly the definitions of mammals and fishes. When Gill submitted a definition of the family of Giraffes Coues read it carefully and turning to Gill exclaimed, "That isn't English, it is Choctaw." "No," said Gill, "it is an exact definition of the family Giraffidæ," and as such it was duly incorporated in the Dictionary.

Gill's later ornithological papers appeared in 'The Osprey' during the four years that it was published under his supervision. Before considering these papers it may be interesting to mention some of

¹ Am. Mus. Journ., XV, p. 10, 1915.

the circumstances connected with the history of this rather remarkable journal. Shortly after the death of Professor Cope in April, 1897, the 'American Naturalist' which had been conducted by him in conjunction with Professor Kingsley, changed hands and beginning with the September number was placed under new editorial supervision. For some time Gill had been desirous of acquiring control of a scientific journal and it was afterwards a source of regret to him that he had not secured 'The Naturalist' when the opportunity was presented.

A year or two previous a well illustrated magazine of popular ornithology called 'The Osprey' had been established by Walter A. Johnson at Galesburg, Illinois. Within six months Doctor Coues became associated with Johnson and for a while contributed a column to each number. Coues at this time was devoting considerable attention to ornithology in connection with the preparation of the fifth edition of his 'Key to North American Birds' and 'The Osprey' evidently afforded a convenient medium for the publication of short notes. At the close of 1897 the publication office of 'The Osprey' was transferred to New York, and Johnson, having engaged in other business, was anxious to be relieved of the editorial work. The magazine was therefore offered for sale. Under these circumstances it is not surprising that Gill, who was looking for a journal, and Coues, who was already interested in 'The Osprey,' should have become associated in the management of the magazine. Gill acquired 'The Osprey' in October, 1898, beginning his work with the first number of Volume III. The office of publication was transferred to Washington and under the joint editorship of Coues and Gill the magazine began a new chapter in its eventful career. It might have been expected that under such able management 'The Osprey' would have prospered, but the combination proved disastrous. Coues who contributed most of the editorials and supervised the makeup began to treat the magazine as a toy and evidently soon tired of the routine work. The editorials at first in humorous vein soon grew sarcastic and became so sharp that Gill, thoroughly disgusted, withdrew his name from the numbers for April and May, 1899. In the June number appeared the statement that Coues had retired and Gill had assumed full control. With the beginning of Volume IV in October the announcement

was made that 'The Osprey' would be edited by Gill in collaboration with Robert Ridgway, Leonhard Stejneger, F. A. Lucas, C. W. Richmond, Paul Bartsch, Wm. Palmer, H. C. Oberholser, and Witmer Stone. With such a galaxy of talent the future of the journal was very promising. Doctor Gill financed the venture, Doctor Bartsch attended to most of the routine work and the collaborating editors contributed occasional articles and notes. But after two years this plan was abandoned, the form of the magazine was changed and a new series begun in January, 1902. Only a few numbers appeared and the journal was finally suspended in the following July.

Among the more important of Gill's contributions to 'The Osprey' were his plan for a new history of North American Birds,¹ his biographies of Swainson,² Richardson,³ and Cassin,⁴ his articles on Longevity in Birds,⁵ and on the Bower Birds of Australia and New Guinea.⁶ Many short biographical and critical notes were introduced under his editorship and the character of the journal was considerably changed. His plan for what he termed 'generalized' biographies of birds was outlined in the number for February, 1899, p. 88, under the caption 'A Great Work Proposed.' After calling attention to three great works on North American Birds, viz. those of (1) Wilson, (2) Audubon, and (3) Baird, Brewer, and Ridgway, he remarks that Wilson and Audubon's works observed no classification and were merely unconnected descriptions and biographies of species without logical sequence, while Baird, Brewer and Ridgway introduced system and generalization of the classificatory data but no generalization of the biographical information. Moreover a quarter of a century had intervened since the publication of the Land Birds and much new data had been collected. His plan for the new work may well be described in his own words:

¹ Osprey, III, 88-94, Feb. 1899.

² William Swainson and His Times: Osprey, IV, pp. 104-108; 120-123; 135-138; 154-156; 166-171; V, 8-10; (23-25; 29-30); 37-39; 58-59; 71-72; 136-137; 152-155; 167-172, 176, Mar. 1900-Nov. 1901.

³ Life and Ornithological Labors of Sir John Richardson, New Ser., I, 13-17, Jan., 1902.

⁴ Biographical Notice of John Cassin, New Ser., I, 50-53; 80-84. Mar., May, 1902.

⁵ Osprey, III, 157-160, June, 1899.

⁶ Osprey, IV, pp. 67-71, Jan., 1900.

"The time has come to commence another ornithology, to gather the harvest scattered in many fields, to bring it together in a new granary. A very decided improvement too, can be effected, it seems to me, in the treatment of the life histories of the beings to which we are devoted. . . . One of the features that would be most desirable in the new Avifauna would be a recapitulation of the habits common to all the species of a genus under the generic caption. In fact a summary of all the ecological features characteristic of the combined species, and an indication as to the range of difference or divergence. . . . The various biographies should be prepared on a regular plan and the data given in a uniform sequence for each species and a summary furnished for each genus. The deficiencies in our knowledge could then be perceived at once, and some one of the numerous observers might be incited to fill the void. . . ."

Naturally the first biography published was that of the species after which the journal was named, the Osprey. This was begun in September, 1900, a year and a half after the announcement and was continued in installments through nine numbers to September, 1901, making in all a publication of about twenty pages.¹

As already indicated, Gill's contributions to ornithology are not to be measured by his formal papers. Indeed his titles on birds are so few and so widely scattered that they scarcely appear in ornithological bibliographies and are apt to be overlooked unless the search be extended to include somewhat obscure nooks and corners. Nevertheless his influence made itself felt in many quarters and his ideas and suggestions may be found in several standard works on ornithology, in the Code of Nomenclature, and in the zoölogical parts of the Century and Standard Dictionaries and Johnson's Cyclopaedia. His was an indirect rather than a direct influence, as gentle and persuasive as his personality, but none the less real and effective. His suggestions and criticisms, always made in a kindly spirit for the assistance rather than the discomfiture of the inquirer, bore rich fruit in the works of others.

Gill's views on the classification of birds were very positive and in some respects widely divergent from those of most American ornithologists, but he was interested chiefly in the relation of the higher groups and paid little attention to species and subspecies. Apparently he never described any new species of birds but in

¹ Vol. V, pp. 11-12; 25-28; 40-42; 60-61; 73-76; 92-93; 105-106; 124-125; 141.

recognition of his eminent work in systematic zoölogy two birds have been named in his honor by other ornithologists. These are: Gill's Albatross, *Diomedea gilliana*, described by Dr. Coues¹ in 1866 (now regarded as probably the young of *Diomedea melanóphrys*), and an extinct species of quail, *Palæotetrix gilli*, described by Dr. Shufeldt² in 1892, from the Pleistocene of Oregon.

Reference has already been made to Gill's futile attempt in 1873 to discover structural characters of family and ordinal value. Briefly stated, he considered that all living birds should be combined in a single order for which he proposed the term Eurhipidura, or birds with a well developed fan-like tail. Among extinct birds he recognized two orders, Saururæ, or birds with a reptile-like tail, represented by *Archæopteryx*, and Ichthyornithides represented by *Ichthyornis* and *Apatornis*. These views were first embodied in a paper on 'The Number of Classes of Vertebrates and their Mutual Relations'³ presented to the National Academy of Sciences at the meeting of October 29, 1873, in the year in which he was elected to membership in the Academy. In contrast to these views it is interesting to note that Baird, Brewer, and Ridgway in 1874 recognized no less than fourteen orders of Carinate birds and fifty-nine families of North American Birds.

A quarter of a century later Gill restated his views more at length:⁴

"The attribution to the so-called orders of birds of that rank is a sin against classification, as well as the truth, which should not be persisted in. . . . I would scarcely recognize any orders among living birds — certainly not more than two. . . . For provisional purposes the orders of most ornithologists might be designated as suborders and the so-called suborders would have about the value of superfamilies. . . .

"Most of the generally admitted families of birds outside of the Passerines appear to me to be well founded, but I cannot regard the Oscine so-called families as such. . . . To entitle the sections of Oscines generally called families as such, is to obscure and falsify our knowledge of structure and to give a distorted idea of the group. . . .

"Objects should be called by their right names. If the groups in question are confessed to lack family characters, they should not be designated

¹ Proc. Acad. Nat. Sci. Phila., May 1866, p. 181.

² Journ. Acad. Nat. Sci. Phila., Ser. 2, IX. p. 415, pl. xvii, fig. 34, 1892.

³ Am. Journ. Sci. & Arts, 3d ser., VI, pp. 432-435, Dec. 1873.

⁴ Osprey, III, pp. 90, 91, Feb. 1899.

as families. Let a lesson be taken from other zoologists. There are families of insects — the Carabids and Scarabeids among beetles, and the Ichneumonids and Chalcidids among Hymenopters, for example — which contain nearly as many as or even more species than are known of birds, and yet there is no great difficulty in subordinating the constituent groups under a family designation.”

Again reverting to this same subject in his address before the Seventh International Zoölogical Congress¹ at the meeting in Boston in 1907, he suggested the following solution of the difficulty:

“One consummation devoutly to be wished for is a general acceptance of a standard for comparison and the use of terms with as nearly equal values as the circumstances admit of. There is a great difference in the use of taxonomic names for the different classes of the animal kingdom. The difference is especially great between usage for the birds and that for the fishes. For the former class, genera, families and orders, are based on characters of a very trivial kind. . . . The mammals are a class whose treatment has been mostly intermediate between that for the birds and that for the fishes. Its divisions, inferior as well as comprehensive, have been founded on anatomical characters to a greater extent than for any other class. Its students are numerous and qualified. Mammalogy might therefore well be accepted as a standard for taxonomy and the groups adopted for it be imitated as nearly as the different conditions will admit. The families of birds would then be much reduced in number and those of fishes increased.”

These extracts have been quoted at length to indicate Gill's own views and to show that his criticism of ornithological classification was not directed so much against the number of divisions as the exaggerated value assigned the various groups. His strongest contention was to standardize the higher groups of birds so as to make them more nearly equal in value with those of other vertebrates. In view of his careful consideration of this question extending over a period of nearly forty years and his wide experience with other vertebrates, his conclusions are entitled to special weight however divergent they may seem to be from those now commonly accepted.

Gill's most important influence was undoubtedly the inspiration of his example in the direction of broader and more thorough technical work. In bibliography careful and exhaustive research and

¹ Systematic Zoölogy. Its Progress and Purposes, sep., pp. 20-21.

attention to the biographical or personal side of science; in nomenclature, rigid adherence to the law of priority, the one letter rule (thereby preserving names otherwise considered preoccupied), the coining of new names on classical models, and the avoidance of hybrid names and other etymological monstrosities; in taxonomy, exactness in definition of terms, attention to the relationships of higher groups, and standardization of the divisions of birds to make them comparable in rank with those of other classes of vertebrates. The value of his suggestions regarding publication of an annual list of additions to the Check-List and 'generalized' life histories of birds should not be lost sight of. While his sample biography of the Osprey can hardly be considered altogether successful, even from the standpoint of the author, the idea of basing the life history of a species on the accounts of a number of observers to eliminate errors due to individuality and personal equation is certainly worthy of thorough trial before being rejected or forgotten. He was especially well qualified to estimate the value of the work of others in systematic zoölogy and his criticisms, while frank and by some considered severe, were always made in a kindly spirit.

Gill was unmarried, possessed of ample means and thus able to devote his time and energies to whatever his fancy dictated. But, although he worked steadily and produced a large number of papers, he lacked the energy or concentration necessary for undertaking any great work. He was genial and social by nature, but his pleasures were comparatively few and simple. He had only a passive interest in outdoor sports and took little active exercise. He found his chief recreation as well as work in books, and he spent many hours every day in reading and writing. The morning hours and early afternoons were spent in the Smithsonian library looking over the new periodicals and keeping in touch with recent discoveries, the later part of the afternoons were devoted to the preparation of whatever papers he had in hand, and the evenings to reading. While truly a master of taxonomy, especially in the marshaling of zoölogical facts, he lacked a corresponding efficiency in handling his tools and the gradually increasing accumulation of books and papers sometimes almost forced him from his desk or from the room which he occupied as a study in the Smithsonian building. Even the master key of his own mind was impotent

at times to locate a certain book or paper which he had laid aside a few weeks before.

The last years of his life were quiet and uneventful. Three or four years before his death he suffered a severe paralytic stroke from which he never fully recovered. His cheerfulness and good spirits remained to the last but his strength gradually ebbed away until he found difficulty in getting about. In September, 1914, he moved out to the suburbs to spend the winter with his brother Herbert A. Gill, and a few days later was confined to his bed. On the morning of the 25th he was apparently as bright as usual, and after breakfast asked for the news of the day especially of the war which he followed carefully — but before noon he passed away suddenly.

In the death of Doctor Gill the American Ornithologists' Union has sustained a great loss, not merely in the absence of his genial personality and the kindly suggestions and criticisms on various knotty questions of nomenclature and bibliography, but chiefly in the lost opportunity which can never be regained of utilizing his broad knowledge and unsurpassed judgment in matters of taxonomy. In that great and pressing problem which has been carefully avoided for three decades but which cannot be ignored much longer — the revision of the classification of North American birds — Gill's intimate knowledge of other groups would have been invaluable. His broad views would have acted as a balance wheel on the ideas of some of the specialists in speciation who in their enthusiasm for minute differences are apt to throw the classification of birds out of gear in its relation to the taxonomy of other classes. No one in this country or generation was better able to appreciate the true value of the higher groups or to coordinate the families, suborders and orders of birds with the corresponding divisions of mammals, fishes or mollusks. Without some such standardization of groups we shall never attain a really satisfactory and permanent basis of classification.

THE MORE NORTHERN SPECIES OF THE GENUS
SCYTALOPUS GOULD¹BY FRANK M. CHAPMAN²

The species of the genus *Scytalopus* are small, black, slaty or brownish wren-like birds of mouse-like habits. Most of them live in dense undergrowth or fallen tree-tops in the forests of the Subtropical and Temperate Zones of the Andes where haunt, habit, color and size make them exceedingly inconspicuous in life and all but invisible in death.

At best they can be seen only when one is within a comparatively few yards of them, and the collector who is not properly equipped with a small gauge gun or auxiliary barrel blows into fragments more specimens than he secures.

Even after a successful shot in the luxuriant, dark, cloud forest of the Subtropical Zone it usually requires the most minute, painstaking search, guided by mark of shot here and a stray feather there, to find the fallen bird; while in the more open Temperate Zone forests I have had a specimen slip from my hand to be hopelessly lost in the mass of fallen limbs and undergrowth which, in places, like mossgrown brush-heaps, accumulate beneath the trees.

The native collector, armed with blow-gun, such as many of them in the Bogotá region of Colombia still use, gets comparatively few specimens of birds as difficult to collect as *Scytalopus*.

For these reasons, rather than because of the rarity of the birds themselves, most of the species of *Scytalopus* have been but poorly represented in our collections. In our work in Colombia and the adjoining countries we have therefore devoted especial attention

¹ This is the fifth paper based chiefly on collections made in Colombia from 1911 to 1915 by expeditions from the American Museum. The four preceding papers were all published in the 'Bulletin' of the Museum as follows: (1) Diagnoses of Apparently New Colombian Birds, XXXI, 1912, pp. 139-166. (2) Diagnoses of Apparently New Colombian Birds, II, XXXIII, 1914, pp. 167-192. (3) Diagnoses of Apparently New Colombian Birds, III, XXXIII, 1914, pp. 603-637. (4) Descriptions of Proposed New Birds from Central and South America. XXXIV, 1915, pp. 363-388.

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² Curator of Ornithology in the American Museum of Natural History.

to birds like *Scytalopus*, not only because of their rarity in collections, but because such birds, as a rule, show a greater tendency to respond to the influences of their environment than do less sedentary species.

Of *Scytalopus* alone we have thus taken in Colombia eighty-two specimens, doubtless a greater number than heretofore has been known from that country. Of *Scytalopus micropterus micropterus* ScL., for example, the British Museum contained but four specimens when Sclater published his monograph of this genus. Prior to our work in Colombia the American Museum contained but one specimen of this species, and at the present time the Museum of Comparative Zoölogy contains but two, making a total of seven specimens for three large Museums.

In view of these facts one might well believe that *Scytalopus micropterus* was a rare species, but without making a greater effort to secure this bird than any other of similar habits, we have nevertheless obtained a series of twenty-four specimens. This includes both juvenal and adult plumages and, for the first time, enables one to determine that the silvery-white crown-patch, which is so striking a feature of some specimens, is purely individual and is not associated with either age or sex.

I give these figures for what I believe to be their significance, as in a general way they indicate how much field-work we still have to do before our collections of South American birds approach anything like completeness, rather than for their restricted application to the case in point.

Without attempting a revision of the entire genus, for which indeed adequate material does not yet exist in Museums, I give below the results reached in preparing a report on our Colombian specimens for inclusion in a paper on the distribution of bird-life in that country now in course of preparation.

In addition to the eighty-two Colombian specimens mentioned, W. B. Richardson has recently collected for us seven specimens in Ecuador, and Anthony and Ball, in April last, collected ten specimens of a most interesting new species in eastern Panama.

Of high importance is a series of thirteen topotypical specimens of *S. magellanicus* (Gmel.) lately received by the Brewster-Sanford Collection from Beck, which in connection with a Chilean specimen

of *S. niger*, sent by the same collector, permits me satisfactorily to determine our large series of the last-named species.

An examination of Lafresnaye's "Bogota" types was of course indispensable in this connection. These Mr. Bangs has kindly loaned me as well as the twenty-one other specimens of the genus contained in the Museum of Comparative Zoölogy.

The results of my studies of all this material, in so far as they affect the status of the species found north of the equator, may be summarized as follows.

Scytalopus senilis (Lafr.) = *Myornis* (gen. nov.) *senilis* (Lafr.).

Scytalopus magellanicus Auct. nec Gmel. = *Scytalopus niger* Swains.

Scytalopus analis Auct. nec Lafr. = *Scytalopus micropterus micropterus* Sel.

Scytalopus analis (Lafr.) = *Triptorhinus paradoxus* Kittl.

Scytalopus latebricola Allen nec Bangs = *Scytalopus sanctæ-martæ* Chapm.

Scytalopus sylvestris Bangs nec Tacz. = *Scytalopus sanctæ-martæ* Chapm.

The following four species are described as new:

Scytalopus panamensis (Subtropical Zone, Tacarcuna, E. Panama).

Scytalopus canus (Temperate Zone, Paramillo, West Andes, Col.).

Scytalopus sanctæ-martæ (Subtropical Zone, Santa Marta Mts., Col.).

Scytalopus infasciatus (Temperate Zone, Eastern Andes, near Bogotá).

Since the status of all but two¹ of the species known from north of the equator is affected by this revision I have for the sake of completeness added notes on them.

In addition to the species herein treated the following species from south of the equator are currently recognized; but in view of our discoveries in Colombia, it seems probable that our knowledge of the forms of *Scytalopus* from south of that country is far from complete:

Scytalopus magellanicus (Gmel.). Falkland Islands, Cape Horn region and northward into Chile.

¹ *S. griseicollis* (Lafr.); *S. argentifrons* Ridgw.

Scytalopus magellanicus [= *niger*?] *grandis* Cory. N. Peru, about thirty miles N. E. of Chachapoyas.

Scytalopus unicolor Salv. Cajabamba, Peru.

Scytalopus obscurus (King). Southern Chile.

Scytalopus acutirostris (Tsch.). Peru.

Scytalopus macropus Berl. & Stolz. Maraynioc, Cen. Peru.

Scytalopus micropterus bolivianus (Allen). Southern Peru; Bolivia.

Scytalopus speluncae (Menetr.). Southeastern Brazil.

Scytalopus indigoticus (Wied). Southeastern Brazil.

Scytalopus superciliaris Cab. Sierra of Tucuman, western Argentina.

It will be seen that with the exception of *Scytalopus indigoticus* and *S. speluncae*, all the known species are confined to the Andes, or, south of Bolivia, to the country at their base.

Such information as I can gather concerning these two species of eastern Brazil, leads me to believe that they inhabit the mountains at some altitude, possibly above the upper limits of the Tropical Zone. However this may be, it appears that of the species which are found in various parts of western South America from Cape Horn to Costa Rica, not one inhabits the Tropical Zone. In Colombia this implies that *Scytalopus* is not found below an altitude of 4,000 feet, and, as a matter of fact, only three of our specimens were taken below this level.

From the lower limits of the Subtropical Zone we have found *Scytalopus* in Colombia as high as 12,700 feet and consequently in the Paramo or Alpine Zone. Each species has its center of abundance in a certain Zone but where local conditions cause the overlapping or inosculation of zonal boundaries so do the ranges of their characteristic species overlap and inosculate.

Thus, although *S. m. micropterus* is characteristic of the Subtropical Zone, we have two specimens from an altitude of 10,000 feet in the Temperate Zone. On the other hand, *S. niger* is a Temperate Zone species but occurs also in the upper part of the Subtropical Zone at an altitude of from 8,000 to 8,500 feet. The Temperate Zone is indeed the center of abundance of the genus and, in Colombia, only *S. m. micropterus* and its representative *S. sanctamartae* range much below it.

At what latitude, south of the equator, this zone reaches sea-level and brings with it other forms which, like *Scytalopus*, have evidently extended their range northward as far as the South Temperate Zone itself, is one of the points an American Museum Expedition under the charge of Mr. Leo E. Miller is now trying to determine.

We know, however, that at least from central Chile southward to Cape Horn, *Scytalopus* lives at sea-level; and doubtless not far north of 30° S. latitude, it begins to ascend the mountains with the zone to which it is so largely restricted.

Since we cannot well believe that so ancient a type as *Scytalopus* can have its center of dispersal in the Temperate Zone of mountains so geologically recent as the Andes, we conclude that *Scytalopus* originated at sea-level and, consequently, south of 30° S. latitude.

The presence of species of this genus in southeastern Brazil, which are apparently separated by a wide area from the species found nearest to them in western South America, is a problem, which in the present stage of our knowledge, I confess I am not prepared to attack.

I append now my notes on the species studied, after first removing from *Scytalopus* the species heretofore known as *Scytalopus senilis* (Lafr.) for which I propose the genus

Myornis gen. nov.

Char. gen.— Resembling *Scytalopus* Gould (type *S. magellanicus* (Gm.)), but mesorhinium laterally compressed and elevated into a thin blade-like ridge which is highest above the posterior margin of the nasal operculum whence it descends toward both the tip and the base of the bill; tail longer, instead of decidedly shorter than wing; wing more rounded, the fourth to eighth, instead of third to seventh primaries (from without) subequal, the second about as long as the inner secondary instead of as long as the eighth primary.

Type.— *Scytalopus senilis* (Lafr.) = *Merul [axis] senilis* Lafr. Rev. Zool. 1840, p. 103 ("Bogotá"); type examined.

Range.— Temperate and Alpine Zones of the Andes of Ecuador and the Central and Eastern Andes of Colombia.

Remarks.— The species heretofore known as *Scytalopus senilis* (Lafr.) is obviously not congeneric with *Scytalopus magellanicus* (Gmel.), the type of the genus *Scytalopus* Gould, or with any other species of the genus known to me. Its laterally compressed and

elevated, angular mesorhinium is shown in a slight degree by *S. sylvestris* and more pronouncedly by *S. latebricola*, but its rounded wings in connection with its lengthened tail is a feature not possessed by any species of *Scytalopus* and it is this combination of characters of bill, wings, and tail which appears to warrant its generic distinction.

Lafresnaye's description (l. c.) of this species as "fronte et aliquot alæ tectricibus albis" is explained by the fact that this type, loaned me by Mr. Bangs, is albinistic, the forehead, loreal region, three greater coverts in one wing and two in the other, being white. The culmen is less elevated basally and less laterally compressed than in a specimen from El Piñon, but this is doubtless an indication of immaturity.

Specimens examined. — Ecuador; Mt. Piñchincha, 1; Colombia; "Bogota," (type of *Merularis senilis* Lafr.) 1; El Piñon, 1; Laguneta, 2.

Scytalopus niger (Swains.).

Platyurus niger Swains. Anim. in Menag. 1838, p. 323 (Chile).

Scytalopus magellanicus Auct. (Peru, Ecuador and Colombia records only).

Range. — Western South America from Chile, north, chiefly through the Temperate Zone, to Colombia.

Remarks. — In Colombia this is the most common species of the genus. It is found in all three ranges of the Andes where it is restricted in the main, to the Temperate Zone. Local conditions bring it down occasionally to the zone below. There is some variation in size and intensity of color in our series but it appears to be individual, and on the whole our specimens agree with one from Valparaiso, Chile. The juvenal plumage is more or less washed with rusty, paler below, and is never as distinctly barred as in *S. cinereicollis* and *S. micropterus*, the bars when present being comparatively obsolete. There is no indication of bars in the tail or of white in the crown.

This widely distributed species has been generally confused with *Scytalopus magellanicus* (Gmel.) which, as shown by thirteen specimens recently secured by Beck in the Cape Horn region for the Brewster-Sanford collection, is a wholly different species,¹ which has the forehead gray, the rest of the upperparts washed with cin-

¹ Cf. Menegaux and Hellmayr (Bull. Mus. d'Hist. Nat. 1905, p. 379) who have already reached a similar conclusion.

namon-brown, the back with subterminal black bars. The wings, except in very worn plumage, are externally edged with a lighter brown than the back, and at least the inner feathers are barred. The rectrices are more or less barred in all but two of these thirteen specimens. The underparts are grayish, of about the same shade as in *Myornis senilis* and the flanks, ventral region, and under tail-coverts are barred with black and ochraceous-buff or ochraceous-tawny.¹ The feet in life are marked as "brown," "brownish" or "yellowish" and in dried skins resemble those of *S. griseicollis* in similar condition.

All these specimens appear to be adult, but four lack the slight trace of silvery white in the crown, while the remaining nine show this mark in varying degrees. Possibly, as in *S. micropterus*, this character is individual.

Instead, therefore, of being a representative of the black, uniformly colored bird to which the name *magellanicus* has by most authors hitherto been misapplied, it is evident that this southern form is more closely related to *S. sylvestris*.

Specimens examined.—*Chile*: Valparaiso, 1. *Ecuador*: Zaruma, 2; Gualea, 1; Mt. Pichincha, 3. *Colombia*: Andes, W. of Popayan (alt. 10,340 ft.), 8; Cerro Munchique, 9; Cocal, 3; Almaguer, 4; Valle de las Pappas, 3; Laguneta, 3; Santa Isabel, 2; Sta. Elena, 1; Fusagasugá, 1; El Roble, 2; El Piñon, 2.

Scytalopus canus sp. nov.

Char. sp.—With a general resemblance to *S. niger* (Swains.)² but adult grayer throughout, the underparts paler than the upperparts, the center of the abdomen grayer than surrounding parts; tail shorter, the feathers narrower and softer, their barbs, apically, more or less separated; bill shorter, feet and tarsi more slender; apparently closely resembling, and perhaps representing, *S. unicolor* Salv. of Peru, but much smaller, the female of the same color as the male.

The juvenal plumage is evidently conspicuously barred above and below with cinnamon-buff and therefore resembles that of *S. griseicollis* rather than that of *S. niger*.

Type.—No. 133361, Am. Mus. Nat. Hist. ♂ ad. Paramillo (alt. 12,500 ft.), W. Andes, Antioquia, Col. Jan. 26, 1915; Miller & Boyle.

Range.—Known only from the type-locality.

¹ The color terms used in this paper will be found figured in Ridgway's 'Color Standards and Nomenclature.' Washington. 1912.

² = *S. magellanicus* auct. plur. nec. Gmel., excl. more southern references.

Description of Adult Male.—Upperparts, wings, and tail clear, dark neutral gray without trace of white on the head or of brownish wash on the back; underparts slightly paler, deep neutral gray the under wing-coverts and center of the abdomen with a trace of whitish; feet (skin) blackish or brownish black; maxilla black, mandible brownish black.

Adult Female.—Resembles the male.

Juvenal.—A male taken at the type-locality Jan. 26, 1915, has nearly acquired the plumage of the adult but still possesses in the crown, nape, scapulars, throat, abdomen, flanks, wing-coverts, tertials and tail, feathers which are barred with cinnamon-buff and black.

Remarks.—Miller and Boyle secured an excellent series of ten specimens of this species in that elevated region near the northern end of the Western Andes known as the Paramillo. In general coloration it resembles *Myornis senilis* with which, however, it has no close relation. Although approaching in size and superficially resembling *Scytalopus niger* (Swains.), the more loosely constructed remiges and differences in the color of the young indicate that it is not a representative of that species.

I have seen no specimens of the Peruvian *S. unicolor*, but from Salvin's description of it (Nov. Zoöl. II, 1895, p. 15) I conclude that *canus* resembles it in color but is smaller. Possibly *canus* is a representative race of *unicolor*, though as yet no form of either has been recorded from between northern Peru and northern Colombia. If this assumption of relationships be true the case is paralleled both in characters and distribution by that of *Diglossa brunneiventris* in which true *brunneiventris* is known only from Peru, while a smaller race is known only from Colombia. Indeed we have found it only on the Paramillo with *Scytalopus canus*.

Measurements of *S. unicolor* and *S. canus* are given below. Salvin's description of the female of *unicolor* is probably based on an immature bird. The "*S. magellanicus*" to which he refers is doubtless *Scytalopus niger* (Swains.).

	Sex	Wing	Tail	Tarsus	Bill from rictus
<i>Scytalopus unicolor</i> ¹	?	59.6	40.6	21.5	15.2
“ <i>canus</i>	♂	50	35	23	13
“ “	♂	55	35	23	13
“ “	♀	52	35	22	13.5
“ “	♀	52	34	23	13

Specimens examined.—Colombia: Paramillo, W. Andes, 10.

¹ Ex. Salvin.

Scytalopus griseicollis (Lafr.)

Merul [axis] grisei-collis Lafr., Rev. Zoöl., 1840, p. 103 (Bogotá); type examined.

Merul [axis] squamiger Lafr., Rev. Zoöl., 1840, p. 103 (Bogotá); Juv.; type examined.

Range.—Temperate Zone of the Eastern Andes of Colombia (and north-eastward to the Sierra of Merida, Venezuela?).

Remarks.—Found by us only in the Temperate Zone of the Eastern Andes near Bogotá. Examination of the type of Lafresnaye's *Merulaxis squamiger* shows it to be based on the juvenal plumage of this species. Mr. Bangs sends me, in addition to the types of *griseicollis* and *squamiger* a Lafresnaye specimen (No. 4854) labelled "*Scytalopus erythropterus* Lafr." I cannot find that this name was published. The bird is a not fully adult specimen of *Scytalopus griseicollis*.

The whitish abdomen, unbarred tawny flanks and rump, and brownish tail, distinguish the adult of this species. The juvenal plumage is conspicuously and evenly barred both below and above.

Specimens examined.—Colombia: 'Bogotá' (including the type), 7; El Roble (8,000 ft.), 1; El Piñon, 2; Chipaque, 1; Tocaimito (above Bogotá, 10,500 ft.), 3.

Scytalopus infasciatus sp. nov.

Char. sp.—In general color resembling *Scytalopus micropterus micropterus* Sel. (= *S. analis* Auct. nec Lafr.) but somewhat paler, the tail brownish, the rump and flanks tawny, unbarred as in *S. griseicollis* Lafr., bill black as in *micropterus*.

Type.—No. 132328, American Museum of Natural History. Paramo de Beltran (alt. 9750 ft.) near Bogotá, Colombia, Mch. 31, 1915, Hermano Apolinar Maria.

Range.—Known only from the Andes near Bogotá at altitudes of 8,000 and 9,750 ft.

Description of Type.—Upperparts dark neutral gray, the crown anteriorly, in some lights, rather more silvery but with no indication of a white patch, forehead and orbital region more dusky, back very slightly tinged with olive-brown, rump and upper tail-coverts tawny or ochraceous-tawny, unbarred; tail dark Prout's brown; wings fuscous, externally Prout's brown; underparts slightly paler than the back, abdomen without

trace of white; flanks and under tail-coverts bright ochraceous-tawny or ochraceous-orange, unbarred; feet brownish; bill black; the mandible, except on its rami, as dark as the maxilla; wing, 58; tail, 39; tarsus, 24; culmen, 11.5.

Remarks. — This species, which further illustrates the apparent exhaustlessness of the Bogotá region as well as of the genus *Scytalopus*, is based on a specimen presented to the American Museum by Hermano Apolinar Maria, the eminently efficient Director of the Instituto de la Salle in Bogotá.

Comparison with our large series of all the other known Colombian forms of *Scytalopus* leaves no doubt in my mind of its specific distinctness.

In the species possessing barred flanks in the adult this character is very constant. For example, not one of a series of twenty-five specimens of *S. micropterus*, including juvenal, immature, and adult plumages is without conspicuous bars in this region. On the other hand, not one of four adult specimens of *S. griseicollis* has the flanks barred. The absence of bars on flanks and rump, upper and under tail-coverts is therefore significant. Of the Colombian species which have these parts tawny, *S. griseicollis* has heretofore been the only one known without bars. Although *S. infasciatus* agrees with *griseicollis* in this important respect, the specific distinctness of the two birds is indicated by their differences in color, *griseicollis* being much paler with a whitish abdomen, and by the fact that both are found in the Temperate Zone of the same range.

Scytalopus infasciatus however, evidently ranges downward to the upper parts of the Subtropical Zone since a specimen from El Roble (altitude 8,000 ft.) above Fusugasuga, is apparently to be referred to this species. It differs from the type in having some indication of bars in the flanks, a fact which I take to indicate immaturity. Not dissimilar markings are shown by immature specimens of *S. griseicollis*, a species to which *infasciatus* is so nearly related that it is probable that in juvenal plumage *infasciatus*, as well as *griseicollis*, is barred. This El Roble specimen has a close superficial resemblance to *S. micropterus*, but its much more slender bill, agreeing in size with that of *griseicollis*, distinguishes it.

Specimens examined. — Colombia: Paramo de Beltran, 1; El Roble, 1.

Scytalopus sylvestris Tacz.

Scytalopus sylvestris Tacz. P. Z. S., 1874, p. 138 (Pallaypampa, cen. Peru).

Range.—Peru northward to the Temperate and Alpine Zones of the Central (and Eastern?) Andes of Colombia and northeastward to the Sierra of Merida, Venezuela.

Remarks. — I refer to this species, of which I have seen no authentic specimens, an adult female, from the Paramo of Santa Isabel, in the Central Andes. It has the forehead grayish, the rest of the upperparts somewhat light mummy-brown, the feathers of the back narrowly margined with black; the tail is somewhat browner than the back; the underparts are deep neutral gray; the flanks, ventral region, and under tail-coverts barred with black and ochraceous-tawny. A young male from the same locality is passing from juvenal into adult plumage. It resembles the adult but has more barred feathers in wings and on the nape, and the three remaining tail-feathers of the juvenal plumage are distinctly barred with black and ochraceous-tawny.

To this species I also refer four specimens taken in the Temperate Zone of the Andes of Merida, Venezuela. They have the flanks paler, abdomen whiter, tail and upperparts blacker, but these differences are at best racial and probably only individual.

A Venezuelan specimen in molt has enough of the postjuvenal plumage remaining to show that it is distinctly barred with ochraceous-tawny above as well as below.

Possibly our birds may not be true *Scytalopus sylvestris* but they agree too closely with Taczanowski's description of that species to warrant separation from it without comparison with Peruvian specimens.

Although this species more nearly resembles *S. magellanicus* (Gmel.) than does any of the other species here considered, it is not clear whether it is a representative of that species.

Specimens examined. — *Colombia:* Parama of Santa Isabel, 2; *Venezuela:* Paramo de Conejos, Sierra of Merida, 4.

Scytalopus latebricola Bangs.

Scytalopus latebricola Bangs, Proc. Biol. Soc. Wash. XIII, 1899, p. 101 (Paramo da Chiruqua, Col.).

Range.—*Colombia:* Alpine Zone of the Santa Marta Mts.

This a strongly marked species of the Alpine Zone of the Santa Marta group known only from the specimens collected by W. W. Brown for E. A. and O. Bangs. Thanks to Mr. Outram Bangs I have examined six of these, including the type. In general color this species resembles *S. griseicollis* (Lafr.) but it is darker below and the rump, flanks, upper and under tail-coverts are barred with black, though less distinctly than in any other of the northern species having bars on these parts.

The feet are heavier even than in *S. micropterus*, and the bill is more laterally compressed, deeper at the base with the culmen more ridged and elevated than in any other species of the genus known to me. The bill thus approaches in form that of *Myornis senilis* but the tail is short as in *Scytalopus*.

Possibly *S. latebricola* represents the species to which I have applied the name of *S. sylvestris* Tacz; but it is much larger than that species and, aside from the differences in the shape of the bill (*sylvestris* having a bill like that of *griseicollis*), *sylvestris* appears always to have the back dark olive-brown, whereas in the adult of *S. latebricola* it is deep mouse-gray.

Specimens examined. — *Colombia*: Paramo de Chiruqua, 4; Paramo de Macotama, 2.

***Scytalopus micropterus micropterus* Sel.**

Scytalopus micropterus Sel., P. Z. S., 1858, p. 69 (Napo, Ecuador).

Scytalopus analis Auct. (not of Lafr. = *Triptorhinus paradoxus* Kittl.; type examined).

Range.—Subtropical Zone in Ecuador and Colombia.

Not uncommon in the denser low growth of the heavy forests of the Subtropical Zone of all three ranges and occasionally extending upward to the lower border of the Temperate Zone and rarely downward to the Tropical Zone. All our twenty-four specimens have the flanks, lower abdomen, rump and upper tail-coverts barred with rusty and black. The white crown-patch appears to be a purely individual character not dependent upon age, sex, season or locality. It is well developed in some immature specimens and wanting in others, is present or absent in both sexes, and in specimens from the same locality. Nine specimens possess it to a greater or less degree, fifteen are without it.

On examination of Lafresnaye's type of "*Mer [ulaxis] analis*" (Rev. Zoöl., 1840, p. 104) loaned me by Mr. Bangs, I find it to be an adult specimen of *Triptorhinus paradoxus* Kittl., a fact confirming Lafresnaye's belief (*l. c.*) that his specimen came from "Paraguay ou du Chili." Kittlitz's name has nine years priority and Lafresnaye's consequently becomes a pure synonym of it.

The bird hitherto known as *Scytalopus analis* (Lafr.) will apparently therefore become *Scytalopus micropterus* Scl., as above. I have seen no Napo specimens but our collection contains a Bogotá skin labelled by Sclater "*Agathopus micropterus*." The generic name he subsequently abandoned.

Scytalopus micropterus bolivianus (Allen), of which I have the type and a specimen from Inca Mine, differs from Colombian specimens only in being smaller, the tail, especially, being shorter. Measurements are appended:

	Locality	Sex	Wing	Tail	Tarsus	Ex. Cul
<i>S. m. bolivianus</i> (Type)	Rfeyes, Bol.	?	53	33	22	13
"	Inca Mine, Peru	♂	51	33	23	12
<i>S. m. micropterus</i>	Buena Vista, Col.	♂	57	44	25	13.5
"	El Eden	♂	63	45	24	13.5
"	Salento	♂	62	44	25	13.5
"	Miraflores	♂	59	42	24	13.5

Specimens examined. — *Colombia*: Alto Bonito, 2; Las Lomitas, 1; San Antonio, 1; Pavas, 1; Andes W. of Popayan (10,340 ft.), 1; Ricaurte, 1; Miraflores, 2; Salento, 3; Laguneta, 1; El Eden, 2; La Palma, 3; La Candela, 2; Andalucia (3,000 ft.), 1; Bogotá, 2; Buena Vista, 1.

Scytalopus sanctæ-martæ sp. nov.

Scytalopus sylvestris Bangs (nec Tacz.) Proc. Biol. Soc. Wash. XIII, 1899, p. 101, (San Francisco, Santa Marta).

Scytalopus latebricola Allen (nec Bangs) Bull. A. M. N. H., XIII, 1900, p. 162, (Valparaiso, Santa Marta).

Char. sp.—Most nearly related to *Scytalopus m. micropterus* Scl., the center of the crown, in some specimens, with a silvery white spot; but size much smaller, general color gray, the tail brownish.

Type.—No. 72893. American Museum of Natural History. ♂ ad.

Valparaiso (alt. 4,500–5,500 ft.) Santa Marta Mts., Col., June 9, 1899, G. H. Hull.

Range.—Subtropical Zone, Santa Marta Mts., Colombia; Andes of Merida, Venezuela.

Description of Type.—Upperparts deep, neutral gray; forehead and orbital region black; crown with a silvery white patch slightly mixed with gray; rump cinnamon-brown, the feathers terminally barred with black and ochraceous-tawny; upper tail-coverts similar in color but less distinctly barred; tail Prout's brown, more fuscous toward the shaft; wings much like the back, more or less margined externally with the color of the tail; underparts paler than the back, neutral gray, the abdominal region centrally whitish; the flanks and under tail-coverts barred with black and bright cinnamon-brown or ochraceous-tawny; feet (skin) brownish; bill black, gonyes brownish. Wing, 51; tail, 33; tarsus, 20; culmen, 13 mm. (A second male is without a tail, but, in other respects, including the white crown-patch, agrees with the type.)

Juvenal Plumage.—With a general resemblance in pattern to the same plumage of *S. micropterus*, but everywhere paler; upperparts Prout's brown; crown slightly darker; the feathers very narrowly margined with black; loreal and ante-orbital region ochraceous-buff; rump not sharply barred with black and ochraceous-tawny; tail, lacking; wings externally much like the back, the coverts terminally barred with black and ochraceous-tawny; underparts rather uniformly barred with ochraceous-buff and black; the bars on the flanks deeper, more transverse, less lunular. (Described from No. 97940 American Museum of Natural History, Valparaiso, Col., taken from the nest, June 30, 1899.)

Postjuvenal Plumage.—Similar to that of the adult but upperparts between Prout's brown and mummy-brown.

Remarks.—In the light of our large series of this group it appears that the three Santa Marta specimens of *Scytalopus* referred by Dr. Allen (*l. c.*) to *S. latebricola* Bangs, and the one immature specimen provisionally identified by Bangs, as *S. sylvestris* Tacz. are representatives of *S. micropterus micropterus* Scl.

The presence in both our adult specimens of the white crown-patch, which is often, but not always, found in *S. micropterus*, and so far as I am aware, in no other species of the genus, betrays the relationships of *sanctæ-martæ* with the species. Furthermore, the juvenal plumage of *sanctæ-martæ* resembles in pattern that of *micropterus*. It is important to note that both species inhabit the Subtropical Zone.

Scytalopus latebricolor, on the other hand occupies the Alpine Zone, and is a much larger bird than *sanctæ-martæ* (wing, 63 mm.)

with heavier feet and bill, the latter being much vertically compressed with the culmen sharply ridged and basally elevated, while in *sanctæ-martæ* as in *micropterus*, the bill is more subulate. The fact that in immature plumage both the species just named have the upperparts brown, doubtless misled Mr. Bangs in referring his immature specimen of *sanctæ-martæ* to *S. sylvestris*.

In the specimens which I identify as *sylvestris* the upperparts are brown in the adult and are of a distinctly different shade, olive-brown rather than mummy-brown or Prout's brown as in *sanctæ-martæ* or *micropterus*. An adult from the Subtropical Zone near Merida, Venezuela appears to be conspecific with this form.

Specimens examined.—*Colombia*: Valparaiso, 3; San Francisco, 1; *Venezuela*: Andes near Merida, (alt. 6,500 ft.), 1.

Scytalopus panamensis sp. nov.

Char. sp.—Most nearly related to *Scytalopus argentifrons* Ridgw., but forehead black like the crown; supra-ocular stripe whiter, broader, more pronounced; underparts, particularly throat, paler gray; size larger, bill longer and heavier.

Type.—No. 135591, American Museum of Natural History, ♂ ad. Tacarcuna (3,600 ft.), eastern Panama, March 6, 1915; H. E. Anthony and D. S. Ball.

Range.—Subtropical Zone of the Santa Espiritu Mts., eastern Panama.

Description of Male.—Entire crown and foreback slate-black, becoming dark mummy-brown on the lower back and brighter, more rusty on the rump and upper tail-coverts, which are barred with black; a broad, sharply defined silvery-white line passes over the eye from above the front of the orbit to the nape and is separated from the auriculars by a slaty-black post-ocular stripe; auriculars somewhat grayer; lores dusky; orbital ring blackish; tail blackish with a slight tinge of brown; wings slaty-black with a slight trace of mummy-brown in the outer margins of quills and coverts increasing in amount internally; throat and rest of underparts centrally, pale neutral gray; the sides darker; the flanks, ventral region and under tail-coverts distinctly barred with black and bright tawny or ochraceous-tawny; feet (skin) brownish black; bill black.

Female.—Similar to the male, the superciliary stripe less bright and not so pronounced; the upperparts washed with mummy-brown.

Remarks.—This is one of the most interesting species secured by our recent expedition to the mountains of eastern Panama. Ten specimens, six males and four females, all apparently adult, were

taken on Mt. Tacarcuna at altitudes from approximately 3,600 to 4,600 ft.

In the Subtropical Zone of the mountains of western Panama and Costa Rica, *Scytalopus panamensis* is obviously represented by the nearly related *S. argentifrons* and the discovery of this new form, makes less inexplicable the occurrence of a species of this genus in a region so far removed from the nearest point at which other species were known to occur. The bearing of this discovery on the faunal affinity of the Subtropical Zones of Costa Rica and western Panama with those of eastern Panama and Colombia is obvious but the subject is too wide to be discussed in this connection.

Specimens examined.—Mt. Tacarcuna, eastern Panama, 10.

***Scytalopus argentifrons* Ridgw.**

Scytalopus argentifrons Ridgw., Pr. U. S. N. M. xiv., 1891, p. 475 (Volcan de Range-Irazú, Costa Rica).

This, the most northern species of the genus, is clearly a representative form of *S. panamensis* from which it is now specifically distinct. It is confined chiefly to the Subtropical Zone in Costa Rica and western Panama, ranging in the first-named country, according to Carriker, from 4,000 ft. to timber line, and in western Panama Bangs records it from 5,000 to 7,000 ft.

Specimens from Boquete and Mt. Chiriqui, when compared with those from Irazu show, in their larger bill and somewhat less silvery forehead, a slight but unmistakable approach toward *panamensis*. This variation is obvious enough in comparison of specimens but it is too slight to be defined by words or in figures.

The female of *argentifrons* apparently lacks the silvery front and superciliaries which distinguish the male and thus closely resembles the female of *S. micropterus*, a fact which indicates its descent from that species. The female of *panamensis* on the other hand, possesses (though in a somewhat less conspicuous form) the white superciliaries of the male, and thus bears less resemblance to the female of *micropterus* than does the female of *argentifrons*, though geographically nearer to it.

Specimens examined.—*Costa Rica*: Irazu, 6; *Panama*: Boquete, 4; Mt. Chiriqui, 2.

KEY TO ADULTS OF THE SPECIES OF *Scytalopus* FOUND NORTH OF THE EQUATOR.

1. Plumage uniform.
 - a. Blackish, not perceptibly paler below than above. *S. niger*.
 - b. Grayish, perceptibly paler below than above. *S. canus*.
2. Plumage not uniform.
 - A. Flanks tawny, barred.
 - a. A silvery or white superciliary.
 - a.¹ Superciliary and forehead silvery. *S. argentifrons*, ♂.
 - a.² Superciliary white, forehead blackish like the crown. *S. panamensis*.
 - b. Without a superciliary.
 - b.¹ Back gray.
 - b.² Size small, wing under 55 mm. *S. sanctæ-martæ*.
 - c.² Size larger; wing over 58 mm.
 - c.³ Underparts dark slaty, flanks sharply and distinctly barred; bill not deeper than wide at base. *S. m. micropterus*.
 - c.⁴ Underparts mouse-gray, flanks not sharply and distinctly barred; bill much deeper than wide at base. *S. latebricola*.
 - c.¹ Back brown.
 - c.² Forehead neutral gray, tail olive-brownish. *S. sylvestris*.
 - d.² Forehead and tail blackish.
 - d.³ Wing over 55 mm. *S. micropterus*, ♀.
 - d.⁴ Wing under 55 mm. *S. argentifrons*, ♀.
 - B. Flanks tawny, unbarred.
 - a. Paler, underparts light neutral gray. *S. griseicollis*.
 - b. Darker, underparts deep neutral gray. *S. infasciatus*.

SYNOPSIS OF THE CHARACTERS OF THE JUVENAL PLUMAGE IN CERTAIN SPECIES.

- A. Upperparts as well as underparts barred with ochraceous-tawny. *S. griseicollis*, *S. sylvestris*, *S. canus*.
- B. Upperparts dark mummy-brown narrowly margined, more rarely inconspicuously barred, with black; underparts widely margined with ochraceous-tawny or cinnamon-buff. *S. micropterus*, *S. sanctæ-martæ*, *S. argentifrons*.
- C. Plumage practically unbarred, or bars inconspicuous and restricted largely to flanks and upper-tail coverts, the underparts broadly margined with cinnamon-buff. *S. niger*.

Measurements.

Name	Locality	Sex	Wing	Tail	Tarsus	Culmen
<i>S. magellanicus</i>	Cape Horn region	♂	51	32	21	12
"	"	♂	51.5	33	21	12
"	"	♀	52	31	20	12
"	"	♀	51.5	31.5	21	12
<i>S. niger</i>	Valparaiso, Chile	♂	52.5	40.5	20	13
"	Santa Isabel, Col.	♂	55	42	23	13
"	El Roble	♂	55.5	39	23.5	11
"	Sta. Elena	♂	53	39	21	12.7
"	El Roble	♀	55	39	23.5	13
<i>S. canus</i>	Paramillo, Col.	♂	55	35	23	12
"	"	♂	50	35	23	12
"	"	♀	52	35	22	12
"	"	♀	52	34	23	11.5
<i>S. griseicollis</i>	El Piñon, "	♂	58	43.5	24	11.5
"	'Bogotá'	?	56	39	23	12
<i>S. infasciatus</i>	Paramo de Beltran, Col.	?	58	39	24	11.5
"	El Roble, "	♀	57	41	23	11.5
<i>S. sylvestris</i>	Santa Isabel, "	♀	53	41	21	10.5
"	above Merida, Venèzuela	♂	54	38	23	12
"	"	♂	52	39	23	12.5
<i>S. latebricola</i>	Paramo de Chiruqua, Col.	♀	63	42.5	26.5	15
"	"	♀	63	42	26	15
<i>S.m.micropterus</i>	Buena Vista, "	♂	57	44	25	13.5
"	Salento, "	♂	62	44	25	13.5
"	San Antonio, "	♀	57	42	23	13.5
"	La Candela	♀	59	45	21	13
<i>S. sanctæ-martæ</i>	Valparaiso, "	♂	51	33	23	13
"	Merida, Venezuela	?	54	35	22.5	13
<i>S. panamensis</i>	Tacarcuna, Panama	♂	55.5	44	23	14
"	"	♂	53	41	23.5	14
"	"	♀	57	41	22	13
"	"	♀	54	37	22	13
<i>S. argentifrons</i>	Irazu, Costa Rica	♂	53	44	22	12
"	Chiriqui, Panama	♂	53	43	22	13
"	Boquete, "	♀	51	41	20	13

THE PLUM ISLAND NIGHT HERONS.

BY S. WALDO BAILEY.

FOR a region which on casual or hasty observation appears to be barren and dreary, devoid of many of those features which go to make the attractive and picturesque in nature, I have found on intimate acquaintance, Plum Island lying off the northeast coast of Massachusetts, to be a most interesting and fruitful locality for study and research.

Separated from the mainland by a broad stretch of level marsh and several tidal creeks, on the north, the latter widening into a broad sound farther south, the island extends from the mouth of the Merrimac River on the north some nine miles southward to Ipswich River not far from the northerly base of Cape Ann, but averages scarcely half a mile in width.

Geologically it is a series of wave washed, wind blown sand dunes, overlaying by no great depth submerged drumlins, the inundation of these being due to the slow subsidence of the coast line since the glacial epoch. The dunes on the landward side are bordered by an irregular narrow strip of marsh, cut by numerous small intersecting ditches and sinuous tidal creeks. Bordering the mainland, broad stretches of marsh come down to meet these creeks. Nearly the whole of the marshy area is covered completely by every monthly high run of tides.

Thoreau writing of the region over sixty-five years ago described it as a place of "dreary bluffs of sand and valleys plowed by the wind, where you might expect to discover the bones of a caravan. . . . probably Massachusetts does not furnish a more grand and dreary walk. On the sea side there are only a distant sail and a few coots to break the grand monotony. A solitary stake stuck up or a sharper sandhill than usual is remarkable as a landmark for miles; while for music you hear only the ceaseless sound of the surf and the dreary peep of the beach birds."

Conditions have changed but little since Thoreau's time. A small summer colony at the northern end of the Island connected with Newburyport by trolley, and a hotel and a few summer cõt-

tages at the southern extremity or "Bluffs" add life and activity to these portions during a few months of the year, and a federal lighthouse and two life saving stations maintain a watchful eye seaward. But between these points of activity lie long stretches of bleak dunes and rolling ridges over which the winds of winter sweep with relentless fury blowing the looser particles of sand much in the manner of snow, cutting into, and altering somewhat the contour of the hillocks from year to year. And in midsummer the sun beats down with a torrid intenseness.

Occasionally among the wind swept hollows between the dunes one finds a rudely chipped implement or arrow head of flint (much polished and worn by the action of the sand) a silent reminder of the former wild inhabitants of the land. And like a hundred and one other places along the Atlantic coast, this place has its traditional buried treasure, left years ago by Capt. Kidd, and now only awaiting the search and industry of some keen prospector to bring it to light.

But bleak and desolate as the locality would seem, and at certain seasons is certainly, the land is not wholly barren. In many favored parts, sheltered from the force of the winds and shifting sands, nature attempts to cover the nakedness of the soil with a mantle of vegetation. The botanist may find much here of interest in his particular line of study, and a survey of the entire region would reward the student with a list of species quite respectable in numbers. On the tops and leeward sides of the dunes one finds the coarse beach grass, *Ammophila arenaria*, growing abundantly, its plummy heads nodding before every breeze, and its long slender recurving leaves describing dainty arcs in the sand around their base.

And growing along in company with it but in lesser quantities is the beach pea, *Lathyrus maritimus*, the long deep roots of both these species acting beneficially as sand binders. Such coastwise species as the yellow-eyed grass, *Xyris flexuosa*, and the beach heather, *Hudsonia tomentosa*, find a congenial soil here, the last named, forming in places on the levels between the higher dunes, a pale green carpet to cover the brown of the sand, and in its season of bloom, further adds to the colored tapestry with a rich display of deep yellow. And so I might continue, and enumerate a long list of

herbaceous plants and come at length to the low shrubs like sweet fern, *Myrica asplenifolia*, and bayberry, *Myrica carolinensis*, both of which grow plentifully here. And too, the beach plum *Prunus maritima*, from which the Island receives its name, once growing here abundantly now nearly extirpated by the ravages of the brown-tail moth, *Euproctis chrysorrhæa*: and, varying from a low shrub, to a tree of from 15 to 25 feet in height, is the black cherry, *Prunus serotina*, growing abundantly in many places all along the Island.

On the landward or marsh side of the Island a variety of grasses may be found, many acres of which are harvested each year and fed to the stock on the adjacent inland farms. The low seaside gerardia; *Gerardia maritima*, and heathery marsh rosemary, *Limonium carolinianum*, and the less abundant, but showy Canadian burnet, *Sanguisobra canadensis*, all these and many more may be found scattered over the broad expanse of the marshes, both of the Island and mainland.

One is surprised too, at the number and considerable size of the trees that grow in certain of the deep bowl-like hollows between the dunes. There are a fair number of such species as poplar, *Populus tremuloides*; black oak, *Quercus velutina*; elm, *Ulmus americana*; tupelo, *Nyssa sylvatica*; red maple, *Acer rubrum*, and shad, *Amelanchier canadensis*, many of these in especially favored places attaining a height of 35 feet or over. Toward the southern end of the Island are a few thickets of grey birch, *Betula populifolia*, and scraggy wind distorted cedars, *Juniperus virginiana*. Not infrequently, in among the growths of trees the explorer encounters nearly impenetrable tangles of wild grape, *Vitis labrusca*; Virginia creeper, *Psedera quinquefolia*; cat brier, *Smilax rotundifolia*; and climbing bittersweet, *Celastrus scandens*. And poison ivy, *Rhus toxicodendron*, grows profusely over a wide area.

To the bird lover and the sportsman the Island and its adjacent marshes hold out several alluring invitations. It has been said, and with probable truth, that in years past, no place of equal extent on the Massachusetts coast has been a favorite resort for more wild fowl and shore birds. And up to the present time, considering the increasing persecution of these birds, fair flights of some of the species still continue, though in recent years owing probably to incessant murderous attacks made upon them, there has been,

apparently, a deflection in their line of flight, many flocks passing by altogether, well off shore.

For twenty-five or thirty years past (if the information given me by longshoremen and gunners long familiar with the region, is correct) up to 1909, a colony of Black-crowned Night Herons (*Nycticorax nycticorax naevius*) have nested on the Island. This colony I believe is one that about thirty years ago nested in a hemlock swamp not far back from the Merrimac River in the town of Amesbury. With the cutting off of the trees in this swamp and its surroundings the birds were driven from their favorite and probably long used breeding place here and resorted to the more secluded site the Island afforded. My acquaintance with these birds in this latter place began in 1904 when of a day's gunning on the marshes I wandered back among the dunes and by chance came upon the rookery. For the next five years my knowledge of them was gained by several visits made at irregular intervals, to the region, and for a description of these, I will, with a few corrections and omissions of unimportant details, quote briefly from my notes of those dates.

August 12, 1904 — To the Plum Island marshes, gunning. The weather cloudy, threatening rain: wind, moderate northeasterly. . . The most interesting happening of the day occurred when after tiring of gunning and tramping over the marshes, with indifferent success, I wandered back among the sand dunes toward the sea-shore near "Long Point" and in a deep, brushy, bowl-like depression between high dunes discovered a nesting colony of Black-crowned Night Herons. As a conservative estimate of the birds here, young and old, I placed the number at upward of 700. As there was more or less of activity and commotion among them and a continual passage of birds to and from the shore and at less regular intervals from the marshes, it was rather difficult to form an estimate. The number of nests served as a more reliable basis to judge upon. A somewhat hasty count of these resulted in 157, that I believed from appearances were, or had recently been, in use. Granting that there were two adults for each nest, and an average of three young (I believe the average would be higher than this), the total would not be far above the figure named.

I found a few young birds still in the nests but by far the larger

portion of them were able to fly. It is probable that the birds still in the nests were of a second brood, or their parents had been interrupted in their first attempts at nesting.

Guttural squawks and a ghoulish, uncanny, rasping din greeted me as I stood on the rim of the hollow and looked across the lively scene, voices that the ornithologist Wilson aptly likened to the noise made by several hundred Indians trying to choke each other! Descending into the brushy thickets, I found the place not a clean one to travel about in. Decidedly filthy in the vicinity of the nests, the trees and much of the foliage white with chalkings, and the ground beneath covered with refuse, the stench of which was keenly sensible to the olfactory nerves.

The nests were very loosely constructed, of coarse dead sticks, without any attempt at lining, apparently only thrown together and looking as if a good breeze would blow them out of the trees altogether. Some of the larger trees contained over a dozen nests each, these varying in situation from 6 to 25 feet above the ground, the ramshackle affairs built in almost every available crotch, often seemingly regardless, of the close proximity of a similar dwelling.

In moving about amid the tangle that composed the undergrowth of the place I was continually scaring up more birds for by no means had they all taken flight upon my first appearance, though the multitude that left at that time would seem to have emptied it. Sometimes, a dozen or twenty birds, chiefly adults, would take flight at once from a thicker covert, and after much flapping about and noisy, hoarse squawking become silent but sail steadily to and fro high over head, the younger birds taking refuge in the thickets of several nearby hollows among the dunes.

Some few of the young birds still on the nests, upon being disturbed at my approach or attempted investigation, would crawl out and climb clumsily about on the adjacent limbs, gawky, awkward, and scarce able to keep the balance requisite for maintaining their hold on the slender branches. Emerging on the farther side from any point of entrance, of the circular hollow, the whole area being only about two acres in extent, I caught glimpses of small groups of birds, the young and unsteady of wing, that had resorted to nearby cover. These callow birds were perched on the plum bushes or moving slowly about on the sand and doubtless

wondering what all the uproar was about. Their grayish brown coats contrasted rather markedly with the green of the foliage but against the duller tone of the sand, harmonized to a degree almost perfect until their presence was revealed by motion.

On the whole the hour spent here was a novel and interesting experience and I congratulated myself for chancing upon it, believing that an occasional visit to the place in the future, would offer an opportunity for varying my studies, previously confined, to the smaller land birds found near home.

My next visit to the locality was made the following spring, May 21, 1905, and recorded in my note-book somewhat as follows:—

“By trolley and afoot to Plum Island, down as far as ‘Long Point,’ to visit the heron rookery there. The day a fine mild, clear one with light northwesterly wind. Was accompanied on this trip by F. D. B. The object of our visit today was to secure a few sets of eggs for our collections and make a few observations on nesting habits in general. As we topped the steep sand hills and looked down on and across the wooded basin which the herons had chosen for a nesting place, one could not, even though he be of a reserved or nonchalant disposition, fail to be impressed with the lively scene there presented to view. Several hundred birds rose at our appearance on the rim of the hollow and with much flapping and wheeling about, voiced their resentment at our disturbance of their domestic peace, with discordant, raucous, guttural squawking, which was increased to a tumultuous din when we descended into the lower ground to the precincts of their nests. Through rank tangles of beach plum, black cherry, grape vine, catbrier and poison ivy, we pushed our way to the more open ground under some of the larger trees, in which many of the nests were to be found. The tangles were made much more disagreeable of penetration by chalkings and the stench of refuse underfoot, these further adding to the natural protection afforded by briars and the closely interlacing branches.

In trees of shad, poplar, maple and elm, the majority of the nests seemed to be placed, with fewer numbers in oak and tupelo. Positions varying in height, ranging from six to twenty-five or even thirty feet from the ground, available crotches, chiefly governing the choice of position. A few, probably a dozen, I noted, were

placed within a few feet only from the ground, several nearly or quite on it, but most of these were in such tangled thickets none but a weasel or winged enemy could gain access to them. The climbing of these trees was not a task for one considerate of clean clothes or sensitive nostrils for they were well white-washed, which served as a deterrent to any but the most enthusiastic. A few of the nests contained at this early date, downy young ten days or a fortnight old and the thin piping whistle-like voices of these helped to increase the uproar going on overhead among the adults. Many of the nests we visited contained sets of eggs well advanced in incubation. In fact the most of those that we saw were more or less advanced and it was only after considerable searching and difficulty that we were able to obtain a few comparatively fresh sets. As we visited several groups of trees, each containing numerous nests we had an opportunity to make note not only of the different stages of incubation but the various number of eggs making up a set. In three instances I saw nests containing only two eggs and these apparently were full sets in these cases for they were well along toward the time of hatching. In not a few other nests, three seemed to be the complement. But by far the greater number contained four and a few even five, the last named figure the highest I saw in any of them. The difference of time represented between fresh sets and the young birds of several days of age would go to show that there was considerable variation among the different pairs regarding the date of commencing household duties. A few pairs must take them up soon after their arrival in mid April; others in a more leisurely fashion as indicated by the fresher sets.

I took for my collection a few fresh sets of four and five, of the Night Herons, and a set of four of the Little Green Heron, *Butorides virescens virescens*, a nest of which I was fortunate in finding in a thicket of low bushes near the center of the hollow.

A few crows hovered around the margin of the woodland, and in several places I saw punctured, empty and broken egg shells which appeared not to have been broken after the usual manner of hatching, and from these evidences I suspected the cause of the crows neighborliness. Though in justice to the crow I would add, that it seemed not improbable that some eggs might be rolled out of the shallow nests, occasionally by the herons themselves in set-

ting on or on leaving the nests. Crow Blackbirds were in the vicinity in small numbers. Among the low growing beach plums and black cherry I found a few nests of these birds, containing sets of three and four eggs. Whether these birds take any part in nest robbing here in this locality I am from my limited observations in the region, not prepared to say, but my opinion, based on experience with them farther inland, leads me to think that they will do so on occasion. Numerous empty gun shells seen in the immediate vicinity of the rookery, and now and then the skeleton or dried remains of a heron on the ground or lodged among the branches, betokened a less excusable enemy. Some "sportsman" (so called, but spare the mark!) who thought it clever to keep in "good practise" by using these sluggish birds as a target.

The more strenuous labors of our visit being over, we secreted ourselves for a time in one of the thicker tangles and from there watched the colony settle down to a state of comparative tranquillity again. The birds came readily enough back to their home trees, after our disturbance and the deserted nests soon contained their brooding birds again and the business of life in the rookery went on as usual. I was interested in noting in the cases of some of the nests we had just robbed, that the females settled broodily upon them again as though nothing had happened to their nursery treasures. So much for the power of instinct and habit perhaps!

There was more or less of activity at all times in the vicinity of the rookery; birds flying to and from their salvaging or feeding ground along the shore, or from the quest of food out on the marshes. The arriving birds settled with flapping of wings and awkward bobbings to preserve their balance, among the trees in proximity to their nests. The arrival or departure of a bird seemed to be the signal for additional squawking and outcry on the part of his fellows. There was seldom or never a full minute of quiet. The hungry young were already beginning to pipe their wants in weak falsetto or as in the case of the older chicks with a persistent and stronger "tek-tek-tek." Whether all the guttural and variously pitched squawking of their elders were uttered in response to the insistent demands of the youngsters, would be difficult for anyone unacquainted with heron language to determine, but certain it was there was no lack of clamor and raucous din, always augmented by

the arrival or departure of birds or by any change of position among those about the rookery.

Two or three birds were still engaged in nestbuilding, or rather the repairing of last year's nests. I saw one male heron come flying in from a neighboring thicket of trees with a fair sized dead stick in his beak, and this coarse building material he proceeded to work into the rude platform of similar timber. In another instance, close by our place of concealment I saw the skeleton of a young heron, victim of some disaster of the previous year, worked in as constructive material for the nest. Rather a gruesome reminder, close at hand, for the birds of the present season were they gifted with the powers of thought or reflection.

Our leave-taking and the two mile walk along the border of the marshes, back to the trolley line was considerably hastened by the vigorous assaults of swarms of bloodthirsty mosquitoes, who disregarded all but savage standards of warfare in their attacks. But altogether this visit to the rookery was a pleasant and instructive one, resulting in our gaining a fuller knowledge of the habits of these interesting birds."

In the season of 1906 I visited the rookery but once, and then late in August when the business of housekeeping for that season was pretty well over and the place chiefly used now as a kind of rendezvous or roosting place for such of the birds as had not scattered and wandered along the coast or inland in small family flocks or individually. From the time the young became steady of wing, up to the time of departure for the South, in late October or early November, according to the mildness or severity of the season, the birds are something of wanderers, drifting from one swamp or secluded river border to another, or along the marshes and tidal creeks of the coasts. At this season I have frequently found them along the borders of several of the larger sluggish streams and brooks inland, and about the shores of the smaller reedy ponds and watering holes. At dusk and during the early evening their uncanny "quawks" may be heard coming eerily from the gloom overhead, as they change from one tarrying place to another.

On June 9, 1907, I made a trip to Plum Island and attempted at this time to secure photographs of the herons at the "Long Point" rookery. For a camera I had a 4 × 5 POCO, with the usual

trade lens known as a "rapid rectilinear," a three speed shutter, and a few single plate holders together with other necessary accessories, such as tripod, thread auxiliary lenses, etc. Of the half dozen or more exposures made on this trip there were but one or two that proved successful, my failure due to a certain extent, to my inexperience in using a camera and also I might add, that in the light of the knowledge gained in recent years, of a camera and its management, due to inadequate equipment for the work in hand, a better lens and more rapid shutter being necessary for the making of good photos in this particular line of work.

The weather on this occasion was typical of the best in June, the morning a clear and bright one, with a light northwest wind blowing and a few low lying white-capped clouds in the west, prophetic of possible showers later in the day. In making the two mile tramp down the shore from the trolley line I found the beach much changed by the storms of the previous winter. Much of the sand along the upper end of the Island was cut away and the beach narrowed, the portions thus removed being deposited in shoals and bars farther down along the shore, in the region of "High Sandy Beach" and from this point along toward the southern extremity of the Island.

Barren though these low lying sandhills may be at some seasons and seem to some people, yet they possess a charm and beauty peculiarly their own, and never seemed to me more picturesque and delightful than on this morning. The rolling wind swept dunes with their green caps of waving beach grass and low plum; the violet, porphyry particled sand blown into delicate curving lines along their slopes, blending harmoniously with the paler bronze of the sand mass; with now and then glimpses to be caught between the dunes of the fresh and vivid greens of the level marshes, and distant purple inland hills; and on the water side, the deep blues and changing greens of the sparkling, restless sea with the duller purple of the distant Cape Ann; the crystalline, actinic blue of the sky; all these burnished and blended, mellowed and permeated by the bright sunlight of a perfect June day.

"Breathes there a man with soul so dead. . . ." whose æsthetic senses would not respond, and quicken with appreciation at this enchantment wrought by Nature's alchemists?

Distance along the level beach is deceitful and a walk of any given length, or with the goal or landmark ahead in sight, is seemingly much longer because of the level unbroken character of the surroundings and the difficulty of walking, the coarse yielding sand affording but insecure footing for the pedestrian. Close to the water's edge one finds the firmest though not always the safest going, if dry feet are a consideration.

Each wave of the ebbing tide leaves its autograph on the sand, a record of "heights attained." The beach is strewn with the shipwrecked homes of thousands of the order *Mollusca* and the varied flotsam of the winter storms.

Nearing the neighborhood of the rookery I found the beach scored with the tracks of many herons. And about a half mile ahead I descried apparently a patch of sand darker than usual and through the glass learned that it was a company of nearly 200 birds, feeding along the shore, close to the water's edge. Here the herons as well as many species of shore birds, have a spacious feeding ground, the former during the entire season with us, the latter for the brief space they tarry in this latitude; with food cast up in abundance daily, the offal of the sea. A closer view of this flock I thought would be decidedly interesting and a close range shot at them with the camera, would give a picture of interest and value. But long before I could get within range, even before I was within 300 yards, they all took wing and went nearly a mile farther down the beach. Yet my desire for a picture of them in such surroundings was keen, so I put into practise the best tactics in the fine art of stalking, taking to the leeward of the dunes and being careful to keep well concealed behind them. But a little later on making a reconnoissance over the tops of these opposite to where I suppose the flock to be, I was rewarded with no better view of them than I had before for they had again flown, this time too far down the beach for me to follow. Some bird passing overhead had probably given warning to his fellows of the approach of an enemy.

Returning up the beach, for in my chase I had gone considerably past the rookery, I found the moist sand, much traced, crossed and recrossed, with the imprints of many herons' feet, forming a mosaic of triangular figures, but one without definite plan or de-

sign in arrangement. Soon entering the sand hills again I came at length to the immediate vicinity of the rookery, well screened and hidden from the casual passerby in its secluded hollow. A few birds are to be seen sailing too and from the shore or from their quest out on the acres of marshland. But for these few voyagers one might never suspect the close proximity of such a colony.

Before exposing myself to view, I prepared my camera, with the vain hope of securing a picture of the birds as they would take flight when I appeared on the rim of the basin. Several hundreds of them arose with much tumult of flapping and squawking when I first gained the top of the slope and came fairly into view. Such a lively scene of wild life and activity as they present at such a time, would be well worthy the attempt of a professional photographer to portray, but my attempts in this instance were unsatisfactory, for reasons previously noted.

By this date the serious business of housekeeping engaged the time and attention of nearly all the herons. Only in one or two instances did I note birds carrying nest building materials and only a few comparatively fresh sets of eggs. By far the greater number of nests contained eggs well advanced in incubation and not a few already contained young birds, of varying days of age. Climbing one of the first good sized trees that I came to, a red maple containing four or five nests, I found in one of these a couple of yellow eyed, frightened young, just arriving at the "pin feather" age, their primaries and longer tail feathers just beginning to be prominent. I endeavored to obtain the portraits of these two interesting fledglings, but later the dark room again pronounced failure, not however because of the bad behavior of my subjects for they were as quiet and accommodating as heron manners would permit.

The tardiness of the season was illustrated in the vegetable world by the condition of the shad trees here, many of them being just in bloom, nearly or quite a month later than their usual time on normal seasons inland. The backward season, however, apparently made little difference in the heron world for conditions here on this date were similar to those on a like date during a normal season.

In the midst of my investigations today, being intent on the many interesting things going on around me, a smart shower came up,

unnoticed until the first large drops called it unpleasantly to my attention, then too late for me to seek a secure cover, so taking refuge in the thickest tangle at hand, I enjoyed, in a rather melancholy manner, in this damp shelter, the lunch I had brought along and at the same time served most unwillingly as a free lunch to swarms of hungry mosquitoes. Lunch well over and the rain still continuing without sign of immediate slackening, I decided on a hasty retreat back to the car line arriving there in due season in a somewhat moistened condition; but not wholly disappointed with my visit and the things accomplished, and resolved to come again later in the season.

Accordingly, a week later, June 16, I again visited the Island and rookery with the intention of making further observations to supplement the unfinished work of the previous visit. The weather on this date was clear and uncomfortably warm, with a gentle southwesterly wind blowing. Arrived on the beach about 9 A.M. and found the tide on the ebb and the ocean exceedingly calm. Far down the beach in the direction I was going I saw again a good sized flock of the herons feeding on the refuse along shore, but these kept well ahead of me, making short flights from time to time as I approached them. Numbers, with them, seem to beget wariness and fear, for always when feeding in company in this manner, I have found them to be extremely shy, whereas, when singly, or in the case of only a few, one can frequently work up quite close to them without alarming them.

So calm was the water and quiet the air on this morning that arrived at a point, off abreast of the rookery, I could plainly hear the voices of the birds, young and old, in their haunts a quarter of a mile away. I found the usual activity prevailing in the vicinity of the nests. This was increased to a noisy clamor of alarm when I entered the brushy growth surrounding them. Today as on several previous occasions I secreted myself in some of the thick undergrowth, that afforded a good outlook over many of the nearby nests. In getting into this position I noted very few eggs in any of the nests, most of them at this advanced date being hatched. I saw one nest containing five eggs and secured a fair photograph of it but only in three or four others did I see eggs.

From my vantage point in the dense thicket I watched the do-

mestic affairs of the birds for over two hours and recorded several curious and entertaining things concerning their habits. I learned that Madam Heron is a careful and solicitous mother although the coarsely made and ill kept nest might indicate otherwise. She is very loath to leave her eggs or newly hatched chicks, long exposed to the hot sun or open to a possible discovery by some passing enemy. Birds that had been frightened from their nests when I entered their precincts came readily back to them after a period of from five to eight minutes, after I had hidden myself. These flying low, with sluggish flapping of wings, over the trees would awkwardly alight near their nests and after a greater or lesser interval of staring vacantly about, the slang word "rubbering" aptly describing this performance, they would, more clumsily still, climb down to their nests and settle on the eggs; or in the case of very young birds perch on the nest in a crouching attitude and spread their wings slightly, standing thus to shelter the callow chicks from the intense heat.

How a returning bird could distinguish its own nest from countless others like it amid the surrounding confusion and tangle is one of the curious facts belonging to the realm of instinct, and probably beyond our human ken.

Those nests containing young of a few days of age only, were visited often by the parents at intervals of from fifteen to thirty minutes during the time I kept watch of them near my place of concealment. Their method of feeding, by regurgitation was an interesting procedure to witness, although a little revolting perhaps to persons of a sensitive nature, used to more genteel manners, but withal quite satisfactory to the baby birds who know no other than *a la l'Heronaise*. Up to what age this manner of feeding is continued I could not learn. Many of the young that I judged to be well over three weeks old were still fed in this way. A later visit to the rookery might help to determine this question.

The piping of the young birds was incessant, the volume and force of individual voices varying according to the age of the complainant. The very young birds uttered a peculiar weak shrill whistle-like note not so very unlike the plaintive peeping of domestic chicks, while the older birds voiced their wants with an emphatic "tet tet tet" or "yick-yick-yick." So impressed on my memory are

the varied voices and clamor of the birds here, and the sounds of the surrounding region, that I can even now after several years, call them all distinctly to mind, from the plaintive piping of the hungry young to the answering or alarmed raucous squawks of the mature birds, and the low, droning undertone of the surf on the shore or the swish and flutter of the leaves over my hiding place as the hot wind drew through the hollow. And I have but to hear the uncanny "quawk" of a night heron passing over of a summer evening, to bring at once to my mind the pleasant hours spent in the haunts of the birds here on the Island.

To-day, while sitting here in my brushy covert under some low and stunted trees, watching the comings and goings of the birds, a deer came daintily and noiselessly along through the undergrowths and caught sight of me almost at the moment that I discovered him. One inquiring glance of a moment served to satisfy him of the nature of the danger he was encountering and away he went in precipitate haste with white flag flying, doubtless greatly surprised to find his haunts inhabited by other tenants than the feathered ones he was familiar with.

Seven other species of birds beside the Green and the Black-crowned Night Herons, I have found or am certain breed here on Plum Island in the immediate vicinity of the rookery. At least three pairs of Crows nested in the larger trees in the rookery proper and probably more in the several neighboring wooded hollows. Crow and Red-winged Blackbirds were fairly numerous. I counted eleven nests of the former in the low undergrowth of the basin and found two of the Redwings in the rose bushes and grass in a little open space near the center and lowest part of the hollow.

Kingbirds while not in close proximity to the heronry were common out in the more open bushy country near at hand. Cat birds and Brown Thrashers nested in the thickest tangles and from the many Maryland Yellowthroats seen and heard, I concluded there must have been nearly a dozen pairs nesting in the nearby lowland cover. One of the characteristic bird voices of the Island, wherever you go, back a little way from the shore and deeper rumble of the surf, is that of the Savannah Sparrow (*Passerculus sandwichensis savanna*). His song though weak and insect-like has a carrying quality and reaches one's ear when the small minstrel

is several hundred yards away, and often impossible to locate. From the numbers of these dusky and elusive sprites that I have seen and heard all along the Island and borders of the marshes through the breeding season, I should judge that there must be many nesting pairs of them there.

The Song Sparrow is commonly seen throughout all the warmer months as is also the Vesper Sparrow. Without doubt both these species breed here. Probably a careful survey of the entire region would add several more nesting species to the list. During the month of April, September and October, thousands of sparrows tarry for a time on the Island, finding there an abundance of favorite food, and shelter to their liking. With the possible exception of the rank growths of wild rice, *Zizania aquatica*, found along the flats of the Merrimac River, I know of no place, locally, where the bird student may find a greater number of these birds during the seasons of migration.

My next visit to the rookery was not made until the spring of 1908 when on May 10 I spent a few hours in the locality, finding at this time an apparent increase in the number of herons present and nesting. And this increase despite a considerable amount of harrying and wanton disturbances made during the year previous, by thoughtless and unsportsmanlike persons. Rumors of these annoyances had reached my ear from time to time and their truth was attested to, even at this late date, by unmistakable evidences, such as empty gun shells and shrivelled carcasses or skeletons of last season's birds in the undergrowth or caught in the thicker trees, and by dismantled nests and faded pieces of egg shells protruding here and there in the sand.

At the time of this visit many of the nests already contained full sets of eggs and one I saw with young birds two or three days old, showing that family duties must have commenced at an early date this spring. Several pairs of Green Herons, (*Butorides virescens virescens*) were nesting here also, their nests placed on or near the ground among the rank growth of bushes and grass in the lowest portion of the hollow.

A cold rain storm on this occasion cut my visit short and it was not until four weeks later, June 7, that I was again able to get there.

Nesting activities among the birds were at their height by this time, the all important and laborious duties attending the rearing of broods, demanding continual care and attention on the part of the parents. The incessant calls of the ever hungry young, together with the responsive voices of their elders served to make the immediate neighborhood a noisy if not melodious place and this in addition to the constant coming and going of the birds to and from their fishing grounds lent an air of business and activity more fully apparent than on any of my previous visits.

I climbed a slender maple to nests containing four and five young respectively. These thinly clad little fellows did not take kindly to my advances toward a closer acquaintance, but resented any familiarity, with resort to a thoroughly disgusting performance, that of vomiting onto the edge of the nest, their partially digested food of fish and mussels, this was a defensive measure no doubt or a warning to me to keep my distance, and had my sense of smell been at all over sensitive, I probably would have heeded it.

At another nest that I visited, where the young were older and more fully developed a different means of defence was employed. The largest fellow of the four in the nest, drew himself grandiloquently up to the proud height of some ten inches and awkwardly spreading his wings, and balancing on rather unsteady legs, made several rapid and quite forceful thrusts with his beak, uttering with each thrust and elongation of his neck a husky squawk, quite worthy of the best attempt of his elders. Such an energetic attempt on the part of so youthful and unstable a bird was extremely amusing to me, an onlooker, but a sufficiently serious matter to the performer whose eyes kindled with a savage anger and fear each time I moved, near him.

For one equipped with a small hand camera, carrying a good lens and rapid shutter, opportunities for photographs, showing characteristic phases of nest life of these birds, would have been many and varied. As circumstances were, most of the nests being in the deeper shade or the young birds in constant motion, work with ordinary equipment was out of the question.

Could I have realized that this was the last season that the birds would be nesting here I doubtless would have visited the place

several times again this season, but considering them a permanent fixture of the region or at least pretty certainly to be depended upon to be present each year, I neglected to follow them up closely, and so lost an opportunity for securing further interesting data concerning them, for on visiting the locality the following year, May 23, 1909, I found the rookery completely deserted. The reason for this condition was not plainly apparent, and left the question therefore rather to conjecture than to any satisfactory solution. It was true that the herons during the past two seasons had been much persecuted here and that during the winter of 1908-09 a few of the larger trees had been cut in the wooded hollow in which they had made their homes and more of the trees of the shad and cherry species had succumbed to the attacks of the pestiferous brown tail moths, but notwithstanding these disturbing factors, much good cover was left unharmed, and the herons are remarkably tenacious and persistent in regard to nesting in a favorite locality in the face of annoying circumstances. On the whole it seemed to me that there must have been more pernicious contributory causes to drive them from this place, used probably for over twenty-five years.

I have visited the Island each year since that time and searched the brushy cover, pretty thoroughly, well down toward the northern Ipswich boundary, and although I have seen a few scattered herons along the creeks and ponds of the marshes, which would seem to indicate nesting somewhere in the locality, I have failed to find further proof of a nesting colony.

Early in the present year I was informed by one familiar with the waterways about the southern extremity of the Island, that the herons had been nesting for a few seasons of late, in numbers, on a small wooded islet in that vicinity. Subsequent inquiries and some little searching on my own part have failed to locate the colony, though the frequency with which one still sees the herons flying about or feeding along the marshes would indicate the presence of a rookery not far distant.

BIRD MIGRATION IN THE MACKENZIE VALLEY.

BY WELLS W. COOKE.

THE Mackenzie Valley in northern Canada presents a broad surface with a gentle slope rising only eight hundred feet in the fifteen hundred miles from the mouth of the Mackenzie to the head of steamboat navigation on the Athabaska at Fort McMurray. The height of land between it and the valley of the Saskatchewan to the south is but slightly over two thousand feet in elevation and presents an almost uniform flat surface with not even a ridge of hills to mark the change of slope from the north to the south.

The migratory birds of the Mackenzie Valley have the choice of three principal routes as they return from their winter homes. They can come from the south, through Alberta, western Saskatchewan, western Montana and Utah, where Great Salt Lake, the winter home of thousands of birds, lies directly south of Great Slave Lake. A second route passes up the Pacific coast of the United States to Washington and thence up the valley of the Columbia to the headwaters of the Athabaska or up the valley of the Fraser to the watershed of the Peace River. The third route is up the Mississippi River to southern or central Minnesota; thence to the valley of the Red River of the North and up the Assiniboine and Saskatchewan Rivers to the sources of the Athabaska in Alberta, or across Saskatchewan at right angles to the valleys of these rivers directly to Lake Athabaska.

The first of these routes lies across a wilderness of mountains with many divides 8,000 to 10,000 feet high, and in the southern half of the United States through a district largely a desert. It would therefore seem probable that comparatively few species would employ this route and indeed not a single species is known certainly to migrate from Arizona or Utah to the Mackenzie Valley, and from a study of the data it seems that hardly half a dozen species can possibly travel this route.

There is a modification of this route which ought apparently to form a convenient and fairly direct course from Mexico or Texas to the Mackenzie Valley. This is along the foothills of the Rocky

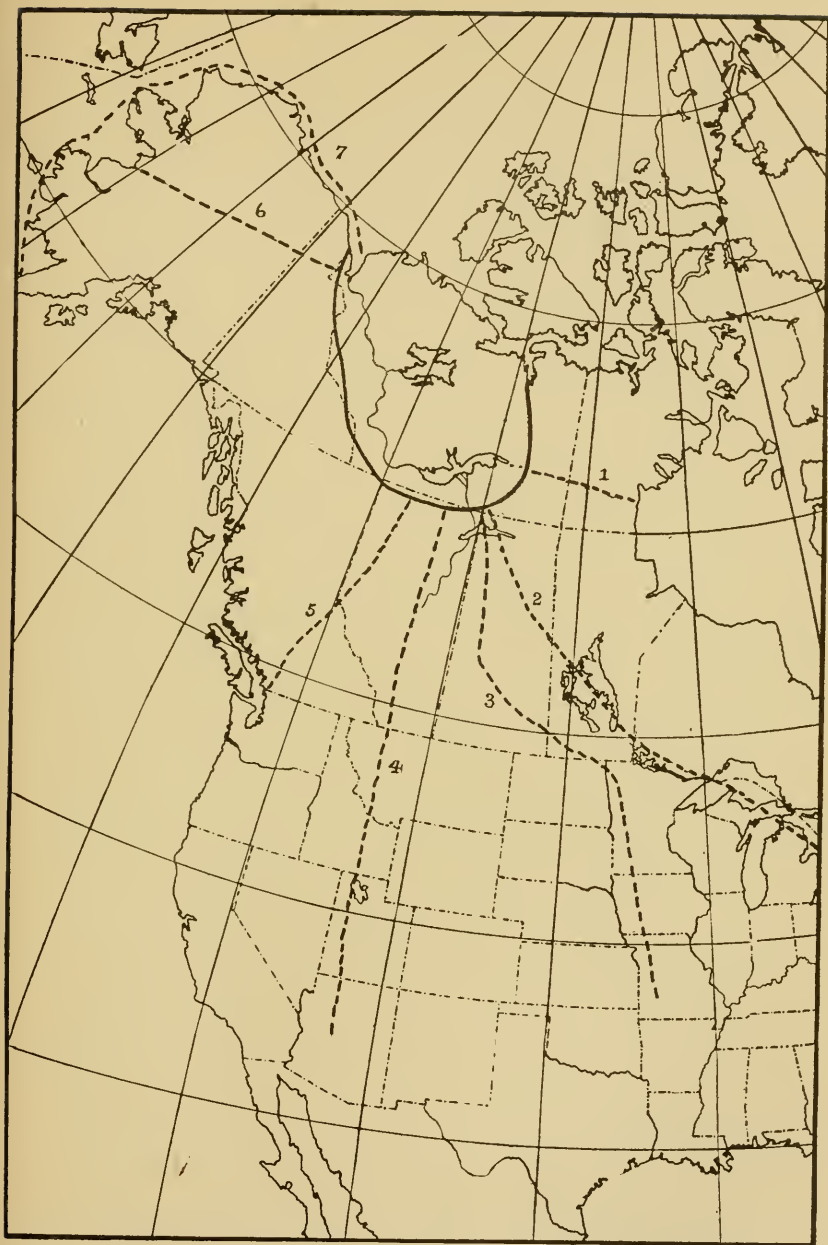


Fig. 1. Principal Migration Routes to the Mackenzie Valley.

Mountains through Colorado, Wyoming and Central Montana to Western Saskatchewan, over an almost uniform plain 5,000–6,000 feet in altitude. Probably some species do follow this route, but no positive proof of this has been found, and it is known that several species for which this would seem to be the most desirable path, actually go many hundred miles out of their way to travel a route farther east. The birds that come into the Rocky Mountains are for the most part birds that are to breed there or to go north only into the southern parts of Canada; very few go even as far north as northern Alberta. Hence in considering the probable routes of migration to the Mackenzie Valley we can ignore the usual north and south direction and consider that the bird comes either from the southeast or the southwest.

The second route from California to the Mackenzie is the shortest of the three. No deserts or high mountains intervene and the whole country seems well adapted to support a wealth of bird life. If this route was largely used, then the birds of the Mackenzie Valley would be most closely related to the species of the western United States. Since the contrary is the fact, very few migratory western birds occurring in the Mackenzie Valley, it follows that only a few species can use this second route.

The third route is the longest and seems quite roundabout to one who is in the habit of thinking of migration as always a north and south movement. In the spring most migratory birds enter the United States along the north shore of the Gulf of Mexico between Florida and Texas. Of these the larger part enter in a still smaller path, six hundred miles wide, the middle of which is the mouth of the Mississippi River. At the border of the United States, the course of migration divides: part of the birds travel northeast to New England, the Gulf of St. Lawrence, and to Labrador's inhospitable shores; a second part migrate straight north to the Great Lakes and Hudson Bay; the third part move at first north nearly to the northern boundary of the United States and then turn northwest to the valley of the Mackenzie and even to Alaska. This last described route is the principal highway for the migratory birds of the Mackenzie Valley and is the most natural and notable migration route on the whole globe. Stretching for more than three thousand miles from the mouth of the Mississippi to the mouth of the Macken-

zie, not a mountain chain or even a ridge of hills interferes with the uniform movements of the birds. The highest elevation is less than two thousand feet, and so gradual are the slopes that, with a few short portages the whole distance can be traversed in a canoe. The whole region is well watered and well timbered, affording ideal conditions for the support of the multitudes of birds which swarm along this route as they do nowhere else on the North American Continent.

If the mouth of the Mackenzie River was due north of Louisiana and in the middle of the continent, bird migration by this route would be a uniform progression from south to north in the spring and the reverse in the fall. On the contrary the valley of the Mackenzie lies nearly two thousand miles nearer to the Pacific than to the Atlantic Ocean, and the warm Japan current produces conditions that interfere with the uniformity of migration and bring about variations, probably not equalled anywhere else in the world, both in the direction and the speed of migration.

That this diagonal northwest and southeast route is traversed by birds from the Mississippi Valley is shown positively in the case of thirty-three species, for these breed in the Mackenzie Valley and pass in migration across the United States and yet occur in the United States as far west only as the eastern edge of the plains. Hence it is certain that these thirty-three species have a northward migration in the Mississippi Valley from eastern Kansas to western Minnesota and thence a northwestward route to Lake Athabaska.

This is shown on the accompanying map of the distribution of the Rose-breasted Grosbeak (*Zamelodia ludoviciana*).

It is evident that the westernmost breeding birds, those that summer in the Mackenzie Valley must have reached their breeding grounds from the southeast by way of the Mississippi Valley.

The cause of the choice of this route is easily found in the conditions of moisture and woodland. All these species are either lovers of damp forests or of moist meadows and marshy lakes. Their favorite surroundings extend in the United States not farther west than eastern Kansas and western Minnesota. On arriving at Manitoba, the dry plains that have been a barrier on their left for the last thousand miles, become better watered and interspersed with groves and soon these groves unite to form almost continuous

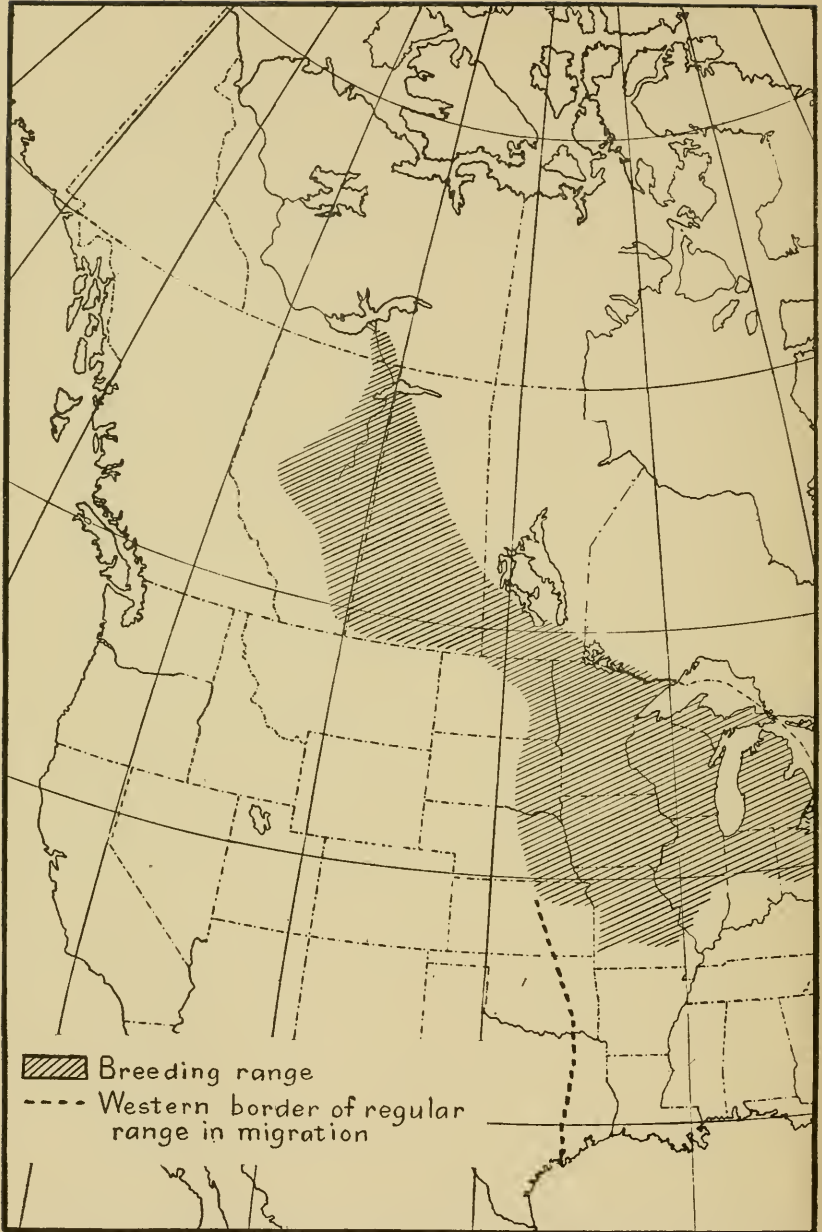


Fig. 2. Rose-breasted Grosbeak (*Zamelodia ludoviciana*).

well-watered forest — a genuine birds' paradise. Attracted by the early season and abundant food supply, the birds turn north-westward and settle for the summer in the valley of the Mackenzie.

The thirty-three species that traverse this route are *Sterna hirundo*, *Micropalama himantopus*, *Limosa hæmastica*, *Numenius borealis*, *Butco b. borealis*, *Sphyrapicus v. varius*, *Chordeiles v. virginianus*, *Sayornis phoebe*, *Empidonax flaviventris*, *Empidonax trailli alnorum*, *Otocoris alpestris hoyti*, *Cyanocitta c. cristata*, *Euphagus carolinus*, *Carpodacus p. purpureus*, *Calcarius l. lapponicus*, *Passerherbulus n. nelsoni*, *Zonotrichia albicollis*, *Spizella m. monticola*, *Melospiza m. melodia*, *Melospiza georgiana*, *Passercella i. iliaca*, *Zamelodia ludoviciana*, *Vircosylva philadelphia*, *Lanius s. solitarius*, *Dendroica tigrina*, *Dendroica magnolia*, *Dendroica castanea*, *Dendroica virens*, *Dendroica p. palmarum*, *Sciurus aurocapillus*, *Wilsonia p. pusilla*, *Hylocichla a. aliciae*, and *Hylocichla guttata pallasi*.

A modification of this route from the southeast in a still more pronounced form is followed by the White-winged Scoter (*Oidemia deglandi*), which winters off the coast from Massachusetts to New Jersey and in its spring migration follows the valley of the Connecticut, crosses to the Hudson, thence to the Great Lakes and north-westward to its summer home in the Mackenzie Valley. It is probable that this same general route is followed by many thousands of the ducks of other species which winter so abundantly along the coast from Chesapeake Bay to Florida, but it is also true that a comparatively small part of these traverse this route as far as Great Slave Lake, since the larger part stop for the summer in the "ducks' paradise" of Manitoba and the Saskatchewan.

Still another route, practically east and west instead of north and south is followed by the three species of Jaeger, which winter on the Atlantic, appear in Hudson Bay with the earliest open water and then cross nearly due west to the breeding grounds about Great Slave Lake, and to the northward.

There are eighteen species that also probably use the main route from the southeast but the proof of this use is not so simple, because these species not only occur in the central Mississippi Valley, but also range regularly across the plains to the foothills of the Rocky Mountains. These eighteen species are: *Grus americana*, *Pisobia*

fuscicollis, *Ercunetes pusillus*, *Bartramia longicauda*, *Falco s. sparverius*, *Colaptes auratus luteus*, *Tyrannus tyrannus*, *Empidonax minimus*, *Agelaius phoeniceus fortis*, *Quiscalus quiscula arvensis*, *Vireosylva olivacea*, *Mniotilta varia*, *Vermivora c. celata*, *Vermivora peregrina*, *Dendroica striata*, *Setophaga ruticilla*, *Hylocichla ustulata swainsoni*, and *Planesticus m. migratorius*.



Fig. 3. Red-eyed Vireo (*Vireosylva olivacea*).

They present some of the most interesting problems in the study of bird migration. In the case of the Red-eyed Vireo, the species breeds along the whole northern tier of states west to Washington,

and occurs in migration in Colorado and Wyoming, but the individuals that appear first in Alberta are not birds that have passed through Colorado, Wyoming and Montana, because the dates of migration, as indicated on the map, show that migration is early and rapid in the middle Mississippi Valley and late and slow along the foothills of the Rocky Mountains. The earliest arrivals in southeastern Saskatchewan appear on the average May 17, but they do not come from directly south, since in eastern Colorado, 600 miles to the southward the birds do not appear on the average until May 22. The first advance to Athabasca Lake by May 28, which is just the date at which they appear on the average in northern Montana and northern Idaho. Therefore it is evident that the birds of the Mackenzie Valley at Lake Athabaska have not come by way of the Rocky Mountains, but by the route near the Mississippi River.

The same general method of proof can be applied to the migrations of the other seventeen species in this group. The proof is particularly clear and convincing in the case of the Robin, Flicker, Bronzed Grackle, Redstart and the Black-poll, Tennessee and Black-and-White Warblers.

Eighty-two other species of migratory birds breed in the Mackenzie Valley and during the winter or in migration occur across the United States from the Atlantic to the Pacific. But even with these species it can be shown that most of them probably reach the Mackenzie Valley from the middle part of the Mississippi Valley. These eighty-two may be divided into fifty-eight species of wide ranging water birds, nine species of hawks and owls, and fifteen species of smaller land birds.

The fifty-eight species of water birds that are found at Lake Athabaska and which also range from the Atlantic to the Pacific oceans present a problem with regard to their route of migration that with the records at hand cannot be certainly solved. The Canada Goose is one of the abundant water birds of the Mackenzie Valley and may be taken as representative of the above mentioned group. The great bulk of the Mackenzie Valley Canada Geese must come from the Mississippi Valley, where the species is abundant, for *Branta canadensis* is rather rare on the Pacific coast, its place there and in Alaska being taken largely by the other three forms, *hutchinsi*, *occidentalis* and *minima*.

But the fact that the Mississippi Valley birds pass to the Mackenzie Valley cannot be proved by dates of migration as is shown by the following records. The Canada Goose begins its migration near the Mississippi river in February. About the twentieth of that month may be considered the date of its normal arrival in southeastern Iowa. Passing slowly north it appears one month later in southeastern Minnesota at the end of the first week in April. Migration in southeastern Nebraska commences at about the same time as in southeastern Iowa, but the birds move north a trifle faster and cross to Saskatchewan about the first of April. Further west the Canada Goose winters not far south of the United States boundary and crosses into southern Alberta the last of March. On the Pacific coast the species winters in British Columbia. When, therefore, it is known that the Canada Goose arrives at Lake Athabaska April 20, no certain conclusion can be drawn from this data as to whether these earliest birds come from Manitoba, Alberta, or British Columbia. The last furnishes its most northern winter home and hence would require the least rapid migration in spring to reach Lake Athabaska by the given date. The journey by way of Manitoba or eastern Saskatchewan is a longer distance and the later start requires a higher speed of migration. Hence if no other information was available, the migration dates alone would lead one to suppose that the earliest birds at Lake Athabaska came from the southwest. But as stated at the outset, the relative numbers of the birds east and west of the Rocky Mountains, make it certain that most the birds of Lake Athabaska really do come from the Mississippi Valley. Since this is true of the geese, it may be assumed to be true also of the Mallard and Pintail Ducks which travel in company with the geese and have the same range from the Atlantic to the Pacific.

The same method of reasoning may be applied to the larger part of the fifty-eight species of wide-ranging waterfowl that occur regularly at Lake Athabaska. Most of them are abundant in migration across the moist plains from Kansas to Saskatchewan, but are comparatively rare in the whole mountainous region of western United States where favorable localities either for breeding or for feeding during migration are few and of small area. Hence it must be true in general that the untold thousands of water birds that frequent

the lakes and marshes of the Mackenzie Valley, come from the moister portions of the Mississippi Valley.

With regard to the nine species of migratory hawks and owls of wide range that visit Lake Athabaska nothing can be judged at present either from distribution or migration as to the route or routes they employ. Fifteen species of the smaller migratory land birds have the same range and in some cases, the dates of migration afford a hint of the route traveled. Thus in the case of the Crow, the dates of migration show clearly that the earliest individuals to reach southwestern Manitoba come not from South Dakota as would be expected, but from the timbered regions of Minnesota. The date of arrival at latitude fifty degrees in southwestern Manitoba is March 27, as determined by fourteen years' observations from four neighboring towns. March 27 is a fair average date for the arrival of the Crow in east central South Dakota, three hundred and fifty miles to the southward; while the average date of arrival in southern North Dakota is a week later than in Manitoba. Continuing in the same general northwestern course it is probable that the Crows appearing April 2, 1893, at Osler, Saskatchewan came from Manitoba rather than from Montana; since this date would be considered an early date of arrival in southeastern Montana. In this manner the dates of migration show that the earliest Crows in the Mackenzie Valley come from the wooded districts of the Mississippi Valley.

The Myrtle Warbler presents a quite similar set of dates. This species ranges from the Mississippi Valley throughout the Rocky Mountains and to the Pacific, becoming much rarer west of the mountains. In its spring migration, it reaches southern Manitoba April 23, at about the same time as its first appearance in central Nebraska and northern Colorado, showing conclusively that the Manitoba birds come from the southeast. It is equally sure that the arrival at Osler, Sask. latitude fifty degrees May 4, 1893, came from the southeast, for this is the usual time of arrival in central Montana latitude forty-seven degrees. Farther north a new possibility presents itself, since the May 16 birds of Lake Athabaska might, as far as the date is concerned, have come from British Columbia in the southern portion of which Province they arrive the middle of April. To determine this latter point use can be

made of the general principle of parallel lines of migration. Since it is true that the birds of western Minnesota pass northwestward to Saskatchewan, it is probable that the birds of Montana also proceed in a northwestern direction and traverse Alberta, in which case it is altogether unlikely that the birds of the same species would be migrating northeast from British Columbia to Athabaska across the route of the eastern birds and at right angles to it. A more reasonable assumption is that the birds of British Columbia migrate also northwestward and proceed to Alaska, where the dates of arrival, May 5 at Fort Reliance on the middle Yukon and May 18 at the mouth of that river, show that the birds must have come from British Columbia.

The migration records now available are insufficient to determine whether the remaining thirteen species of small migratory wide-ranging land birds come to the Mackenzie Valley from the southeast, or southwest.

There remain twenty-three species of migratory birds which breed in the Mackenzie Valley, but which in migration are confined to the Western United States, ranging not farther east than the eastern edge of the plains. These may be divided into three groups. The first group comprises nine species that in winter are confined to the Pacific coast; the second group, three species that range east to the Rocky Mountains, and the third, sixteen species that occur east to the plains.

The species of the first group, whose routes are best known, are the Pacific Eider (*Somateria v-nigra*), Black Brant (*Branta nigricans*), Short-billed Gull (*Larus brachyrhynchus*), Ross's Goose (*Chen rossi*), and the Northern Varied Thrush (*Ixoreus naevius meruloides*). The accompanying chart shows the principal migration route followed by each of these species. They all cross the Rocky Mountains, but in widely separated latitudes. The Ross's Goose crosses the lofty ranges of the main chain of the Rocky Mountains from northeastern California to northwestern Montana and thence north across the Mackenzie Valley to its breeding grounds on the Arctic islands.

The Northern Varied Thrush winters mainly in the interior of California and in western Nevada. Its main migration route crosses thence through northern Idaho and northwestern Montana and

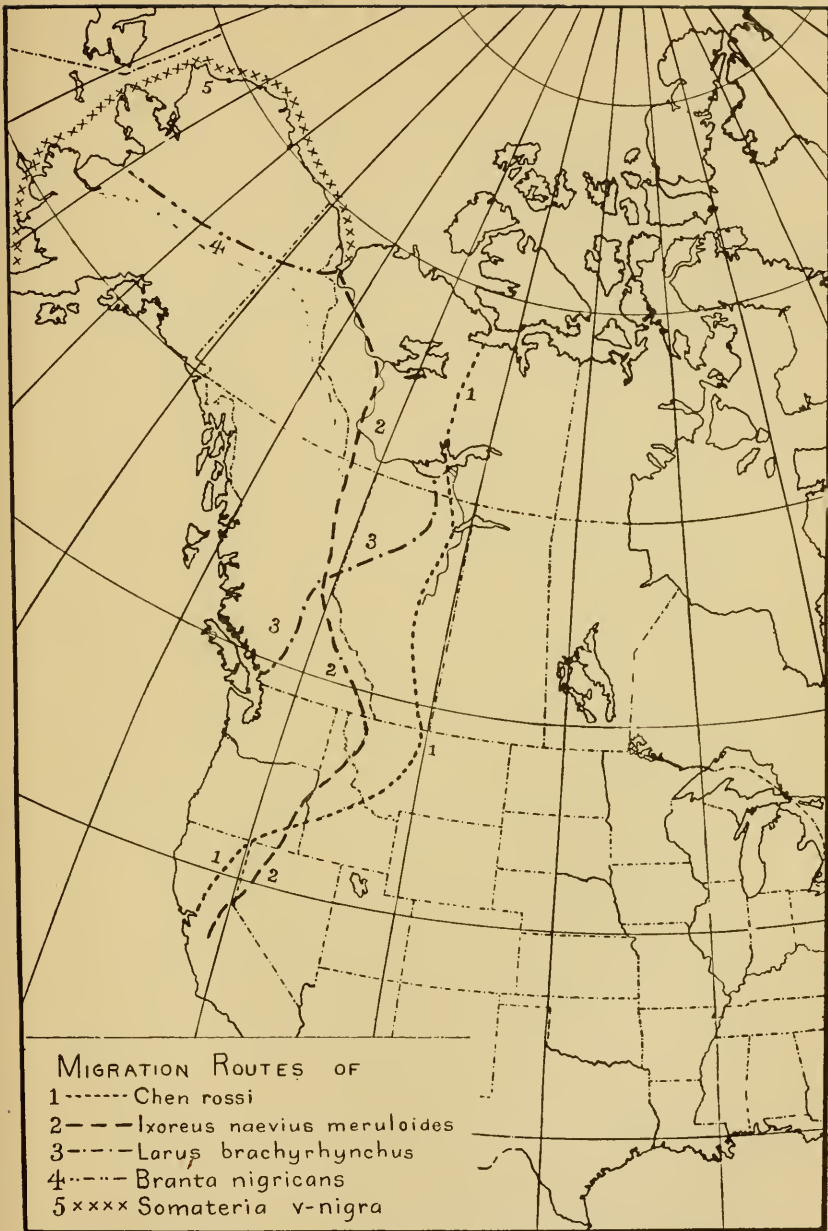


Fig. 4. Migration Routes from the Pacific Coast to the Mackenzie Valley.

along the mountains of eastern British Columbia to the valley of the Liard and reaches the Mackenzie a few miles below Fort Simpson.

The relation of the breeding and wintering areas of the Short-billed Gull makes it probable that the main migration route follows up the Fraser River and down the Peace River to the breeding grounds on Great Slave Lake and northward.

The Black Brant is a common breeder at the mouth of the Mackenzie and along the coast to the eastward. It does not reach Mackenzie from the south, indeed it is not known inland in that Province, but in spring migration it passes up the Pacific coast to the mouth of the Yukon, up this river to its junction with the Porcupine, and up this stream and across the low divide to the mouth of the Mackenzie. It seems probable that the Pacific Loon (*Gavia pacifica*) and the Sabine Gull (*Xema sabini*) follow this same route, but the proof is not as yet conclusive.

The Pacific Eider (*Somateria V-nigra*) does not occur inland in either Alaska or Mackenzie. It winters around the Aleutian Islands and is a common breeder on the coast east of the mouth of the Mackenzie. Hence it follows that the line of migration must pass through Bering Strait and go round the northern coast of Alaska. It seems certain that the King Eiders (*Somateria spectabilis*) and the Glaucous Gulls (*Larus hyperboreus*) breeding on the Mackenzie coast arrive by the same route rather than from the Atlantic side. Indeed it can be said there is nothing to indicate that any birds migrate regularly from the Labrador coast north-westerly to the coast of western Mackenzie.

A migration route as yet unsolved is that of the Yellow-billed Loon (*Gavia adamsi*). It appears at Great Slave Lake as soon as any part of the lake is open. It is not known at any time of the year, either east, south, or west of Great Slave Lake, and at the time it appears there, no open water exists anywhere between that Lake and the Arctic Ocean, and the species is not yet recorded from anywhere inland in Alaska. In fact the records as they stand at present are explainable only on the theory of a single flight from the open Polar Sea to the summer home on Great Slave Lake, and such a flight is scarcely believable.

The three western species occurring in the Mackenzie Valley

that range from the Rocky Mountains to the Pacific are *Spizella passerina arizonæ*, *Vireosylva gilva swainsoni*, and *Piranga ludoviciana*. The migration route of this last species is especially interesting. It breeds over the whole of western United States from the eastern foothills of the Rocky Mountains to the Pacific. Hence if one saw the map of the breeding range and noted that the line of the easternmost limit was almost north and south and extended without a break from Mexico to Canada, he would take it for granted that the breeding birds of Alberta reached their summer home by a migration route along the eastern slope of the Rocky Mountains. Such reasoning is correct with almost all species, but an examination of the large amount of migration data available shows that the Western Tanager is an exception to the rule. The bird winters in Guatemala and when it starts north in the spring the individuals along the Pacific coast move north faster than those that choose to migrate along the eastern slope of the Rocky Mountains as shown by the isochronal lines on the accompanying map. By May 10, the earliest migrants have reached northern Washington along the Pacific coast, while in the Rocky Mountains they are just entering southern Colorado. During the next ten days the eastern birds loiter across Colorado to southeastern Wyoming, while on the same date, May 20, the first birds appear in central Alberta, a thousand miles farther north. It is evident that these latter birds could not have come by way of Colorado, but must have come from Washington and British Columbia, though this latter assumption requires that they cross the main chain of the Rocky Mountains at a time in the spring when even the lowest passes are still covered with snow. It is true that warm weather has already come by this date in the southern Mackenzie Valley, but it is one of the strangest problems in bird migration as to how the Western Tanagers know that on the other side of those snow clad ranges summer is waiting for them.

The migration dates of the Western Chipping Sparrow show that the breeding birds of Alberta follow the same general route as outlined above for the Western Tanager, while the data so far available concerning the migration of the Western Warbling Vireo throw no light as to the route employed.

The fifteen western species breeding in the Mackenzie Valley and

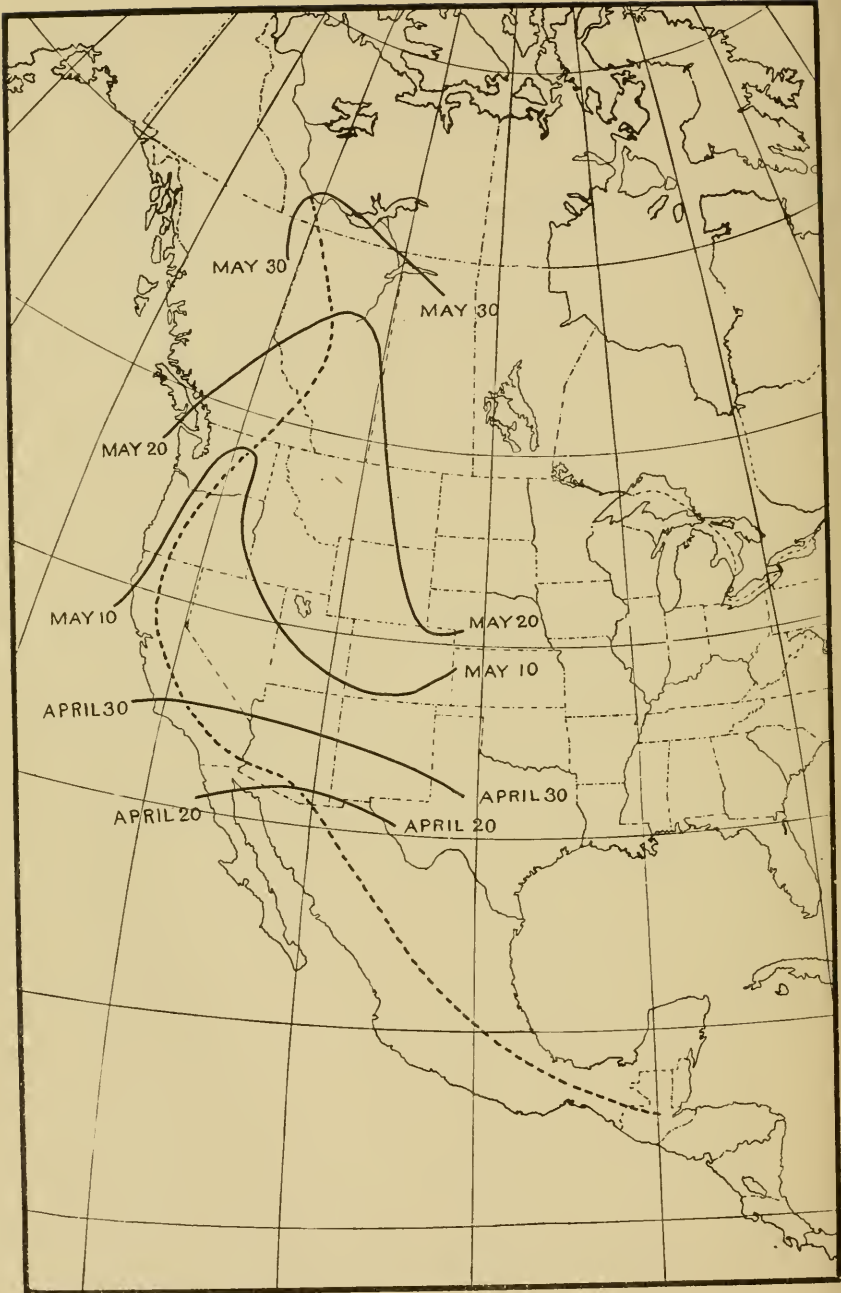


Fig. 5. Migration Route of the Western Tanager (*Piranga ludoviciana*).

ranging to the eastern edge of the plains in the United States are: *Larus californicus*, *Branta canadensis hutchinsi*, *Grus canadensis*, *Macrorhamphus griseus scolopaceus*, *Sayornis sayus*, *Xanthocephalus xanthocephalus*, *Calcarius lapponicus alascensis*, *Calcarius pictus*, *Poœctes gramineus confinis*, *Passerculus sandwichensis alaudinus*, *Passerherbulus leontei*, *Zonotrichia leucophrys gambeli*, *Spizella monticola ochracea*, *Spizella pallida*, and *Sciurus norceboracensis notabilis*.

Larus californicus winters abundantly on the coast of British Columbia and breeds commonly from Great Slave Lake northward, showing that its route of migration is northeast across British Columbia.

Branta canadensis hutchinsi is known to migrate in immense flocks from the plains of the Mississippi to those of the Mackenzie on its way to its northwestern breeding grounds. The same is true of *Macrorhamphus scolopaceus*, the line of whose northwestern migration is known to extend from Florida to Great Slave Lake; the same route is undoubtedly followed by *Grus canadensis*.

The earliest individuals of *Sayornis sayus* reach southern British Columbia about two weeks earlier than the first arrive in southern Colorado. The Alberta dates agree with those of Montana rather than those of British Columbia and Washington, while the dates on the lower Mackenzie and the Yukon can be satisfactorily explained only on the supposition that these birds have come from British Columbia. *Xanthocephalus xanthocephalus* is so rare at Athabaska Lake and northward, that it can be considered as hardly more than a straggler in the Mackenzie Valley. The date of arrival in eastern Saskatchewan however is so much earlier than in eastern Montana, as to indicate that the birds of Saskatchewan come from the southeast. The migration records of *Zonotrichia leucophrys gambeli* are so much earlier in British Columbia and Alaska than in corresponding latitudes to the eastward as to make it practically certain that the Alaska birds have come by way of the interior warm valleys of British Columbia. Hence it is equally probable that the individuals which swarm in Nebraska, Kansas, and southward during migration and winter are the birds that pass north through Manitoba and Saskatchewan to breed in the Mackenzie Valley.

The migration route of *Calcarius pictus* is evident since the great majority of the individuals are confined during migration and winter to a narrow belt of plains country extending from Texas northward to the Saskatchewan and thence northwestward along the Mackenzie to the summer home on the Barren Grounds of the Arctic. The same route is followed more or less closely by *Passerherbulus lecontei*, *Spizella pallida*, and *Calcarius lapponicus alascensis*.

One of the strangest migration routes to the Mackenzie Valley is that of the Yellow-bellied Sapsucker (*Sphyrapicus v. varius*). The mouth of the Nahanni River a hundred miles northwest of Fort Simpson forms the normal limit of the species' range in that direction; this is in longitude 124° W. The Yellow-bellied Sapsuckers breeding here come by way of Minnesota at least as far east as longitude 96° W. The range of this species extends thence south through western Missouri on the meridian of 94° and then southwest through the whole eastern half of Texas to at least longitude 103° W. in southwestern Mexico. Thus the migration route forms a bow, the southern half extending through nine degrees of longitude in a portion of the globe where this is equal to six hundred miles, and the northern half through thirty degrees of longitude, equivalent in those high latitudes to nine hundred miles.

The above routes account for the different groups of species breeding in the Mackenzie Valley as follows:

Eastern species ranging in the central United States only to the edge of the Plains.	33
Eastern species ranging regularly or occasionally to the Rocky Mountains in the central United States.	19
Species that in migration or during the winter occur across the whole United States from the Atlantic to the Pacific.	82
Western species confined almost entirely to the Pacific coast.	9
Western species, ranging only occasionally east of the Rocky Mountains in the central United States.	3
Western species, ranging to the eastern edge of the Plains in the central United States.	15
Total migratory species breeding in the Mackenzie Valley, and wintering to the southward.	161
In addition to these, the list of the birds of the Mackenzie	

Valley includes several groups of species that do not come under any of the above headings.

Non-migratory species and those which occur during the winter. 37

Species that barely reach the Mackenzie Valley from the south, being found on the Athabaska and not ranging north to Lake Athabaska. 41

Species not included under the previous headings, being for the most part stragglers or species that are most common on the Arctic islands. 29

Total species known to occur in the Mackenzie Valley 268

The distinctly eastern character of the avifauna of the Mackenzie Valley is shown by the fact that of the one hundred and sixty-one regular breeding migrants, only eighteen are known with certainty to reach the Valley from the west or southwest, while it is known with equal certainty that seventy-one reach it from the southeast or east; and of the remaining seventy-two species, mostly water-birds, probably four-fifths come from the central Mississippi Valley.



LIST OF WATER AND SHORE BIRDS OF THE PUGET SOUND REGION IN THE VICINITY OF SEATTLE.

BY SAMUEL F. RATHBUN.

THIS region is a much favored resort of many of the species of water birds whose habitat is the Pacific coast and this undoubtedly is accounted for by the fact that within its boundaries are embraced the essential desiderata necessary to attract them, viz. protection from the elements, an abundance of food and a most equable temperature throughout the year.

Its geographical location is likewise fortuitous being nearly in the direct line of migration of the countless numbers of birds whose summer home is the North Pacific and of these, thousands use this region as a winter resort, finding here every requirement

necessary for an existence; this fact being strongly impressed upon the observer by the abundance of bird life that will be seen more particularly during the period of the winter months, at which season the number of individual birds exceed that, that may be noted during the balance of the year.

Relative to the equable climatic conditions that prevail it is quite appropriate to quote from "U. S. Department of Agriculture, Weather Bureau Summary of the Climatological data for the United States" "Section 19, Western Washington," which information has been courteously given me by Mr. G. N. Salisbury, Section Director at Seattle.

"The mean temperature of the Puget Sound country ranges from 38 degrees in mid-winter to 62 degrees in mid-summer, while the range near the coast is considerably less, being from 40 degrees in winter to 60 degrees in summer. The average daily march of temperature in the Puget Sound region is from 35 degrees to 45 degrees in mid-winter and from 55 degrees to 75 degrees in mid-summer. The average daily range is noticeably small in winter, showing the equability of temperature," "Frequently in winter the difference between the day and night temperatures is only 5 degrees or less."

It would thus appear that in so far as the mean temperature of the region during winter is concerned, it must prove attractive to many species at that season and when to this is added the other requirements necessary to sustain life, one reason of the region being so favored by the aquatic species is quite obvious.

There may be an additional reason for this abundant bird life during the winter, as it is quite possible that during the autumnal migration, the probable route followed by a majority of the migrants is along the east side of Vancouver Island to a point of intersection with the Straits of Juan de Fuca at the Straits eastern terminus, at which intersectional point a certain amount of "banking" or accumulation of individuals occurs, although no doubt a proportion continue to migrate towards the Pacific Ocean to the westward, or follow the Sound southward. But that this accumulation does occur is quite probable for at and within a fairly defined radius of the intersectional point named, will be found during the winter months the greater abundance of bird life, not necessarily

of species but of individuals; this being noted by the writer on various trips to the section named and appearing particularly to apply to species belonging to the Alcidae, Phalacrocoracidae, to some extent the Anatidae, but not in any great degree to the Laridae, as the representatives of this latter Family, that use this region as a winter resort, seemingly are well distributed.

The following List is intended as supplemental to the original "List of Land Birds of Seattle" published in 'The Auk' (Vol. XIX, No. 2, April, 1902) and an Addendum to which appeared in 'The Auk' (Vol. XXVIII, No. 4, October, 1911).

1. *Aechmophorus occidentalis*. WESTERN GREBE.— Common spring and fall migrant and observed during the winter months.
2. *Colymbus holbœlli*. HOLBÆLL'S GREBE.— Spring and fall migrant. Sometimes noted during the winter.
3. *Colymbus nigricollis californicus*. EARED GREBE.— Noted as a migrant and during the winter.
4. *Podilymbus podiceps*. PIED-BILLED GREBE.— Common summer resident and breeds.
5. *Gavia immer*. LOON.— Resident and breeds but not so commonly as formerly in this immediate locality. More abundant during the winter.
6. *Gavia pacifica*. PACIFIC LOON.— Noted as a fall migrant.
7. *Gavia stellata*. RED-THROATED LOON.— To some extent a winter resident.
8. *Lunda cirrhata*. TUFTED PUFFIN.— Apparently rare in this immediate locality but not uncommon on the lower sound where it breeds to some extent.
9. *Synthliboramphus antiquus*. ANCIENT MURRELET.— Rare. A specimen taken August 9, 1913 by D. E. Brown of Seattle.
10. *Brachyramphus marmoratus*. MARBLED MURRELET.— From November until April a common resident becoming rarer as the season progresses, but is observed intermittently during the balance of the year. D. E. Brown has taken a number of birds in full breeding plumage, one of which collected May 23, 1914 contained an egg an inch in diameter. It would thus appear that this locality may be within the southern portion of the breeding range of the species.
11. *Cephus columba*. PIGEON GUILLEMOT.— Common resident and breeds.
12. *Uria troille californica*. CALIFORNICA MURRE.— Winter resident.
13. *Stercorarius parasiticus*. PARASITIC JAEGER.— Noted on several occasions in September and October flying about the bay in front of the city.
14. *Rissa tridactyla pollicaris*. PACIFIC KITTIWAKE.— Have seen

this species a number of times during the winter with other Gulls about the tide flats near the city.

15. **Larus glaucescens.** GLAUCOUS-WINGED GULL.— Common from October to latter part of April, but breeds sparingly on some of the islands in the lower sound.

16. **Larus occidentalis.** WESTERN GULL.— Common winter resident.

17. **Larus californicus.** CALIFORNIA GULL.— Spring and fall migrant. On occasions observed during the winter.

18. **Larus brachyrhynchus.** SHORT-BILLED GULL.— Common from November until April.

19. **Larus heermanni.** HEERMANN'S GULL.— Not uncommon as a summer visitant.

20. **Larus philadelphia.** BONAPARTE'S GULL.— Spring and fall migrant.

21. **Sterna paradisæa.** ARCTIC TERN.— A rather regular fall migrant. Have observed it a number of times flying about the sound in front of the city.

22. **Phalacrocorax auritus cincinatus.** WHITE-CRESTED CORMORANT.— Not an uncommon winter resident.

23. **Phalacrocorax penicillatus.** BRANDT'S CORMORANT.— Common winter resident.

24. **Pelecanus erythrorhynchus.** WHITE PELICAN.— A rare migrant.

25. **Mergus americanus.** MERGANSER.— A common species from October until April and regularly breeds along the mountain streams flowing from the Cascade Mountains to the sound.

26. **Mergus serrator.** RED-BREADED MERGANSER.— Common migrant and often observed in winter.

27. **Lophodytes cucullatus.** HOODED MERGANSER.— Rather common during the migrations and have observed it during the winter.

28. **Anas platyrhynchos.** MALLARD.— A common resident but most abundant from October until May. Breeds.

29. **Chaulelasmus streperus.** GADWALL.— Rare migrant.

30. **Mareca penelope.** EUROPEAN WIDGEON.— Can be regarded only as accidental. An adult male was brought me in February, 1912, for identification, that a few days previously had been shot on the lower sound.

31. **Mareca americana.** BALDPATE.— Observed from October until early May, but is a common winter resident.

32. **Nettion carolinense.** GREEN-WINGED TEAL.— Common from October until May. Undoubtedly breeds sparingly as it has been noted during the summer.

33. **Querquedula discors.** BLUE-WINGED TEAL.— Rare.

34. **Spatula clypeata.** SHOVELLER.— A rather common species from October until April and breeds sparingly. Found nesting at Lake Washington, May 15, 1893.

35. **Dafila acuta.** PINTAIL.— From late fall until April one of our most abundant ducks.
36. **Aix sponsa.** WOOD DUCK.— Formerly a not uncommon summer resident in this immediate locality, but now seldom noted.
37. **Marila americana.** REDHEAD.— Occurs as a rare migrant.
38. **Marila valisineria.** CANVAS-BACK.— Common from November until April but most abundant during winter.
39. **Marila marila.** SCAUP DUCK.— Same as the preceding, *M. valisineria*, with which it is often found associated.
40. **Marila affinis.** LESSER SCAUP DUCK.— More or less common during the winter months.
41. **Marila collaris.** RING-NECKED DUCK.— Regard this species as uncommon, as have noted it but a few times and during the winter months.
42. **Clangula clangula americana.** GOLDEN-EYE.— Not uncommon as a winter resident.
43. **Charitonetta albeola.** BUFFLE-HEAD.— Common winter resident, departing in April.
44. **Harelda hyemalis.** OLD-SQUAW.— Observed from November until April but most common during the winter months.
45. **Histrionicus histrionicus.** HARLEQUIN DUCK.— A rather rare species during the winter and have noted it until May.
46. **Oidemia americana.** SCOTER.— A regular but rather uncommon winter resident.
47. **Oidemia deglandi.** WHITE-WINGED SCOTER.— Common from November until May.
48. **Oidemia perspicillata.** SURF SCOTER.— Common winter resident.
49. **Erismatura jamaicensis.** RUDDY DUCK.— Formerly rather common during the migrations but of late years has not been so often noted.
50. **Chen hypoboreus hypoboreus.** SNOW GOOSE.— On two occasions have seen on the sound near Seattle small flocks of what we regarded as this species. But on the lower sound flocks of white geese are quite regularly observed during the migrations.
51. **Anser albifrons gambeli.** WHITE-FRONTED GOOSE.— Not uncommon as a spring and fall migrant.
52. **Branta canadensis occidentalis.** WHITE-CHEEKED GOOSE.— More or less a regular migrant.
53. **Branta canadensis minima.** CACKLING GOOSE.— A rare migrant.
54. **Branta nigricans.** BLACK BRANT.— From observations the most common of the Anserinæ. A regular spring and fall migrant and common winter resident but seemingly restricted during this period to certain localities on the sound, doubtless on account of its food supply. A very easy bird to decoy. Generally arrives about the first of December and last seen during April.
55. **Olor columbianus.** WHISTLING SWAN.— A regular but not common migrant.

56. *Ardea herodias fannini*. NORTHWESTERN COAST HERON.— A common resident and breeds.

57. *Grus canadensis*. LITTLE BROWN CRANE.— Although a quite regular migrant, apparently not very common.

58. *Rallus virginianus*. VIRGINIA RAIL.— Common summer resident and breeds.

59. *Porzana carolina*. SORA.— A not uncommon summer resident and breeds.

60. *Fulica americana*. COOT.— Abundant resident. Breeds. Seemingly restricted to the fresh water.

61. *Lobipes lobatus*. NORTHERN PHALAROPE.— A rare spring but regular fall migrant.

62. *Gallinago delicata*. WILSON'S SNIPE.— Abundant spring and fall migrant. Not uncommon during the winter.

63. *Macrorhamphus griseus scolopaceus*. LONG-BILLED DOWITCHER.— Observed as a not uncommon fall migrant.

64. *Tringa canutus*. KNOT.— A rare spring and fall migrant. Mr. D. E. Brown has several spring records.

65. *Pisobia maculata*. PECTORAL SANDPIPER.— Rare and noted as a fall migrant only.

66. *Pisobia minutilla*. LEAST SANDPIPER.— Common migrant, more particularly during the early fall.

67. *Pelidna alpina sakhalina*. RED-BACKED SANDPIPER.— Not an uncommon spring and fall migrant and sometimes observed in winter.

68. *Ereunetes mauri*. WESTERN SANDPIPER.— A rather common fall migrant.

69. *Calidris leucophæa*. SANDERLING.— A rare spring but common fall migrant and probably winters to a limited extent. Observed March 26, 1910; January 11, 1911; and on December 11, 1913, flocks numbering several hundred birds were noted at Smith's Island, located near the entrance to Puget Sound. On December 18, following we observed a flock of about sixty at this same point and on the nineteenth and twentieth at Dungeness, about seventeen miles southwest, flocks aggregating nearly a thousand birds were watched busily feeding, they allowing an approach to within twenty feet. Among the Sanderling were a few Red-backed Sandpipers.

70. *Totanus melanoleucus*. GREATER YELLOW-LEGS.— Regular spring and fall migrant.

71. *Totanus flavipes*. YELLOW-LEGS.— Not uncommon as a spring migrant.

72. *Helodromas solitarius cinnamomeus*. WESTERN SOLITARY SANDPIPER.— Very rare. Specimen taken May 6, 1914, by D. E. Brown.

73. *Catoptrophorus semipalmatus inornatus*. WESTERN WILLET.— One record. September 6, 1913, by D. E. Brown.

74. *Actitis macularia*. SPOTTED SANDPIPER.— Rather common summer resident and breeds.

75. *Numenius hudsonicus*. HUDSONIAN CURLEW.— Regular spring migrant.

76. *Squatarola squatarola*. BLACK-BELLIED PLOVER.— Regular spring and fall migrant but more common during the latter period.

77. *Oxyechus vociferus*. KILLDEER.— Resident and breeds but most common from March to December.

78. *Ægialitis semipalmata*. SEMPALMATED PLOVER.— Not an uncommon spring and fall migrant.

79. *Ægialitis nivosa*. SNOWY PLOVER.— A rare migrant. Recorded May 6, 1914 by D. E. Brown.

80. *Arenaria interpres morinella*. RUDDY TURNSTONE.— Rare migrant. Taken May 6, 1914 by D. E. Brown.

81. *Arenaria melanocephala*. BLACK TURNSTONE.— A rare migrant and possibly rare winter resident. Have an adult male taken February 22, 1914, collected by myself.

82. *Hæmatopus bachmani*. BLACK OYSTER-CATCHER.— Formerly not uncommon on the lower sound as a summer resident but of late years has become rare.

THE BIRDS' BATH.

BY HEYWARD SCUDDER.

A VERY little brook winds through a swamp. On the north and east, swamp maples, high and of thick foliage, make a dense shade; on the south and west, low alders, and open spaces filled with Joe-pye-weed and golden-rod let in the sun, and offer perches on which to dry and dress feathers. At intervals the brook widens into shallow pools.

In the course of the day — most abundantly between eleven and three — all the land birds, except the crows and owls, come to bathe in these pools.

A Prairie Warbler flies down on one side of a pool, hesitates at the brink like one fearing the chill of the water, then dashes in and begins splashing. On the other side a Black and White Warbler starts his bath. Then along comes a Robin, hops into the pool and through it till he comes to water deep enough to suit him, saying loudly, "Tut-tut! Tut-tut!" as if in scorn of the warblers, which

fly off instantly. After the Robin has gone, is an interval; then more small birds begin bathing, till the harsh cry of a Blue Jay near at hand, drives them into the bushes. There are no hawks here, except in migration. But a Blue Jay's presence seems to cause the same sort of fear among the small birds that a hawk's does in other places. Only Robins and Starlings hold their own without fear.

Is this bathing the explanation of the disappearance of birds in the middle of the day during the nesting season and all through the hot weather? Anyone who has been at a seashore resort knows how long it may take to get to the beach and into the water, take a bath, dress and then get home again, especially when one always has to be on the look-out to avoid certain objectionable persons, and when one is most particular about dressing and having one's clothes perfectly put on. In the case of the birds there is no way of telling how long it takes them to come and go, and to make sure that there is no enemy around. The numbers of certain kinds of birds can be explained in a satisfactory way only on the theory that most of them come from considerable distances. For the presence of ten or a dozen Prairie Warblers every hour would show a greater abundance of these birds near the swamp than is indicated by a study of the birds within a radius of a mile, though, of course, an accurate census of a bird population is really impossible. The other explanation for the abundance of birds is that the same bird may bathe repeatedly during the day. This is undoubtedly true in some cases, and possibly the rule during hot weather. But within a length of time as short as one or two hours, it requires a number of absences either from the search for food, or from the nest, which seems too great to be probable.

Certain pools are frequented for bathing, because of favorable conditions of water supply, depth of water, places for drying and preening feathers, and freedom from enemies. Within a half mile, one set of pools will abound with birds, while all the rest have only a few visitors or none at all. Yet it is often impossible to see any reason for the choice which has been made.

We all know the way in which a bird usually takes a bath, ruffling out its feathers, half opening its wings, then dipping its head in and out of the water, splashing with its wings and tail, and shaking its body vigorously.

But there are four variations of the way of bathing, seen chiefly in the nesting season. Why a bird should choose one way rather than another is a mystery for which I have never been able to furnish any explanation, even by the wildest use of imagination. The factors which have been considered are the temperature, the wind, the amount of sun or cloud or rain, the time of day, the sex of the bird when it can be known from plumage, the appearance of the bird (for a Chipping Sparrow certainly looks as if it were more careful of its feathers and general appearance than a Phoebe is), and the size and kind of bird. What is left? I think that the question can be solved only by one who is able to live with a bird, and keep up with it when it leaves its nest — which sounds very difficult.

Now as to these different ways of bathing. In the typical form there is only the length of time to consider. This has ranged in my observation from two seconds to one hundred seconds.

The next most common form is a series of short baths in the typical way, each lasting from two to fifty seconds, with an average of about five seconds. Then the bird flies to a perch on which it stays a short time, sometimes with just a little shake, sometimes with elaborate preening of feathers. Then it takes another bath and flies back to the perch for drying. In this way the bath is repeated sometimes six or seven times. In these cases the birds were entirely free from fear and from disturbance, an important consideration. For if a bird is driven out of the water by another bird, it will often fly up, perch, and come back again when the other is through. It may be driven away several times, yet always return until satisfied, as if some particular length or completeness of bathing was necessary.

Then comes a variation in which the bird takes a number of short dips, but does not shake much while in the water, though the wings are partly opened.

The fourth variation consists in a very vigorous shaking on a perch in the air before taking a bath, which may be any of the three preceding kinds. But I have never seen this shaking followed by the fifth kind of bath.

This fifth variation consists in keeping the wings tight shut or nearly tight shut, while in the water. The bird may splash about vigorously, or take a quiet bath.

Now I have seen these five kinds of baths taken by so many birds, that I am sure of their importance in bird life. Certain other variations occur occasionally. Thus, a Woodcock, after taking a typical bath, stood in the water while dressing its feathers. When all was done, and the feathers lying smooth, it stretched its wings out fully, then flapped them very quickly for about three seconds, raising them so high that they nearly met above its back. After that, it walked off quietly.

These observations were made chiefly in the southeastern part of the state of New York. The birds most often seen were Blue Jays, Flickers and Downy Woodpeckers, Wood-Thrushes, Robins, Starlings, Catbirds, Scarlet Tanagers, Orioles, Bluebirds, Cowbirds, Red-winged Blackbirds, Brown Thrashers, and various kinds of vireos, flycatchers, sparrows, and warblers.

Most of the observations were made between the middle of May and the middle of July, with the beginning of May and the end of October as limits for all but casual observation. This brings up two recollections of the indifference of birds to temperature; a Semipalmated Plover in the late fall, after sunset, bathing for more than half a minute in a half frozen pool on a beach; and a herring gull at noon of a day in which the thermometer never was above ten degrees, stepping off a cake of ice in a harbor and bathing for nearly half a minute.

But in hot weather, is this bathing the reason for the mid-day absence of birds from their usual places? Who can say?

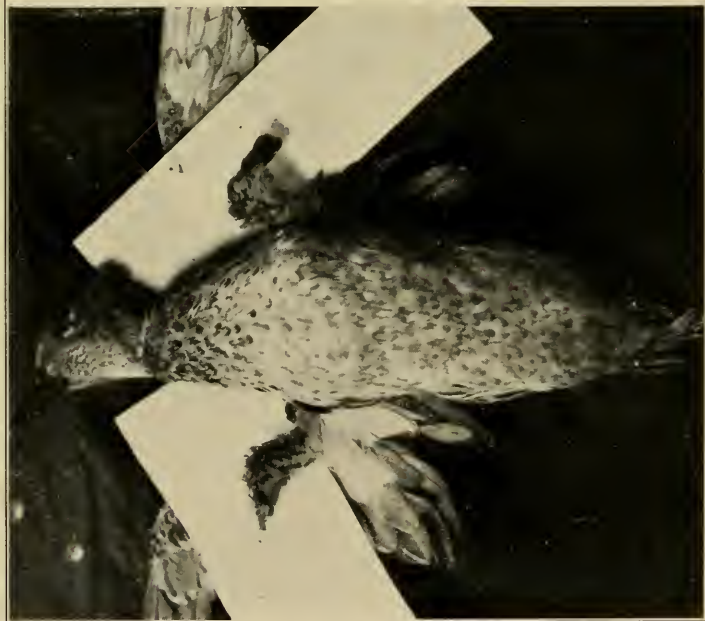
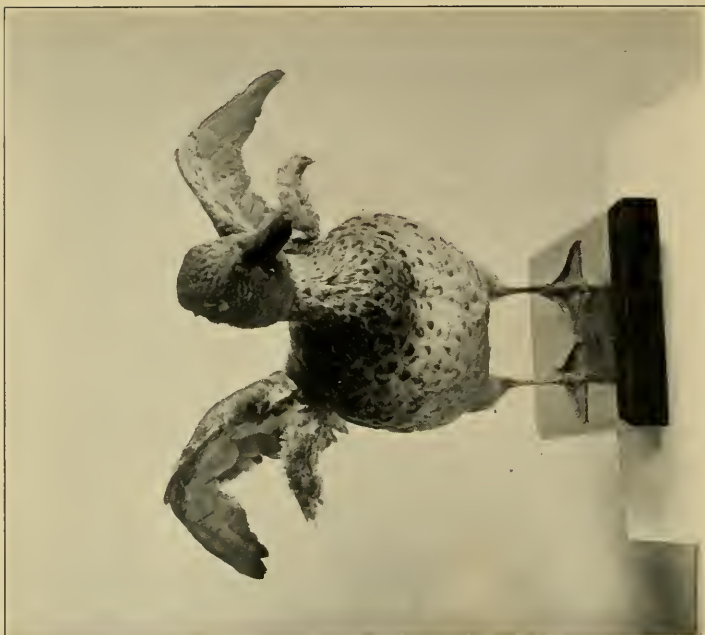


FIG. 1. IN THE FLESH.



PHOTOGRAPHS OF FOUR-WINGED TEAL.

FIG. 2. MOUNTED, CHAS. BRANDLER, TAXIDERMIST.

A FOUR-WINGED WILD-DUCK.

BY CHARLES EUGENE JOHNSON.¹*Plates XXVII-XXIX.*

ON November 18 last, the Zoölogical Museum of the University of Minnesota received through Mr. James Ford Bell of this city, a wild duck possessing a pair of supernumerary wings. The specimen had been shot by Mr. J. H. Staddon, of Minneapolis, a few miles west of Wyoming, Minnesota. While in Mr. Bell's possession, the specimen was examined also by the veteran ornithologist Dr. Thomas S. Roberts. The anomaly was considered sufficiently unusual and interesting to merit detailed study and publication.

Supernumerary parts in connection with the appendages of the body occur not infrequently among both vertebrates and invertebrates. Among vertebrates they appear in a variety of forms, such as supernumerary fingers and toes, tails, horns, mammæ, earlike appendages, etc. There appear also the more complex anomalies known as "double hands," and "double feet;" and more rarely there is found an extra pair of limbs nearly entire in themselves, attached in the vicinity of a normal pair, with more or less abnormal condition of the girdle, but in a body in other respects normal. The relative frequency of such abnormalities apparently varies in different groups of vertebrates. Bateson ('94) in his extensive work, calls attention to the many cases of polydactylism for instance, known in the horse, pig, and cat, and the complete absence of any records for the ass and very few for the sheep and dog. For the human species there is a rather extensive record of such cases. In birds, according to the same author, the total number of cases recorded is comparatively small. While in the domestic fowl polydactylism is common, in other groups it is rare; in pigeons, ducks and geese it does not seem to be known.

In the literature accessible, I have found no record of any avian abnormality similar to the case to be here described. Broom ('97)

¹ From the Laboratory of Comparative Anatomy of Vertebrates, Department of Animal Biology, University of Minnesota, Minneapolis.

records a "four-winged chick" but his specimen is of an entirely different character, possessing not only four wings but also four legs, and two tails. The spine is bifid, beginning at the base of the neck, and each spinal column has a corresponding pair of wings, a pair of legs and a tail. Diard ('97) reports a four-footed duck six months old. In this case there is a supernumerary pair of feet separate and distinct as far as the ankle joint, where each has its own articulation with a bifid enlargement at the end of a shaft of bone which apparently corresponds to fused tibio-tarsal elements of the two appendages. There is no distinct femoral segment differentiated, the feet being suspended from the previously mentioned shaft which articulates with the pelvis on the left dorsal side, at the junction of the synsacrum and caudal vertebræ. The feet themselves are abnormal. The left is larger and possesses three toes fully webbed; the smaller right foot has only two well formed webbed toes and an inner rudimentary digit. The fourth, posterior toe is lacking in each. The feet are furthermore somewhat deformed and atrophied and incapable of movement.

Tornier ('01) describes among other abnormalities three hens and two ducks, each with a pair of supernumerary legs appended to an abnormal pelvis. In addition to the accessory limbs, each of these specimens had two supernumerary cæca and the rectal segment of the gut was forked, presenting two cloacal chambers and anal openings.

The subject of the present paper is an adult female Green-winged Teal (*Nettion carolinense*). In a letter describing the circumstances in which the specimen was obtained, Mr. Staddon says:

"It may be of interest to know that the bird had no difficulty in flying but was peculiar from the fact that it flew out from some thick grass bordering a small creek back in the woods, whereas this species of duck, in my experience, more often stays along the protected shore of a lake when resting. Furthermore, I had not seen another Green-wing in that locality for at least two weeks before this one was killed. Pretty sure the rest of the species had migrated."

External features. The left wing of the normal or primary pair had been shot off at the elbow, otherwise the two sides are essentially alike in external appearance. When the primary wings are raised the supernumerary wings appear as a miniature set springing

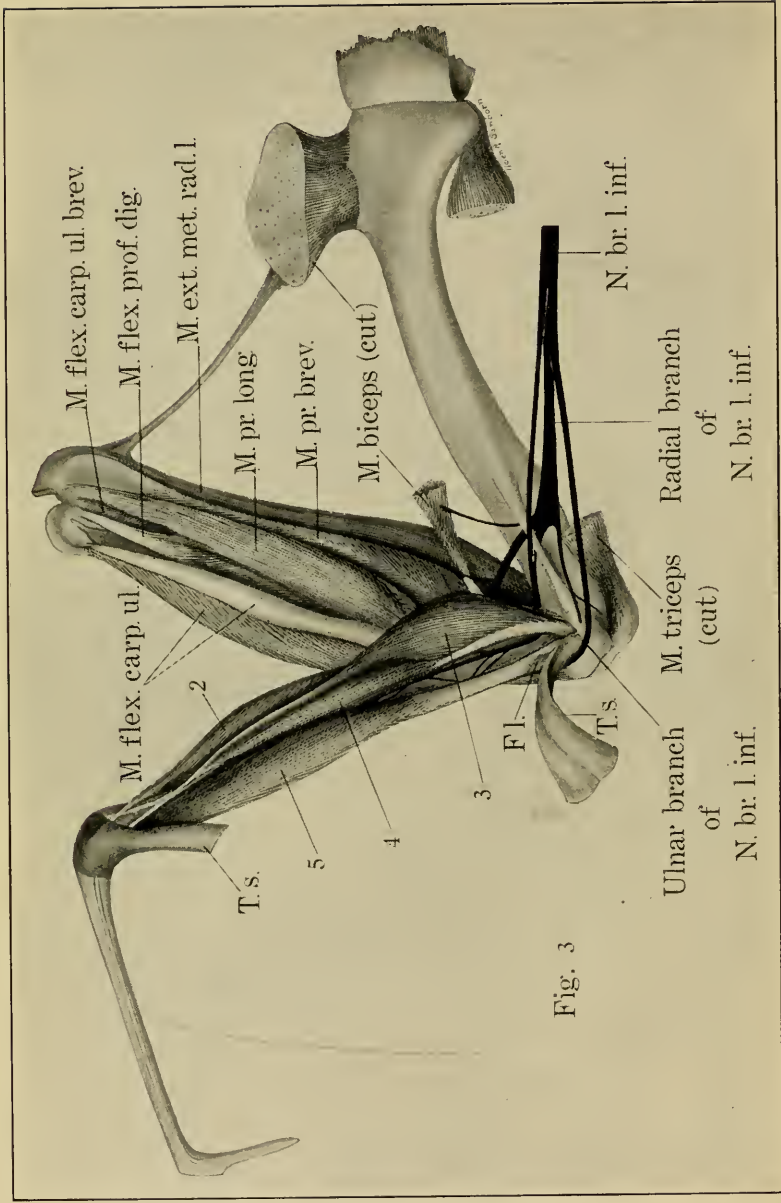


FIG. 3. DISSECTION OF MUSCLES AND NERVES OF THE RIGHT SIDE, FROM INNER ASPECT.

from the under side of the former at the region of the elbow, presenting corresponding surfaces and with divisions of forearm and hand clearly indicated. The feathery covering shows no modifications representing flight feathers but consists of under wing-coverts which belong primarily to the feather tracts of the normal pair. The broadly white-tipped posterior series of under wing-coverts of the primary wing continues onto the posterior margin of the supernumerary appendage while the rest of the latter is covered with the smaller, darker feathers of the anterior series.

The accessory wing of each side feels rigid at the elbow and has no movement independent of the primary wing. It is partly flexed at the point corresponding to the carpal region and here it can be felt that a slight movement is possible, but apparently complete flexion or extension can not take place. When the primary wings are folded in place against the body the tips of the smaller set project beyond their margins ventrally as a pair of inconspicuous feather tufts. The right projects a trifle further, and the integument covering its tip is scarred. The accessory wings may possibly during life have interfered somewhat with the folding of the larger pair though in the dead bird this is not apparent.

Skeleton. It is evident that in an abnormality like the present case any attempt to speak of homologies must result more or less unsatisfactorily. This applies to the bony parts as well as to the muscles, and while in the following account the supernumerary parts may be referred to in terms of normal structures it is not intended to convey the impression that homologies in any strict sense exist.

No abnormal features were found in the shoulder girdle. On the two sides the bony elements of the accessory wings are essentially alike from the elbow joint distally but the upperarm portions present markedly different conditions.

On the left side (Fig. 5) the distal end of the humerus of the primary wing is shattered. The remaining part of the bone is of normal shape. On the inner aspect of this bone, at the junction of the shaft with the head is a slender process of bone 7 mm. in length, extending roughly parallel with the shaft of the humerus. At its distal end the process passes into a slender, cylindrical, tendinous ligament 15 mm. in length, which continues toward the

elbow joint, and somewhat beyond the proximal half of the humerus, passes over into another bony process, similar to the first mentioned but longer, measuring about 18 mm. in total length. This process terminates in an enlarged headlike end, which, in life, was ankylosed on its lateral side to the median epicondylar region of the humerus of the primary wing by a rather narrow, low ridge of bone. The ligament, near its proximal end has a loop which evidently has resulted from tension exerted by the nerves to the biceps muscle, which lie in this loop. The median nerve passes distally between the ligament and the shaft of the humerus. The parts described, it will thus be seen, represent the imperfectly developed humerus of the left secondary or accessory wing.

On the right side, the humerus of the primary wing is somewhat stouter than that on the left. At about the middle of the shaft (Fig. 3) on its inner aspect, there becomes evident a rather narrow, rounded ridge of bone which further distally differentiates into a slender cylindrical shaft, terminating in an enlarged end similar to that of the left side, and ankylosed to the median epicondylar region of the primary humerus. This represents the humerus of the right accessory wing. At only one place does this shaft become entirely free from the primary humerus; here a narrow foramen is formed, about 6 mm. in length, transmitting a branch of the *Nervus brachialis longus inferior*.

The forearm skeleton is represented by a single bone. The general shape and articular relations are those of a radius rather than an ulna. It is set at an angle of about thirty-three and a third degrees with the corresponding humeral element, with the distal end of which it is firmly ankylosed. The bone measures 43 mm. in length, as compared with 50 mm. of the radius of the primary wing, and is approximately of the same diameter as the latter. The corresponding bone of the right side is practically identical in size and shape but is ankylosed at right angles to the upperarm segment. The exact relations of the left forearm bone to the primary humerus have been destroyed by the shot wound, but its lateral surface shows that an ankylosis has existed similar to that of the right side. The principal difference is that the left forearm bone forms a sharper angle with the two humeri. On the right side where the elbow articulations are intact, the accessory

forearm forms an angle of about forty degrees with the plane of motion of the primary forearm upon the upperarm, and evidently could offer no hindrance to the movements of the large wing in flight.

Distally, the forearm bone articulates with two small bony elements which from their position would seem to represent respectively the radial (Rad. carp.) and ulnar (Ul. carp.) carpal bones of the normal wing.

The carpal region of the right side possesses no separate radial element, but such a bone is possibly represented by a knob-like process on the metacarpal element, which forms the articulation with the radius.

The metacarpal skeleton consists of a single elongate, cylindrical bone, somewhat enlarged at its proximal end. It is approximately two-thirds the length of the forearm bone. Articulating with the metacarpal bone and terminating the series is a single relatively short phalanx.

On the right side (Fig. 3) there is likewise but a single phalangeal element; it is slightly longer than the left and bent medially at right angles to the metacarpal element with which it is immovably ankylosed.

It will be seen in the figures that a different degree of flexion exists at the two carpal joints. While the joint surfaces here permit of motion, it is clear from the restrictions of the fascia about these joints, as well as from the inadequate muscle supply later described, that movement must necessarily have been very limited.

Muscles and nerves. Like the skeleton, the muscles of the two accessory wings present similar conditions from the elbow distally, but in the upperarm the left side alone possesses muscles and these are only two in number and of rudimentary character. Distad of the carpal region there are no muscles, but a tendon from one of the forearm muscles finds its insertion beyond this region.

The rudimentary muscles of the left upperarm are innervated by branches from the nerves to the biceps muscle of the primary wing. The nerve connections to the accessory forearm muscles of this side could not be positively made out on account of previous mutilation. The muscles of the corresponding right forearm receive their innervation from the Nervus brachialis longus inferior

(Fig. 3, N. br. 1. inf.). A single nerve enters the fleshy part of the forearm at its base, on the under side, and distributes to the various muscles. This nerve is formed by the union of two branches from the N. brachialis longus inferior, one of which accompanies the radial branch of the last named through the slit-like passage formed between the upperarm bones. No branch from the Nervus radialis was found to pass to the muscles of the supernumerary wing.

The ulnar branch of the N. brachialis longus inferior, instead of crossing the hollow of the elbow as in normal conditions, reaches its destination by passing around over the convex surface of the ankylosed elbow joint of the accessory wing.

With regard to symmetry, the arrangement of the muscles and nerves seems to indicate that the primary and accessory wings on each side are not related to each other as right and left, that is, as halves of the undivided wing; but that the smaller wing represents an imperfect copy of the larger.

On the left side two slender but well defined muscles are connected with the upperarm bone of the supernumerary wing. Both arise as offshoots from the biceps muscle of the primary wing; one from the posterior edge of the tendon of origin of the short head, near its attachment to the head of the humerus; the other from the ventral surface of the belly of the muscle at its proximal end. The fleshy part of the latter of these two muscles extends distally beyond the former, reaching nearly to the elbow joint. Here both insert by closely associated tendon slips, in the angle between the distal, bony process of the accessory humeral element and the corresponding forearm bone.

On the anterior face of the forearm bone lies a relatively large, dorso-ventrally flattened muscle (Fig. 4, 1) which arises by two short heads; one from the area of ankylosis between the forearm and the corresponding upperarm bones, on the outer anterior surface; the other from the anterior surface of the last named bone, adjacent to the ankylosis. The innervating branch from the N. brachialis longus inferior enters between the two heads. The muscle inserts for the greater part of its length on the forearm bone, extending distally as far as the last quarter of the shaft. In position, form and insertion, and in a general way in its origin, this muscle corresponds to the M. pronator brevis of normal wings.

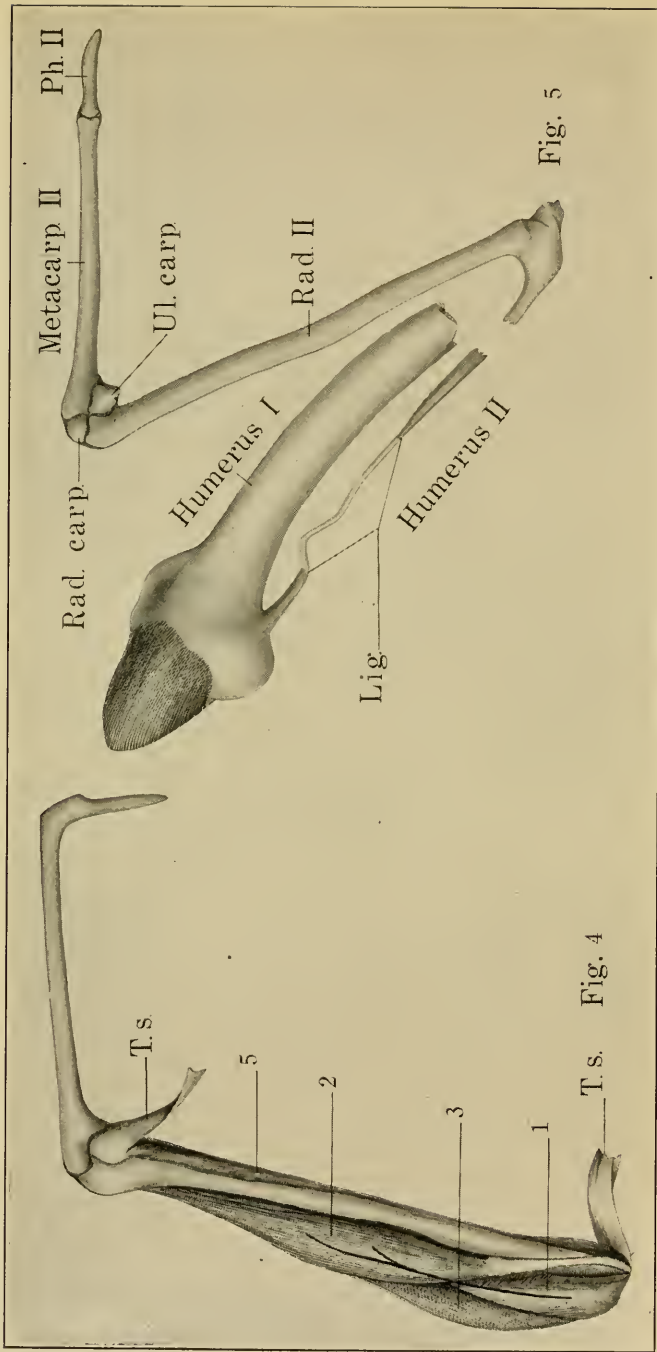


FIG. 4. MUSCLES OF RIGHT ACCESSORY WING, FROM OUTER ASPECT.

FIG. 5. PRIMARY HUMERUS AND SKELETON OF THE ACCESSORY WING OF THE LEFT SIDE. THE RUDIMENTARY HUMERUS WAS ACCIDENTLY BROKEN DURING DISSECTION.

To the outer side of this muscle is a spindle-shaped muscle (Fig. 4, 2) originating by a relatively long, narrow and flattened tendon from the outer, posterior surface of the ankylosis and passing distally, obliquely across the anterior surface of the forearm bone, to become inserted also by a relatively long, slender tendon on the anterior, inner surface of the proximal end of the metacarpal bone. The relations of this muscle closely approach those of the *M. extensor metacarpi radialis longior* of the normal wing, but the two well defined heads of the latter are here lacking. This muscle would have a pronating action upon the metacarpus in addition to the extending function. It is to be noted that the innervation of this muscle is by a branch from the *N. brachialis longus inferior*, while the *M. extensor metacarpi radialis longior* in the normal wing is supplied by the *Nervus radialis*.

On the under or medial surface of the ankylosed area there arises, partly by fleshy fibers and partly by a flattened tendon, a muscle mass which further distally is differentiated into two muscles, each with a long, slender tendon. One of these components (Figs. 3 and 4, 3) is proximal, and its tendon which is much the longer, passes to the under side of the wrist where it is held in place by a fibrous sheath, and thence courses along the under surface of the metacarpal bone to become inserted at the base of the phalanx. The other, more distal muscle becomes inserted into the fibrous capsule of the wrist joint, on its under side and anteriorly, where its tendon is held in place by the tendon of muscle 2. The first of these muscles has an insertion corresponding rather closely to the *M. flexor profundus digitorum*, the second to the *M. flexor carpi ulnaris brevis* of normal wings.

On the ulnar side of the under surface of the forearm is a superficial, broad, thickened, tendinous sheath (Figs. 3 and 4, T. s.). This sheath encloses the elbow joint of the supernumerary wing proximally, and about the middle of the forearm it separates into two bands which diverge, one passing to the outer side of the carpal joint where it inserts, and the other, a narrower band, passing to its insertion on the inner side of the joint. This tendinous sheath encloses a comparatively stout muscle, 5, which is exposed in its distal half by the division of the sheath. The muscle originates on the inner epicondylar region of the rudimentary upperarm bone by

a thickened fibro-cartilaginous ligament (Fig. 3, Fl.) about 6 mm. in length by 2 mm. in width, which strongly suggests the humero-ulnar pulley of the normal wing. The ligament is followed by a flattened tendon of origin and this, at about the second third of the forearm, passes into the muscular portion which has its insertion direct upon the entire posterior border of the ulnar bone of the carpus. Some fibers of the muscle arise from the inner surface of the enveloping tendinous sheath. This muscle occupies a position corresponding to that of the *M. flexor carpi ulnaris* of the normal wing.

Viewing the muscles of the abnormal wing as a whole, one may fancy the arrangement as an attempt to dispose of the muscles formed, in a manner as closely approaching the normal plan as the skeletal conditions of the case and the muscle material available would permit.

The question of causes. With regard to the causes underlying the formation of supernumerary digits or limbs in nature, it may be said that our knowledge is very meager. That supernumerary structures of this kind may be artificially induced in some of the lower vertebrates, often with constant and predictable results, has long been established. And that such parts occur in nature from causes analogous to those of the experimental laboratory is doubtless true; but it is also undoubtedly true that a great many cases occur which are entirely independent of such external causes.

As Barfurth ('95) has pointed out, a number of investigators have held the theory — and he calls this the atavistic theory — that polydactylism represents a “throw-back” (Rückschlag) to an older primitive type of limb which possessed more than five digits. This, because it had been observed that the accessory digit occurred especially in connection with either the first or the last digit of the normal series, and a like supernumerary digit was often known to occur in the same individual on both hand and foot, and was inheritable. Bardeleben, Wiedersheim and others, for instance, assumed that the primitive mammalian limb was not pentadactyl but heptadactyl. Still others pointed further back to the rays of an ancestral fin type.

It would indeed seem that if, in an animal where the normal digital condition for its particular group represents a reduction in

number from the pentadactyl type of its class, the full number of five digits should abnormally occur, these accessory digits might in reality represent a reversion to the ancestral type; as for example, when a fifth finger occurs in some urodelous amphibians which normally possess four fingers.

A second view is that of double embryonic anlagen. Here the normal anlage has become divided either through some extrinsic perhaps mechanical agency, or through an intrinsic peculiarity of the germ-plasm.

According to a third view, the supernumerary digits or limbs are simply malformations or pathological growths that belong in the category of duplicate formations (*Doppelbildungen*) which first arise as germinal variations, and are inheritable.

In the efforts of the various authors holding the views just mentioned, Barfurth finds a more or less evident tendency to assign all cases of supernumerary digits etc. to a common cause. He, himself, believes that they result from a variety of causes.

Among external influences the amnion is considered by some authors as the cause of accessory appendages. Tornier ('97) considers it an established fact that amniotic folds or bands are responsible for some cases of supernumerary digits or limbs in mammals; that this is true not only where such parts occur on one side of the body, but also where they appear on both sides, similar and simultaneous. He cites the case of a pig's foot in the Zoölogical Institute of the University of Leipzig, in which he declares one may follow out in detail the history of the processes by which the end result was produced. According to his view an amniotic band or fold may press against the pelvis or a shoulder blade of the embryo in such a way that a portion becomes pinched off; or a swelling or protuberance arises in which a process of regeneration sets in, producing a structure that in greater or less degree is a duplicate of the part from which it sprang; or a growing limb bud may be split by the penetration into it of such folds or bands. Tornier based his conclusions upon a study of both birds and mammals.

Opposed to this view in regard to the influence of the amnion stand the observations of Kaufmann-Wolf ('08). In an extensive study on the domestic fowl in adult and in embryo, this investigator found no evidence that the embryonic membranes, amnion

or allantois, play any part in the formation of polydactylism, and believes that these membranes cannot be adduced as causative factors in the production of such anomalies. Painsstaking search in embryonic stages showing incipient polydactylism — one series in particular having the embryonic membranes faultlessly preserved — failed to suggest the possibility of amniotic influence. Furthermore the early appearance of the anlage of the supernumerary digits, at a time when the foot-plate possesses no indentations whatever, speaks against such external agency and justifies the view that if in any other amniote, in much later stages, amniotic bands or folds are found in the clefts between supernumerary digits, they have invaded the depressions secondarily. Kaukmann-Wolf holds the view that polydactylism is due to internal influences which in our present state of knowledge cannot in detail be satisfactorily analyzed.

In certain amphibians which possess notably marked capacity for regeneration, such as Siredon and Triton, Barfurth, and Tornier ('97) produced with regularity supernumerary limbs by means of more or less complex amputations and other forms of injury, the accessory parts being here produced by regeneration at the wound surfaces. From the results of his experiments Tornier concluded that embryonically initiated extra digits or limbs in Anamnia are due to influences analogous to those produced by the embryonic membranes of Amniota; that is, to some stress producing a warping, twisting or splitting of the developing part, thereby inducing regenerative processes or complete division. In both vertebrate groups Tornier thus believes that the underlying causes are of external nature.

From the opposing views here briefly outlined it will be seen that the problem of causes is far from a satisfactory solution.

In regard to the case recorded in this paper it would seem that the embryonic membranes must be excluded as causative factors. The fact that the radial branch of the N. brachialis longus inferior lies between the primary and accessory upper arm bones, indicates that the latter of these bones is not the result of a splitting off from an originally normal embryonic humerus by the ingrowth of an amniotic band, or other mechanical agency, for in that case we should expect to find the nerve which precedes the skeletal parts in

development, mesial of the accessory element; and there is no reason to believe that the distal and proximal parts of the supernumerary wing are not the result of the same cause. Furthermore, it seems improbable that complications in the embryonic membranes should arise on the two sides simultaneously, of such nature as to produce substantially identical results. Taking this anomaly as a whole, the extent to which the entire wing is involved, the imperfect separation of the accessory upper arm bone, the absence of other impressions and disturbances in adjacent soft parts which one might expect as a result of such agencies, there seems to me no basis for believing that embryonic membranes have here been implicated directly or indirectly. What other extrinsic agencies acting merely on the skeletal anlage of the wing alone, or upon the wing-bud as a whole, might have produced the conditions found, are difficult to imagine. The more probable view for this case, it appears to me, is that it resulted from some inherent abnormality of the anlage of the extremity, of germinal origin.

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NOTES ON DICHROMATIC HERONS AND HAWKS.

BY OUTRAM BANGS.

IN the Proceedings of the Biological Society of Washington, Vol. XXV, pp. 53-58, Oberholser gives a detailed account of the so-called *Butorides brunescens* (Lembeye) of Cuba and the Isle of Pines and emphatically states his belief that it is a true species quite distinct from the Cuban form of *Butorides virescens* with which it sporadically occurs in the two islands just mentioned. He admits that in size and proportion it exactly agrees with the ordinary Green Heron of Cuba.

Theoretically I have always held the opposite opinion. There is nothing about *Butorides brunescens* that suggests specific distinction to me, everything seeming to point rather to this peculiar form being nothing more or less than an erythristic phase of plumage of *Butorides virescens*.

Up to now, extreme examples of the *brunescens* phase of plumage have been recorded only from Cuba and the Isle of Pines, although as stated by Thayer and myself, and by Oberholser, many specimens from the Pearl Islands, Bay of Panama, show a very decided approach to it, some being nearly as extreme as Cuban skins. In a series of twenty-two specimens from the Pearl Islands, just one half show more or less of this erythristic tendency. The other half of the series (eleven skins) is made up of birds in absolutely normal plumage — quite indistinguishable so far as color and markings are concerned from typical examples of *Butorides virescens*.

Peters, Auk, Vol. XXX, p. 370, described at some length a youngish green heron, M. C. Z. no. 60699, taken by himself at Camp Mengel, Quintana Roo, Mexico, February 7, 1912, that shows decided erythristism and that closely approaches the *brunescens* type of coloration.

Lately while cataloguing that part of the Howe-Shattuck collection of birds which was transferred from the Boston Society of Natural History to the Museum of Comparative Zoölogy, in a long series of Green Herons from Florida, I found one adult female in

extreme *brunescens* plumage. This skin, now M. C. Z. no. 72982, was taken March 22, 1902, at Madeira Hummock, Florida, and was in beautiful, fresh spring plumage. Its neck is a little darker than in specimens in normal plumage, is unicolor lacking all traces of either whitish or dusky markings even on the throat and chin; the belly is dark and reddish and but slightly contrasted against the color of the neck; the wing-edge has no whitish on it whatever; the wing coverts are all very narrowly edged with dark rusty brown, with no creamy or whitish anywhere. It affords the following measurements—wing, 166 mm.; tail feathers, 53; tarsus, 51; exposed culmen, 62.

Unfortunately the measurements taken from this example are not positive proof that it was bred in Florida. The chance however, of its having wandered from Cuba to where it was killed seems rather remote, and I regard it as pretty certainly an instance of erythrism of the continental Green Heron—*Butorides virescens virescens* (Linn.). In his Revision of the subspecies of the Green Heron (Proc. U. S. Nat. Mus., Vol. 42, pp. 529–577) Oberholser gives in his list of measurements, the length of wing in females of *B. virescens virescens*, as ranging from 160 to 185. In females of his *B. virescens cubanus* from 155 to 174. The Cuban form does, of course, average smaller in all measurements than *B. virescens virescens*, but single individuals cannot be separated, if their measurements happen to fall—as in the case of the specimen I have just described—between the extremes.

Cory's Least Bittern, *Ixobrychus neoxenus* (Cory), is a similar case of nothing more or less than erythrism of the common Least Bittern, *Ixobrychus exilis* (Gml.) as I have wholly satisfied myself by an examination of specimens, which vary among themselves as to the degree of erythrism shown. It crops out, here and there, anywhere, within the range of the species, and has no distinct range of its own.

Another dichromatism common among herons, and now thoroughly well understood, is the very striking one, of a pure white—albinistic—phase, and a normally colored,—usually bluish and reddish—phase shown by the same species. The three species showing this extraordinary tendency, and now admitted by nearly all systematic ornithologists to be dichromatic, are the Red-

dish Egret of America, *Dichromanassa rufescens* (Gml.) whose white phase has been named *D. pealei* (Bp.). In some places, especially in some of the Bahamas, this species presents a mixed plumage, partly white and partly blue, called by Maynard *Ardea rufa mutata*. The Reef Heron, *Demigretta sacra* (Gml.) of the coasts and islands of the Indian and Pacific Oceans; and the Little Blue Heron, *Florida carulea* (Linn.). In this latter species the white dress is usually a sign of immaturity, and is changed, for a blue one as the bird becomes fully adult. But this is not always the case. I have myself seen birds breeding in the white plumage, and fancy that such individuals retain the white dress throughout life.

Albinism, melanism and erythrism are of course but manifestations of an abnormal condition of pigmentation, and as such are directly inherited. Thus, miscolored forms of this kind may appear to have geographic limitations, similar to those of real subspecies.

All these facts being perfectly well known, and all other Herons showing dichromatism having been finally treated as such by ornithologists, it seems to me extraordinary that the Great White Heron of Florida should still be dealt with as though it were a species.

There is an accumulation of evidence now, both printed and on the labels of museum specimens, to show that *Ardea occidentalis* Aud. and *Ardea herodias wardi* Ridg. breed together freely. We also have an intermediate form in *Ardea würdemanni* Baird, that is very variable, sometimes shading toward the blue phase, sometimes toward the white phase. All three are of exactly the same size and proportions, and show no specific characters except color, which I consider has no real significance in such a case.

In Cuba and the Isle of Pines a Great White Heron also occurs, associated with birds in normal plumage,— *Ardea repens* Bangs and Zappey. This form can be separated from the Great White Heron of Florida by its lesser dimensions. In size and proportions it exactly agrees with the Great Blue Heron of the West Indies, the white phase of which I unhesitatingly pronounce it to be.

I should therefore propose to change the standing of some of the American Herons as follows —

Ixobrychus neozenus (Cory) must become a synonym of

IXOBRYCHUS EXILIS (Gml.).

Ardea herodias wardi Ridg. and *Ardea würdemanni* Baird both become synonyms of

ARDEA HERODIAS OCCIDENTALIS Aud.

The West Indies Great Blue Heron, becomes

ARDEA HERODIAS REPENS Bangs & Zappey,

with *Ardea herodias adoxa* Oberholser as a synonym, and the Cuban Green Heron, if really distinct from *Butorides virescens maculatus* (Bodd.), of Martinique, which I doubt, becomes,

BUTORIDES VIRESCENS BRUNESCENS (Lemb.)

with *Butorides virescens cubanus* Oberholser a synonym.

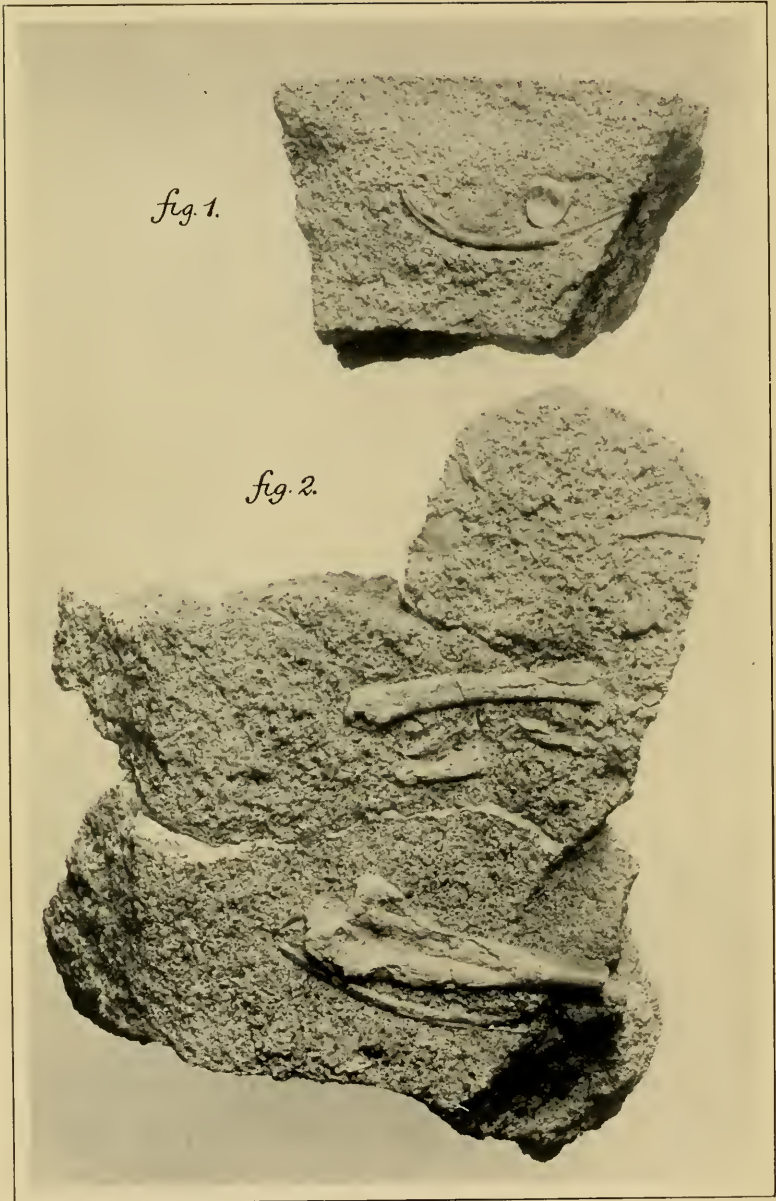
The Hawks, now admitted by, I think, all bird anatomists to be close relations of the Herons, show an array of color variation due to melanism, erythrism and even albinism, such as no other group of birds presents. The melanistic forms are so common, have been so much discussed and are so well known that I shall pass them by entirely here.

The most sharply marked instance of dichromatism, that I know in the Hawks, that is due to erythrism, is in the Cuban Sparrow Hawk, *Falco sparverius sparveroides* Vig. In Cuba and the Isle of Pines, the normally colored pale birds and the reddish brown, erythristic examples, are about equally common, occur everywhere together, and breed, mated indiscriminately.

An instance of albinism in the Hawks, which on account of the tendency of the causes of this disease to be inherited, gives the bird a semblance of geographical limitations like those of a subspecies, is the famous white Goshawk of Kamchatka and parts of east Siberia, *Accipiter*¹ *gentilis albidus* (Menzb.). This bird has recently been discussed at length by Hartert, (*Die Vögel der paläarktischen Fauna*, Vol. II, p. 1149), who points out that normally colored birds do occur with it, as well as all intermediate stages, and who considers it only an albinistic phase of *Accipiter g. schvedowi* (Menzb.).

I have no doubt myself that the White Goshawk of Australia, *Accipiter nova-hollandiæ* (Gmel.), is an albinistic phase of *Accipiter cinereus* (Vieill.) with which it occurs in the same regions.

¹ *Astur*, of course, if one wants to recognize that genus.



FOSSIL REMAINS OF EXTINCT CORMORANT, *Phalacrocorax macropus*,
FROM MONTANA.

FOSSIL REMAINS OF THE EXTINCT CORMORANT
PHALACROCORAX MACROPUS FOUND IN MONTANA.

BY R. W. SHUFELDT, M.D.

Plate XXX.

CHARLES H. STERNBERG was the first one to discover the fossil bones of a large extinct cormorant in the Pliocene formation of Oregon. These bones belonged to a number, or rather represented a number of individuals of different ages and probably both sexes. Subsequently, Cope described this extinct cormorant and named it *Graculus macropus*.¹

Several years afterwards, under the name *Phalacrocorax macropus*, I reëxamined the thirty-four parts of fossil bones of the collection made by Sternberg, and compared them with the corresponding ones in several species of existing cormorants found in the avifauna of the United States. A table of measurements was also made and presented.² Including the two metacarpî that originally belonged in the Condon collection, there were four more or less imperfect specimens of that bone of the skeleton represented, while none of these fragments were figured on the plates.

Thus our knowledge of this cormorant stood up to the ninth of July, 1913, when the American Museum of Natural History of New York City issued its 'Bulletin' containing my "Review of the Fossil Fauna of the Desert Region of Oregon, with a Description of Additional Material Collected there." (Vol. XXXII, Art. vi, pp. 123-178. Pls. ix-xliii, figs. 1-578.) In this work I refer to what was formerly set forth in the Philadelphia Academy memoir, and the remark is made that "The present reëxamination of the material tends to confirm this latter opinion; and, as the fossil bones of *P. macropus* have never been illustrated, I have devoted four plates and many figures to them in the présent paper."

¹ Cope, E. D. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. IV, No. 2 (1878). pp. 386, 387.

² Shufeldt, R. W. "A Study of the Fossil Avifauna of the Equus Beds of the Oregon Desert." *Jour. Acad. Nat. Sci. Phila.*, Vol. IX, Pls. xv-xvii, Phila., Oct., 1892, pp. 389-425.

With respect to the present article, the bones which interest us here are to be found on Plate xxi of the aforesaid 'Bulletin' (figs. 262-264), and they represent different fragmental parts of three carpometacarpi of an adult *Phalacrocorax macropus*. Figs. 262 and 263 are of *left-side* bones, the first being rather more than the proximal moiety; fig. 264 is of the distal portion of a carpometacarpus from the right side. The latter does not especially interest us in the present connection, while figs. 262 and 263 distinctly do, as I shall show further on in this paper.

Up to include the early part of the year 1915, no fossil remains of *Phalacrocorax macropus* had been discovered outside the State of Oregon, and if they had, such a discovery was not known to science. Early in February of that year, Mr. Charles W. Gilmore, of the Division of Vertebrate Palæontology of the United States National Museum, referred some fossil bone material to me for examination, reference, and publication. This material consisted of one large and two smaller pieces. (Figs. 1 and 2, Plate XXX.) The largest fragment and the one next in size to it had been repaired by sealing them together with plaster-of-paris, — an excellent piece of work done by one of Mr. Gilmore's assistants at the museum. A few fossil and imperfect bones were firmly fixed in the matrix of the latter piece, the principal one apparently being the rib of some teleostean fish; these bones do not concern us here. On the twelfth of February, 1915, I photographed the two other fragments, natural size, and in such a way as to show the fossil bones the fragments contained. (See Plate XXX.) It will be observed that the smaller fragment presented in it a vertebra and a rib of some adult teleostean fish of the period, which may or may not be known to science, and only interest us here from the fact that they occur in connection with the fossil bird bones found in the largest fragment (Fig. 2). These, with the other specimens, were collected by Mr. C. M. Bauer on the twenty-fifth of October, 1914, while employed by the United States Geological Survey in southeastern Montana. Mr. Bauer was in charge of this collecting party at the time in question, and in noting this specimen he entered the following remarks in his record (p. B 62): "Fish Bones. Locality T. 53 R. 60 E. North Side Cottonwood Creek: Base of Arikaree. Oct. 25, '14." Mr. Gilmore has catalogued this specimen at the

National Museum under number 3251, and informs me that it is from the Lower Miocene formation.

Passing now to an examination of the large fragment shown in Fig. 2 of the Plate, I must first deplore the fact that whoever collected this specimen apparently labored under the impression that all the fossil bones in the matrix were those of some fish, and not sufficiently perfect to be of any use to the palæontologist. He therefore, very evidently, did not bring in all that he could have brought, and probably would have, had he known or appreciated their real value.

All the specimens of fossil bones in this largest fragment are those of some large bird or other. They consist of a rib, the proximal part of a left carpometacarpus; a large phalanx from a bird's foot; also a small, pedal joint, and other pieces too fragmentary to identify. These fossil bones I believe all belonged to the same adult individual, with the possible exception of a rib, which may be a fish's rib, though I am much more inclined to believe it to be a costal rib of the same individual.

The carpometacarpus has its direct anconal aspect exposed, the shaft being hollow and crushed inwards for its upper portion. This bone is the key to the species which the specimens represent. Before making any comparisons, I pronounced that the bird represented was a specimen of *Phalacrocorax macropus*; and as a matter of fact, and as subsequently proven, this upper portion of a carpometacarpus agrees exactly, in the matters of measurement, proportions, characters, and form with the corresponding fragment of a carpometacarpus of *Phalacrocorax macropus* mentioned in a former paragraph of this paper. (Fig. 262, Bull. Amer. Mus. Nat. Hist., July 9, 1913.)

It is the largest bone in the matrix shown in Fig. 2 of the Plate of the present paper. The one next in size is evidently the long, proximal joint of the hallux (of one or the other of the feet) of this cormorant. Its dorsal aspect is exposed, and its distal end is opposite the proximal end of the carpometacarpus in the fragment. It agrees with this bone of the foot in average existing cormorants, apart from being considerably larger. There is no other bone in the skeleton of any cormorant (*Phalacrocorax*) with which it can be confused; and this is the first instance of this particular bone in

the skeleton of a *Phalacrocorax macropus* having come into the possession of science.

Finding this bird in Montana will prove, up to date, that it probably was an abundant species during Pleistocene time and earlier, ranging over a considerable portion of the northwestern section of Middle North America, or at least that portion of this continent now so named.

No little interest also attaches to the fact of finding these remains associated with the fossil bones of a highly specialized teleostean fish, if fish it be, which lived during the same era that this extinct cormorant described by Cope did.

THIRTY-THIRD STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.

BY JOHN HALL SAGE.

THE Thirty-third Stated Meeting of the American Ornithologists' Union convened in San Francisco, Cal., Monday evening, May 17, 1915. The business meeting was held at the California Academy of Sciences, and the public sessions, commencing Tuesday, May 18, and lasting three days, were held in the Auditoriums of the Young Women's Christian Association and of the Eiler Musical Company, within the Exposition Grounds.

BUSINESS SESSION. The meeting was called to order by the President, Dr. Albert K. Fisher. Eleven Fellows were present. The Secretary's report gave the membership of the Union at the opening of the present Stated Meeting as 1156, constituted as follows: Fellows, 50; Retired Fellows, 3; Honorary Fellows, 13; Corresponding Fellows, 56; Members, 79; Associates, 955.

Since the last meeting (April, 1914) the Union lost fifty-four members, nine by death, eighteen by resignation, and twenty-seven for non-payment of dues. The deceased were:

Dr. Theodore Nicholas Gill,¹ a Retired Fellow, who died in Washington, D. C., September 25, 1914, in his 78th year; Graf Hans von Berlepsch, an Honorary Fellow, who died February, 27, 1915; Otto Herman, of Budapest, Hungary, a Corresponding Fellow, who died December 27, 1914; and the following Associates: Mrs. Clara E. Buxbaum, who died in Chicago, Illinois, March 23, 1914; William Bardwell Burke, who died at Rochester, New York, April 15, 1914; William Charlesworth Levy, who died at Alton Bay, N. H., July 5, 1914, aged 26 years; William Foreacre Brantley, of Blackshear, Ga., who died September 9, 1914; Prof. Lewis Lindsay Dyche, of Pratt, Kansas, who died January 20, 1915, at the age of 58 years, and Harry Kirkland Pomeroy,² who died in Kalamazoo, Mich., January 27, 1915, in the 50th year of his age.

The report of the Treasurer showed the finances of the Union to be in a satisfactory condition.

All the officers were re-elected, as follows: Albert K. Fisher, President; Henry W. Henshaw and Witner Stone, Vice-Presidents; John H. Sage, Secretary; Jonathan Dwight, Jr., Treasurer; Ruthven Deane, William Dutcher, Joseph Grinnell, Frederic A. Lucas, Wilfred H. Osgood, Chas. W. Richmond, and Thos. S. Roberts, members of the Council.

Dr. Emilia Snethlage, of the Museu Goeldi, Pará, Brazil, was elected a Corresponding Fellow; Edwin R. Kalmbach, and the Hon. George Shiras, 3d, of Washington, D. C., were elected to the class of Members, and the following sixty-eight persons were elected Associates:

E. M. Anderson, Provincial Museum, Victoria, B. C.
Miss Mary Adeline Ayres, Medford, Mass.
Merle Taft Barker, Taunton, Mass.
C. Stanley Benson, North Abington, Mass.
Ralph Benton, Los Angeles, Cal.
Wolfrid Rudyerd Boulton, Jr., Beaver, Pa.
W. C. Bradbury, Denver, Colo.
Herbert William Brandt, Cleveland, Ohio.
Maurice Graham Brooks, French Creek, W. Va.

¹ For an obituary notice, see *Auk*, XXXII, pp. 139-140; also Memorial Address in the present number.

² For an obituary notice, see *Auk*, XXXII, p. 386.

Ronald K. Brown, New York City, N. Y.
 Mrs. Florence Buckwalter, Union, Miss.
 Clarence H. Bush, DeKalb, Ills.
 Charles Edgar Conklin, Roslyn, N. Y.
 Hugh Conn, Cochrane, Ont.
 Frederick W. Cook, Seattle, Wash.
 Miss May Thacher Cooke, Washington, D. C.
 Chas. P. Curtis, Boston, Mass.
 Lewis Dexter, Manchester, N. H.
 Eric B. Dunlop, Winnipeg, Manitoba.
 Russell Errett, Terrace Park, Ohio.
 Erik Fries, Montclair, N. J.
 Charles Gleason, Brookline, Mass.
 Ralph Mather Harrington, Cambridge, Mass.
 Arthur Thacher Hinckley, Niagara Falls, N. Y.
 Wharton Huber, Gwynedd Valley, Pa.
 Miss Dorothy C. Hunt, New York City.
 Mrs. Edwin H. Husher, Los Angeles, Cal.
 Roland Fountain Hussey, Ann Arbor, Mich.
 H. H. Kopman, New Orleans, La.
 John Edward Harry Kelso, M. D., Edgewood, B. C.
 Leslie W. Lake, Hamburg, N. Y.
 John L. Lawrence, Lawrence, N. Y.
 Mrs. William M. Levey, Brookline, Mass.
 Edward G. Lund, Boston, Mass.
 Thomas L. McConnell, McKeesport, Pa.
 Miss Gertrude McDowell, Atlanta, Ga.
 James Latimer McLane, Jr., Garrison P. O., Md.
 Edward Sidney Marks, Arlington, N. J.
 Jesse C. A. Meeker, Danbury, Conn.
 Samuel W. Mellott, Chevy Chase, Md.
 Miss Bertha Stuart Miller, Palisade, N. J.
 William Henry Mousley, Hatley, Quebec.
 Alva Morrison, Braintree, Mass.
 Prof. William H. Munson, Winona, Minn.
 Dr. I. D. Nokes, Los Angeles, Cal.
 Neill Pennell Overman, East Orange, N. J.
 Lloyd Peabody, St. Paul, Minn.
 Arthur Wellesley Perkins, Farmington, Maine.
 G. Planton Middleton, Philadelphia, Pa.
 James C. Quiggle, Washington, D. C.
 Harvey Darell Radetsky, Denver, Col.
 Mrs. A. A. Saunders, New York City.
 Edmund Joseph Sawyer, Watertown, N. Y.
 Chas. F. Schermerhorn, Des Moines, Iowa.
 Chas. P. Shoffner, Philadelphia, Pa.

O. P. Silliman, Castroville, Cal.
 Napier Smith, Montreal, Canada.
 Theodore L. Squire, Battle Creek, Mich.
 F. A. Stuart, Marshall, Mich.
 Mrs. Phillip B. Stewart, Colorado Springs, Colo.
 Phillip B. Stewart, Colorado Springs, Colo.
 Francis Thomas Sujak, Chicago, Ill.
 Henry H. Townshend, New Haven, Conn.
 Dix Teachenor, Lawrence, Kansas.
 Roy A. Ward, Washington, D. C.
 Belle Williams, Columbia, S. C.
 Lem Williams, Shonkin, Montana.
 Miss Clara Lucretia Willis, Waban, Mass.

Drs. Palmer, Stone, and Richmond, Prof. Cooke, and Ruthven Deane, were appointed 'Committee on Biography and Bibliography.'

The amendments to the By-Laws, proposed at the last Stated Meeting of the Union, were unanimously adopted. Members will hereafter share with Fellows the business of the Union and the election of Officers, Members and Associates.

PUBLIC SESSIONS. *First Day.* The meeting was called to order by the President, Dr. Fisher.

The papers of the morning were as follows:

'Notes on the Life-History of Penguins, with Special Reference to the Origin of Certain Instincts,' by Robert Cushman Murphy. Illustrated by lantern slides.

'Oregon Bird Life in Motion Pictures,' by William L. Finley.

The following papers were presented at the afternoon session which was held at the Auditorium of the Eiler Musical Company, in the Palace of Liberal Arts.

'Philadelphia to the Coast in Early Days, and the Development of Western Ornithology prior to 1850,' by Dr. Witmer Stone.

'In Memoriam — Theodore Nicholas Gill,' by Dr. T. S. Palmer.

'The Migration of Albatrosses and Petrels,' by Leveritt Mills Loomis. Remarks followed by Dr. Palmer, Messrs. Murphy and Nichols, and the author.

'A Late Nesting Record for the California Woodpecker,' by Mrs. Harriet Williams Myers.

'The Average Age of the Herring Gull,' by John Treadwell Nichols.

In the evening the members of the Cooper Ornithological Club and the A. O. U., with their friends, met at dinner at the Clift Hotel — fifty persons being present.

Second Day. The meeting was called to order by Vice-President Stone.

The papers of the morning session were:

'Some Breeding Birds of the Grand Canyon,' by Dr. T. S. Palmer.

'Immature Plumages,' by Dr. Jonathan Dwight, Jr. Remarks followed by Mr. Loomis, the author, and the Chair.

'The Shore Birds of California,' by William Leon Dawson. Illustrated by lantern slides.

The noon-day luncheon was served at the Chop Suey Restaurant in the Food Products Building, within the Exposition Grounds.

At the afternoon session Joseph Mailliard, President of the Cooper Ornithological Club, occupied the Chair. The following papers were presented:

'Exhibition of the Salisbury Wild Life Motion Pictures,' by Dr. Harold C. Bryant.

'Farallon Island Bird Life, in Motion Picture,' by P. J. Fair.

'Niche of the California Thrasher,' by Dr. Joseph Grinnell. Remarks followed by Dr. Palmer, Mrs. Myers, Mr. Dawson, and the author.

Third Day. The meeting was called to order by President Fisher.

The papers of the session were:

'The Genus Problem in Present Day Nomenclature,' by Dr. Witmer Stone.

'The Work of the National Association of Audubon Societies,' by T. Gilbert Pearson.

'Two Characteristic California Waders: The Black-necked Stilt and the Snowy Plover,' by Tracy I. Storer. Illustrated by lantern slides. Remarks followed by Messrs. Murphy, Dawson, and Joseph Mailliard.

'Food Habits of the Road-runner, *Geococcyx californicus*,' by Dr. Harold C. Bryant. Illustrated by lantern slides.

In the absence of the authors the following papers were read by title:

'The Pacific Coast Races of *Thryomanes bewicki*,' by Harry C. Swarth.

'History of the Bohemian Waxwing in Northern British Columbia,' by Ernest M. Anderson.

Resolutions were adopted thanking the Young Women's Christian Association and the Eiler Musical Company for the use of their auditoriums for a place of meeting, and for other courtesies extended; to Mr. J. Eugene Law and other members of the Southern Division of the Cooper Ornithological Club for generous hospitality and courtesies extended to the eastern members of the Union and their friends, during their stay in Los Angeles; to the Local Committee of the A. O. U., and the members of the Northern Division of the Cooper Ornithological Club for generous hospitality and many courtesies extended to the Union during its Thirty-third Stated Meeting; and to the United States Bureau of Fisheries for the use of the steamer "Albatross" for a trip about San Francisco Bay and around the Golden Gate.

The Stated Meeting just closed was the first regular meeting ever held on the Pacific Coast, and it will be remembered by those in attendance as one of the most successful in the history of the Union.

On Friday, May 21, after adjournment of the Union, some seventy-five members of the California Academy of Sciences, the Cooper Ornithological Club, and the A. O. U., enjoyed a trip about San Francisco Bay and around the Golden Gate on the U. S. Fish Commission Steamer "Albatross." Dr. Barton W. Evermann, Director of the California Academy of Sciences, acted as host. The same day other members of the Union visited Mt. Tamalpais and the Muir woods.

Later in the month many of the eastern members were entertained by Dr. and Mrs. C. Hart Merriam at their attractive summer home in Lagunitas.

The next meeting of the Union will be held in Philadelphia in 1916, the date to be determined by the local committee.

JOHN H. SAGE,
Secretary.

GENERAL NOTES.

Yellow-billed Loon (*Gavia adamsi*) in Colorado.— A Correction.—

In writing the life history of the Yellow-billed Loon, I have been puzzled to know what to do with the supposed Colorado record of this species. I have always suspected that the record was based on an erroneous identification, as Colorado is so far away from the known range or migration route of this species.

The specimen on which it was based was taken by Mr. William G. Smith, near Loveland, Colorado, on May 25, 1885. A letter from Mr. Smith to Major Bendire, giving the details of its capture, is now in my hands and states that the bird was sold to Mr. Manly Hardy of Brewer, Maine, now deceased.

Knowing that the Hardy collection had been recently purchased for the Rhode Island Audubon Society and was now in the Park Museum in Providence, I wrote to my friend, Mr. Harry S. Hathaway, of that city, for his opinion, as to the identity of the specimen. He very kindly investigated the matter and sent me his report, together with a letter on the subject from Mrs. Fanny Hardy Eckstorm, which strengthened my doubts and practically convinced me that the record was based on an error. For my own personal satisfaction, I went to Providence and examined the specimen with Mr. Hathaway. It is not a Yellow-billed Loon, but a very curious specimen of the Common Loon and I am not surprised that Mr. Hardy, and others who have seen it, have been puzzled. Its entire plumage is decidedly worn and faded to a dull brownish shade. It is a young male in the immature plumage of the first year. Its bill is certainly yellow, the yellowest, or lightest colored, bill I have ever seen in any young loon, which probably led to its identification as *Gavia adamsi*; but the size and shape of the bill agree with *Gavia immer* and not with *G. adamsi*. The culmen measures about 3.20 in. and the depth of the bill at the base is about .90 in. Ridgway's 'Manual' gives, for *G. adamsi*, culmen 3.50 to 3.65 in. and depth, 1.00 to 1.20 in.; and for *G. immer*, culmen 2.75 to 3.50 in. and depth .90 to 1.05 in. The bird in question is small even for *Gavia immer* notwithstanding the fact that it is a male, and it has a particularly slender bill, even for that species, instead of the large, heavy bill, with the straight culmen so characteristic of *Gavia adamsi*. It is only fair to Mr. Hardy to say that he was in doubt about the bird and that the record never ought to have stood without verification. I cannot understand why some one, who was competent to identify the bird, did not examine the specimen before the record was published, which would have prevented the frequent repetition of an error, which can never be wholly rectified. Such errors are far too common and I hope that this one will be corrected in the next edition of our Check-List.— A. C. BENT, Taunton, Mass.

The Puffin (*Fratercula arctica arctica*) on Long Island, N. Y.— On April 30, 1915, a specimen of this species was found on the beach near Montauk Point and was sent to me for identification. The body of the bird was very much decayed and it may have perished several weeks before it was found. This appears to be the third record for Long Island.— J. A. WEBER, *Box 327, Palisades Park, N. J.*

A Near View of an Iceland Gull.— As notes on the Iceland Gull (*Larus leucopterus*) in life are rather scarce, the following observations on its appearance and actions may be worth recording. I found a bird of this species January 2, 1915, at the fish pier, South Boston. It was alternately swimming about and resting in the slip on the west side of the pier, and I watched it for some time with my bird-glass (of three diameters), part of the time within ten or fifteen yards, I should think. It was in the rare pure-white plumage (at least nothing but pure white could be seen on the most careful study under these favorable conditions) and the bill appeared to be entirely black, or blackish. It was clearly smaller than the Herring Gulls with which it was associated, and the bill, as always with this species, was noticeably shorter in proportion, giving a somewhat dove-like appearance to the head. It also carried its head higher and the tail, or rather the rear part of the body, cocked at more of an angle. The wings extended farther beyond the tail than was the case with the Herring Gulls. It was livelier and more "aristocratic" and graceful in bearing than these, and made pretty little dabs with its bill at morsels of food in the water. It appeared to be on terms of equality with the Herring Gulls and was always near them or among them. It had two or three little tiffs with them over food, but these were no more frequent than the quarrels among the Herring Gulls themselves. This bird was afterwards seen at the same place by Dr. Charles W. Townsend, and this or a similar pure-white Iceland Gull was observed at close range off Rockport, Mass., April 19, 1915, by Mr. Charles R. Lamb, who permits me to report the occurrence.— FRANCIS H. ALLEN, *West Roxbury, Mass.*

The Arkansas Kingbird (*Tyrannus verticalis*) in Eastern Minnesota.— While out on a bird-hunting trip with my class in ornithology on May 12, 1915, we saw an Arkansas Kingbird on the boulevard of Minnehaha Creek not far from Lake Harriet. There could be no doubt as to the identification, since he was in plain sight and the lemon-colored underparts were described by all the members of the class. This is the second time within a year that I have seen an Arkansas Kingbird in the neighborhood of the Twin Cities. Since the 'A. O. U. Check-List' names western Minnesota as the eastern boundary of the range of this species, while Hatch in his 'Birds of Minnesota' does not mention the bird at all, I thought the record might be of interest.— PROF. PAUL E. KRETZMANN, PH.D., *Concordia College, St. Paul, Minn.*

Starlings (*Sturnus vulgaris*) in New Hampshire.— Four Starlings were seen at Hanover, N. H., on April 17, 1915. As this is the first time these birds have been seen here, I thought the record might prove of interest.— E. GORDON BELL, *Hanover, N. H.*

Bachman's Sparrow near Chicago, Illinois.— The scene of this discovery is not Chicago proper, but the suburb of River Forest. Near my home in this fine suburb is an eighty acre tract of land, which I call "Waller's Park," for although a piece of real estate held for speculation, it is in reality a beautiful park, as it has been surrounded by the owner with an eight foot fence and for over twenty-five years planted up with many kinds of trees and bushes, so that, besides having in the course of these years become a park, it is also an ideal bird preserve or sanctuary, unintentional as this phase of the project may have been on the part of the owner. On May 9 I went into this idyllic spot, which, however, had up to this time not been resorted to by flights of migrants as much as would be expected, owing to the unseasonably cool or cold weather. The temperature for May recorded by the Chicago weather station was two degrees lower than that for April, if I am not mistaken, the coldest May since the establishment of the office. After seeing several Palm Warblers, Ruby-crowned Kinglets, Field Sparrows, Baltimore Orioles and the here inevitable Cowbirds, my attention was suddenly arrested by an unusual song. On going to that part of the grove from which it came, I noticed ten to fifteen reddish sparrows, which were busily feeding on the ground among the grass and then, as though they could not keep their exhilaration for themselves or that it could not be given vent to on the ground, some would mount to the lowest branches of the adjacent trees and pour out a ringing song. The song resembled that of the Chewink at its best and also that of the Field Sparrow, being, however, louder than the latter and sweeter than the former. Approaching to within fifteen feet of several of the singers, I saw that they were Bachman's Sparrows (*Peucaea aestivalis bachmani*), a species with which I had become familiar during a stay in southern Illinois. It was hard to believe, but looking them over again and again, with and without the glass, one could, also by elimination, arrive at no other conclusion, which was corroborated by the skins in my collection when I came home. That flock stayed there, in the same spot, for several days, for I saw them again on May 12. Knowing that this species is one of those which are gradually extending their breeding range northward, I still thought that these birds would not remain to breed, for the gap between here and the nearest locality to the south from which they are reported as breeders, would be too great. I thought they had in their migratory ardor been carried along by other sparrows until they found themselves farther north than they wished to go, and would retrace their flight fifty or more miles southward. However, on May 23, I noticed one again which behaved very much as though it were at home. On June 29 and 30, I heard two

singing lustily in the open grove opposite my home, which is two blocks east of the park described above. Wishing to clinch the record I, on July 1, took one, which proved to be a male, whose enlarged testes made it certain that it had been or was breeding. Therefore Bachman's Sparrow must be looked upon as an, at least occasional, breeder in the Chicago area.—G. EFRIG, *Oak Park, Ill.*

Leconte's Sparrow in Wisconsin.—Under this title in the January number of 'The Auk,' Mr. Schorger notes the occurrence of Leconte's Sparrow (*Passerherbulus lecontei*) at Madison in April of last year. In Wisconsin the species is undoubtedly an unusual one, at least on the spring migration, but, despite the fact that Kumlien and Hollister failed to get it in spring, there are several records from various points in the state since the publication of 'The Birds of Wisconsin.' Attention is called to a note by Mr. I. N. Mitchell (Bulletin of the Wisconsin Natural History Society, vol. VIII, No. 3, July, 1910), which covers these, and consists of three spring records. Mr. Schorger says: "On April 11, 1914, three were taken and one seen at Madison." Curiously enough, the writer took a full plumaged male at Oconomowoc, Wisconsin, on the same date!—A. R. CAHN, *Univ. of Wis., Madison, Wis.*

Junco Breeding in Concord and Lexington, Mass.—*Junco hyemalis hyemalis* has been generally considered a bird characteristic of the Canadian fauna. Its ordinary distribution in Massachusetts during the breeding season embraces the lofty hill country of the western part of the State, and a narrow elevated strip of land running south from Mt. Monadnock, N. H., into Worcester Co., Mass., and forming the water-shed which divides the tributaries of the Connecticut from those of the Nashua River. In this strip are included the rounded mountain domes known as Watatick (1847 ft.) and Wachusett (2016 ft.). I recall but three instances of Junco breeding in the eastern part of the Atlantic slope of Massachusetts, viz.: in Middlesex Fells (Eustis, Auk, xxii. 103, Jan. 1906), Wellfleet, Barnstable Co. (Remick, Auk, XXIV, 102, Jan. 1907), and Wellesley, Norfolk Co. (A. P. Morse, Pocket List of the Birds of Eastern Massachusetts, p. 64, 1912).

In the latter part of May, 1915, Mr. C. A. Robbins called my attention to a pair of Juncos established on the edge of Sleepy Hollow Cemetery in Concord, and on the 6th of the following June Dr. W. M. Tyler and I watched both of the parent birds as they were busily employed in carrying food to their young, concealed in the branches of some tall white pines.

On the 20th of the same month Dr. Tyler and I found another pair feeding fledged young near the old Paint Mine in Lexington, about six miles from the Concord locality. This family of birds was seen by us at the same place on several occasions up to the 18th of July.—WALTER FAXON, *Lexington, Mass.*

The Indigo Bunting in Colorado.—A male of this species (*Passerina cyanea*) was seen by the writer at Brighton, Colo., on August 15, 1915.—W. H. BERGTOLD, *Denver, Colo.*

Numerous Migrant Pine Warblers (*Dendroica vigorsi*) at Fort Lee, N. J.—In the southern part of this locality the coniferous growth was cut away many years ago and it is therefore not suited to the requirements of the Pine Warbler. Ten years or more of migration notes by the writer in this locality show only one or two migrant warblers of this species during a spring flight. The number observed this spring is therefore noteworthy, viz:—

April 19, 1915 — 1 ♂; April 20, 1915 — 15♂, 5 ♀; April 21, 1915 — 4♂, 4 ♀; April 24, 1915 — 1♂; May 6, 1915 — 1 ♀. Total 21 ♂, 10 ♀.—J. A. WEBER, *Box 327, Palisades Park, N. J.*

Black-throated Blue Warbler in Colorado.—The writer has to record the presence of a male of this species (*Dendroica cærulescens cærulescens*) in Cheesman Park, Denver, Colo., where it was seen during the whole of June 13 and 14, 1915. It is such an extremely rare visitor to this State that the writer slipped into his home (only a few yards away) and took a skin of this species with him while he again watched the living bird as it flitted about in the evergreens. The writer is extremely sceptical about the correctness of many sight identifications, especially of these rare warblers when reported from Colorado, and hence he took the precaution to study the living bird and a skin simultaneously; it was deemed all the more necessary to take this precaution as the writer has not seen the living bird or heard its song in nearly twenty-five years.—W. H. BERGTOLD, *Denver, Colo.*

Cape May Warblers Destructive to Grapes on Long Island.—With much interest I read of the actions of the Cape May Warbler (*Dendroica tigrina*) in recent numbers of 'The Auk.' These warblers were especially abundant here last fall and there were twenty or more on our place from September 20 to October 10. They might be found at all hours of the day in the grape arbor, where they were observed to puncture the grape skins with their bills and drain out the juice.—JAMES W. LANE, JR., *St. James, L. I.*

The Resident Chickadee of Southwestern Pennsylvania.—Attention should be called to a mistake during past years in regard to the resident Chickadee of that region of southwestern Pennsylvania that lies south of central Washington County and east of the first mountain ridge of Fayette County.

During the writer's earlier ornithological investigations he was led to believe that the Black-capped Chickadee (*Parus a. atricapillus*) regu-

larly inhabited this region. This belief was due the identifications of a local oölogist, who sent out sets of eggs, taken here, labelled as *Penthestes a. atricapillus*.

The truth is that the species found with us is the Carolina Chickadee (*Penthestes c. carolinensis*). In order to prove this statement the writer has made a careful study of specimens from various parts of the region and has yet to find one *Penthestes a. atricapillus*. Breeding birds were examined as follows: A nest found May 1, 1915, was built in a cavity made by the birds in the top of a decayed fence post. This post stood in a creek valley and was at the side of a lane which wound about the base of a steep wooded hillside. The female bird was captured on the nest and proved to be *Penthestes c. carolinensis*.

A second nest, discovered May 8, was built in a cavity at the top of a fence post which stood on the border of a field and at a public roadside. The female was lifted from six slightly incubated eggs and carefully examined; she was a typical specimen of *Penthestes c. carolinensis*. Locality: One mile north of the West Virginia line.

A third nest, found on May 9, was situated in a top of a fence post. This stood on the border of a village. The birds were seen to change places on the nest and one was captured and examined. It proved to be *Penthestes c. carolinensis*. Locality: Blacksville, West Virginia, a small town lying on the Mason and Dixon Line.

Breeding birds were examined in the region of Washington, central Washington County, and also found to be *Penthestes c. carolinensis*.

In order to further establish proof as to the species found here I have asked two West Virginia ornithologists to inform me as to the species found in their respective regions. Rev. Earl A. Brooks of Weston, West Virginia, who has studied the bird life of many parts of his state, says that *Penthestes c. carolinensis*, is the species inhabiting the hill country of northern West Virginia. He informs me that only in the higher mountain regions has he found *Penthestes a. atricapillus*.

Mr. George M. Sutton, ornithologist at Bethany College, in the Panhandle of northern West Virginia informs me that the species found there, since his arrival a year ago, is *Penthestes c. carolinensis*. He adds that only once has he noted the Black-cap: in the late fall of 1914.

Mr. W. E. Clyde Todd in charge of the birds at the Carnegie Museum, Pittsburg, Pa., tells me that there is a specimen of *P. c. carolinensis* in the museum collection which was taken near Washington, Pa. He says that he is not surprised to learn that the Carolina Chickadee dwells in this region.—SAMUEL S. DICKEY, *Waynesburg College, Waynesburg, Penn.*

Winter Birds at Wareham, Mass.—It may be of interest to record at Wareham, Massachusetts, during the past winter, the following species:

VESPER SPARROW, *Poæetes gramineus gramineus*, two.

CHIPPING SPARROW, *Spizella passerina passerina*, three.

FIELD SPARROW, *Spizella pusilla pusilla*, rather common.

CATBIRD, *Dumetella carolinensis*, one.

BROWN THRASHER, *Toxostoma rufum*, one.

All were present throughout the entire period, with the possible, though hardly probable, exception of the Vespers, which were not found until February 26, 1915.—C. A. ROBBINS, *Onset, Mass.*

Notes on some Manitoban Birds.—Taking E. T. Seton's list of Manitoban birds in the 'Handbook of the British Association,' Winnipeg, 1909, as a basis, the following observations appear to be worthy of record.

Sterna caspia. CASPIAN TERN.—On June 22, 1914, I found about 120 pairs of Caspian Terns nesting on a small shoal in a remote part of Lake Winnipeg. Laying had commenced shortly before for there were many single eggs and the full clutches which were tested were fresh or nearly so. The only other species nesting on the shoal was a single pair of Herring Gulls, they had evidently taken toll of the Terns eggs. Later in the summer photographs of the birds nesting were obtained from a blind, they proved to be very shy, no doubt the absence of bushes from the shoal and consequent conspicuousness of the birds, partially at all events, account for this. Both sexes incubate. Seton gives no record of this species.

Phalacrocorax auritus auritus. DOUBLE-CRESTED CORMORANT.—In Chapman's 'Birds of Eastern North America,' the number of eggs laid by this Cormorant is given as 2-4. On Lake Winnipeg I found many fives and sixes and also several sevens, the frequency of these occurrences made it certain that they were true clutches and not the product of more than one bird.

Marila marila. GREATER SCAUP DUCK.—As there appears to be no definite record of this species nesting in Manitoba, I may state that it was undoubtedly the most plentiful breeding duck, mid-way up the west side of Lake Winnipeg. Full clutches were not found till the middle of June.

Lobipes lobatus. NORTHERN PHALAROPE.—Noted on the Dauphin River near Lake St. Martin on August 16, 1914, and also on a shoal in Lake Winnipeg, September 4, 1914.

Tryngites subruficollis. BUFF-BREASTED SANDPIPER.—Two secured on west shore of Lake Winnipeg, September 5, 1914.

Squatarola squatarola. BLACK-BELLIED PLOVER.—Seton has no autumn records. Several birds of this species were frequenting the mouth of the Mossy River, Winnipegosis, at the beginning of October, 1914.

Ægialitis meloda. PIPING PLOVER.—A nest of this species found on June 18, 1914, on the shore of Lake Winnipeg contained four eggs. Young of this species were subsequently seen at other points on the same lake.

Perisoreus canadensis canadensis. CANADA JAY.—A curious superstition that I found prevalent among the Indians in various parts of

Manitoba was that if they happened to find a nest of this species containing eggs or young, either they themselves or a near relative would soon die. Nothing would induce the Indians to search for nests of this species.

Passerherbulus nelsoni nelsoni. NELSON'S SPARROW.— This species was found about midway up the west shore of Lake Winnipeg on July 11, 1914. No doubt it was breeding there.

Penthestes hudsonicus hudsonicus. HUDSONIAN CHICKADEE.— As there is only one record of this species for the Province, that of Macoun for Porcupine Mountains, it may be well to state that I noted it at two places on the west shore of Lake Winnipeg on July 17 (an immature bird) and on September 6. I also noted it at Lake St. Martin on October 26, 1914.—ERIC B. DUNLOP, *Winnipeg, Manitoba.*

Bird-Notes from Cambridge, Isanti County, Minnesota.— Isanti county is situated in the southern part of east-central Minnesota, and is at one point only eight miles distant from the St. Croix River — in this vicinity the boundary between Minnesota and Wisconsin. Its northern boundary is about thirty miles south and slightly southeast of Mille Lacs Lake, which is midway between the northern and southern extremities of Minnesota. The size of the county is small compared with the others in this state, its area being only 456 square miles. In shape it is practically a square from which two townships placed north and south of each other have been cut out from the northeast corner. The adjoining counties are: Kanabec on the north, Mille Lacs and Sherburne on the west, Anoka on the south, and Chisago on the east.

The greater part of the county is drained by the Rum River and its tributary streams which are all small brooks and brooklets issuing from nearby lakes. Rum River rises in Mille Lacs Lake, flows southward through Mille Lacs, Sherburne, Isanti and Anoka Counties and unites with the Mississippi at Anoka. Entering Isanti County about five miles south of the middle of the western boundary, it flows northeastward about fifteen miles, turns abruptly southward and leaves the county about eight miles east of the southwest corner. Cambridge is situated five miles south of the vertex of the angle formed and is near the river. The course of the river is winding as may be shown by the fact that (according to the State Drainage Commission) there are fifty-two miles of river in this county. Its fall is very slight, only eleven inches per mile, the altitude of the river surface ranging from 891 to 939 feet. The river valley is bordered by side hills ranging as high as sixty feet above the level of the river. These sometimes rise directly from the water's edge in the form of bluffs but usually are farther in the background, giving space for ample meadows in which graceful bayous or "ox-bows" delight the eye. However, the southeastern projecting corner of the county and the extreme northeast and northwest corners are drained by small tributaries of the St. Croix. There are numerous lakes of varying size usually small, Green Lake, the largest one,

having only a square mile or more of surface. The precipitation at Cambridge is between twenty-nine and thirty inches.

Cambridge lies about five miles north of midway between the 45th and 46th parallels of latitude. The surrounding country is gently rolling and as a whole is of a sandy character. The black heavy loam which we find in the southern parts of the state is here totally absent and consequently such lovers of a fertile soil as the bloodroot and bellwort are here not nearly as common. In many places we find extensive black oak barrens where only black and bur oaks will grow to represent the trees but where the Pasque Flower, the pioneer of early spring startles us with its beauty when we pass through its haunts. The aspens, oaks, birches and red maples form the bulk of the more fertile upland wooded areas, while soft maples, white ashes and elms clothe the river bottomlands. Logging has ceased to be a large industry although a few sawmills are still running to accommodate those farmers who haul in their sled loads of logs to be sawed into lumber.

Cambridge seems to lie on the very southern edge of the Canadian life area of this state. Here we find large tracts of Tamarack bogs covered with a thick layer of peat-moss where the Reindeer-lichen, Labrador Tea, Leather-leaf, Rosemary, Pitcher-plant and Sundews grow in profusion. White Spruces grow abundantly in some places, intermingling with the Tamaracks and from whose dead limbs hangs the long waving *Usnea* and other lichens in which the Northern Parula Warbler may occasionally be found nesting. The mossy mounds and old hoary stumps are covered with mats of the Twin-flower and creeping Snowberry, and several species of *Cypripedium* grow as well. These swamps are the paradise of Orchids and Heaths. A grove of Balsam Firs in the northwest corner of the county at Maple Ridge, and extensive patches of White Pine are found throughout the northern half. In the larger patches the drowsy, buzzing song of the Black-throated Green Warbler can be heard all through the heat of midsummer. Jack Pines grow fairly commonly in some places but are usually under twenty-five feet in height. The leaves of the *Clintonia* cover the ground around the borders of the bogs. In hot sandy soil around some lake shores and in the pines we find the ground matted with Bearberry one of the few plants to be found growing in these situations. Wolves are still quite common in the Tamarack bogs and rarely the bear is met with. The Great Plains fauna is represented by the Jack Rabbit and Brewer's Blackbird.

So far as I know, very little if any study had ever been made of the avifauna of this county before I began my observations here in 1913. These were all made within a radius of seven miles of Cambridge. The following list is intended to give some of the observations which may be most interesting to other Minnesota bird students. With these explanatory paragraphs they are submitted as follows:

1. ***Cryptoglaux funerea richardsoni***. RICHARDSON'S OWL.— I have two records in 1914 for this boreal bird. One was a female shot and brought

to me on January 31 and the skin of which I have. The other was observed March 1 and was remarkably tame. In wooded bottomland by the river.

2. **Picoides arcticus**. ARCTIC THREE-TOED WOODPECKER.— November 1–February 28. Common in winter in tamarack bogs but they can also be found in any kind of woods. Their presence is usually betrayed by a sharp “kip” which they utter at irregular intervals. Tamaracks are their favorite trees and often they will peck off the dead scaly bark the whole length of a tree to get at the borers underneath. The fact that I have no summer records and that they are so common in winter shows that they migrate somewhat south of their breeding range, in winter, through the tamarack belt.

3. **Euphagus cyanocephalus**. BREWER'S BLACKBIRD.— Since colonies of this species have been found near Minneapolis it was no great surprise to me to find another colony in a meadow just east of the station at Grandy five miles north of here on June 30, 1915. It consisted of at least five pairs and during my brief visit there two fledglings were seen able to make extensive flights.

4. **Zonotrichia albicollis**. WHITE-THROATED SPARROW.— Summer resident, April 18–November 9. Common in summer in tamarack and spruce woods. All day long their clear whistle can be heard if we are near their haunts. One nest with five almost fresh eggs on June 4, 1915. Their breeding range does not probably reach much further south than Cambridge.

5. **Spizella pusilla pusilla**. FIELD SPARROW.— In hot sandy places covered with black and bur oaks, this bird was found to be not at all uncommon, although very local. Often two or three can be heard answering each other. A nest with three young and a Cowbird was found on June 16, 1914.

6. **Melospiza melodia melodia**. SONG SPARROW.— My notes contain two wintering records for this bird. On December 8, 1913, I was surprised to hear the characteristic call-note of this bird in a weedy fence-row entering the south side of a tamarack forest and a little search revealed the bird. It was seen again in the same place on several occasions up to January 8 which was the last time it was observed. Again, this winter (1914–1915), one was seen on an average every other day between November 17 and January 12, after which period I did not see it again. It seemed to make its headquarters every night in the willows bordering an “oxbow” a quarter of a mile north of Cambridge. From this place it made frequent trips to feed on the weed seeds on a neighboring hillside and field. I scattered food for it regularly in several places. On December 4 I was surprised to find two birds instead of one, but with that exception only one was seen. Still another bird was observed on the east side of a tamarack bog two miles north of this village on December 19, 1914.

7. **Protonotaria citrea**. PROTHONOTARY WARBLER.— Six miles west of Cambridge and about one mile above Findell Bridge, the river has at some time changed its course, leaving now only a small stream of water to flow through its former channel which is called “Lost River”

and follows a winding path parallel to the new one for a distance of about a mile. At the point where they reunite, the river flows out into large sloughs, losing all semblance of its usual appearance, and affording a favorite feeding ground for herons. In the tall elm trees between "Lost River" and the main channel there is a heronry of at least twenty pairs of Great Blue Herons. This place resembles in all respects though on a smaller scale, the river bottoms of the Mississippi in southeastern Minnesota where the Prothonotary Warbler occurs so abundantly. Even a slight rise in the river will drench it with a foot of water in many places and at all times there is a network of muddy streams to be forded by the intruder. Here we find old decayed stumps, logs and fallen trees which often give natural bridges across the streams. In such a place it was small wonder that the Prothonotary was found breeding, and its clear ringing song associated with that of many Redstarts, was a familiar sound there. I found at least five pairs though there may have been more and also located a nest on June 17, 1915, with three eggs. The most northern point at which they had been found hitherto was four miles below Hastings on the Mississippi: about sixty miles further south.¹ Therefore the birds here form an isolated colony.

8. **Vermivora chrysoptera.** GOLDEN-WINGED WARBLER.—A fairly common summer resident, May 11–September 25. Isanti County seems to lie near the northern limit of their range. They frequent hot, open second growth where hazelnuts grow in abundance.

9. **Vermivora celata celata.** ORANGE-CROWNED WARBLER.—The breeding range of this species is supposed to reach only as far south as Manitoba. I was greatly surprised, therefore, to find one singing in the willows and alders bordering the sloughs at the mouth of "Lost River" on June 11, 1915. It was very confiding so that I could approach quite close to it while it was singing and could plainly see the obscure streaks on the breast; as it was preening its plumage the brownish bases to the feathers on the crown could even be seen. I am thoroughly familiar with the Nashville, Orange-crowned and Tennessee Warblers and their songs so I have no doubt that it was the Orange-crown although the specimen was not collected. It seems probable that it was breeding there, though of that I am not certain.

10. **Dendroica vigorsii.** PINE WARBLER.—Very common in the pines in the northern parts of the county. Often only two or three large pines near farmhouses will shelter a pair of them.

11. **Oporornis agilis.** CONNECTICUT WARBLER.—Summer resident, May 18–? This interesting species was found to be common in summer in the tamarack and spruce bogs where its loud, liquid song was a dominant sound in the morning and evening hours. In the middle of the day they are much less in evidence since they are then preoccupied in *walking* about in the damp moss and undergrowth searching for insects. They display

¹ Roberts, T. S. Auk, Vol. XVI, No. 3, July 1899, pp. 236–246.

very little shyness but instead a great deal of curiosity, and if the observer is still they will come very close to him and sing. On June 26, 1915, Dr. T. S. Roberts and I saw a female with her bill full of food in the spruce swamp north of Cambridge.

12. **Oporornis philadelphia.** MOURNING WARBLER.—A few may be seen and heard singing here in summer in the second growth of rich woods. This species like the last is very tame while singing and chooses some dead limb in full view from which to deliver its loud song. May to September.

13. **Certhia familiaris americana.** BROWN CREEPER.—Permanent resident. A few winter in the tamarack and spruce woods where they are protected from cold winds. In the heavily wooded bottomlands by "Lost River" I saw a pair on June 11, 1915. The scaly bark which was peeling off the old soft maples gave suitable nesting sites and the birds' anxious call-notes indicated that they had a nest near by.

14. **Regulus satrapa satrapa.** GOLDEN-CROWNED KINGLET.—Last winter (1914-1915), this bird was found to be quite common throughout the cold months in the pine and spruce woods, where its penetrating "ti-ti" betrayed its presence for some distance through the clear, frosty air. It was supposed to be very rare and sporadic in southern Minnesota in winter.

15. **Hylocichla guttata pallasi.** HERMIT THRUSH.—In the extensive pine woods bordering tamarack swamps northeast of Grandy, at least three Hermit Thrushes were heard singing this summer (1915) whenever I visited that locality. This is the most southern summer record thus far for Minnesota.—LAWRENCE L. LÖFSTRÖM, *Cambridge, Minn.*

RECENT LITERATURE.

Dall's Biography of Baird.¹—Twenty-seven years have elapsed since the death of Prof. Baird, and while numerous tributes to his scientific attainments and achievements have been published, no biography at all commensurate with his position in the development of science in America, has hitherto appeared. This was undoubtedly due to the fact, well known to Prof. Baird's friends, that his daughter Miss Lucy Hunter Baird was engaged upon such a work with the aid of Prof. G. Browne Goode, assistant Secretary of the Smithsonian Institution during her father's incumbency as secretary. Prof. Goode's death and the recurrent illness and ultimate

¹ Spencer | Fullerton Baird | A Biography | Including Selections from his Correspondence | with Audubon, Agassiz, Dana, and others | By | William Healey Dall, A.M., D.Sc. | with nineteen illustrations | [vignette] | Philadelphia & London | J. B. Lippincott Company | 1915. Svo. pp. i-xvi + 1-462. \$3.50 net.

death of Miss Baird hindered the progress of the work, but a provision of Miss Baird's will arranged for its completion and publication and her executor has displayed admirable judgment in selecting for the task Dr. Wm. H. Dall, long time associate and friend of Prof. Baird and who, to use his own expression, was personally familiar with most of the occurrences of the last twenty years of Prof. Baird's life.

Miss Baird's contribution to the biography is considerable; consisting of her personal recollections of various incidents and periods in her father's life, together with matter obtained from other members of the family or friends covering earlier events in his career. The biographer had also the neatly bound volumes of correspondence which Prof. Baird had carefully preserved and which comprised letters from almost every prominent American scientific man of the period, as well as of many distinguished in other fields of learning. Baird's own letters to his brother William and to several other correspondents were also available as well as his journal.

From such rich material it was possible to construct a virtual autobiography with contemporaneous discussion of the interests and activities of the subject, and this Dr. Dall has done, welding together his materials in a masterly way, interpolating the original letters with excellent judgment and producing not only a splendid exploitation of the life of the naturalist, but a volume of absorbing interest to the reader, whether he be scientist or layman. We feel sure moreover that the one who would appreciate the labors of the author, more perhaps than can any one else, would have been the devoted daughter of the great naturalist to whom the volume is inscribed.

Prof. Baird's position in American scientific circles was unique. No other naturalist was probably acquainted with such a large number of scientific men or held in more universal esteem. His personal qualities were such as endeared him to all with whom he came in contact, and the generous cordiality and affection of his correspondents is reflected in many of the published letters. His influence upon American scientific development was of the utmost importance. From his early youth the idea of amassing specimens was ever foremost in his mind, first as a private collection, then as a great government museum, and as we turn the pages of the biography his selection as Assistant Secretary and then as Secretary of the Smithsonian Institution appears simply a matter of course, so perfectly was the man fitted for the position. In training his scholars in the College at Carlisle, where he was a professor, in methods of collecting specimens, and later in furnishing more elaborate instructions and outfits to the young naturalists who came to the Smithsonian, to army officers and to the staff of the Government surveys, he started a sort of endless chain which reached far into the future producing collectors and collections increasingly skilled and valuable as years went on.

Through the entire volume one is impressed with the tireless energy of the man, collecting and studying birds, fishes, mammals, reptiles, fossils, minerals and plants; preparing specimens for exchange, keeping up an

extensive correspondence and encouraging others to collect for him besides mastering language after language even to Danish and Italian, and reading all the scientific works upon which he could lay his hands.

The community of interest between Spencer F. Baird and his elder brother William, as shown in their correspondence, at once attracts the sympathy of the reader, and the generosity of the older brother when he found himself able to extend financial assistance to the younger to aid his advance in a field which he himself had been forced to abandon, is very touching.

The correspondence with Audubon is extremely interesting, forming, as it were, the connecting link between the leading figure of one epoch of American Ornithology and that of the next. Also the numerous exchanges of letters with John Cassin especially those of Christmas, 1853, wherein they reckoned the number of years that they had been friends and the high value that they placed upon this friendship! Later amid increasing cares we trace Baird's career at Washington, his establishment of the International Scientific Exchange, the development of the Museum and the fatherly interest in the many young naturalists who made the Smithsonian the centre of their activities and organized the Megatherium Club.

Finally the development of the Fish Commission and its numerous activities. But it is useless to try to present a synopsis of such a life; one must read it in its entirety, and suffice it to say that every ornithologist — indeed every scientific man — should read this biography. It is instructive in its mass of historical details, inspiring in the example that it sets and the possibilities that it opens up, and fascinating as a piece of literature. The illustrations are good and well selected, and the book is in every way a credit to both author and publisher.— W. S.

Baynes' 'Wild Bird Guests.'¹ — When interest in the preservation of wild birds first developed in this country, our efforts were almost entirely directed to stopping their killing, and to keep all disturbing agencies away from their haunts. Of late years however this work has advanced along quite different lines and it has been shown that it is possible not only to make the birds' haunts more suitable for their needs but also to attract birds to places where they were almost or quite unknown before. In the fore front of this movement Mr. Ernest Harold Baynes has been the most conspicuous figure, and in the volume before us he tells of his methods and results, placing before a larger audience the facts that are familiar to the many who have heard his lectures or have been associated with him in 'bird club' work.

¹ *Wild Bird Guests. How to Entertain Them. With Chapters on the Destruction of Birds, their Economic and Æsthetic Values, Suggestions for Dealing with their Enemies, and on the Organization and Management of Bird Clubs.* By Ernest Harold Baynes. With 50 photogravure illustrations from photographs. New York. E. P. Dutton & Company, 1915. Svo. pp. i-xviii + 1-326. \$2 net.

Mr. Baynes' book is more than this however. It passes in review the whole subject of bird destruction — by man, by natural enemies and by disease,— presenting the subject in an entertaining way, not as a list of dry statistics, and quoting his facts from a wide range of reliable authorities. He admirably differentiates the "true" and "so-called" sportsman. The former "is fond of the woods and fields and streams and lakes and who when game and fish are plentiful likes to get a little for himself or a friend, but who, when game shows signs of decreasing, does his best in every way to protect it and insure its increase." The latter "shoots all the birds the law permits him to, even when he knows the law is unfair to the birds. If there is no law to stop him he kills all the birds he can, and resorts to the use of automatic and pump guns, because it is not 'sport' but birds that he is trying to get."

Economic, æsthetic and moral reasons for protecting the birds are next reviewed, and finally in the last six chapters the author launches forth in his own particular field, that of attracting the birds, upon which topic he is easily our leading authority. The chapter headings give a good idea of the method of treatment; 'Entertainment in Winter,' 'Hospitality the Year Round,' 'Bird Lovers as Landlords,' 'Bird Baths,' 'Problems Confronting Beginners,' and 'Bird Clubs.' Under these headings we learn of the best foods for wild birds in winter time and methods of distributing them during time of heavy snow. Feeding boxes and winter shelters are also exhaustively considered. Then come lists of trees, shrubs and vines attractive to birds, and plans for nesting boxes, drinking basins and baths of all kinds. Mr. Baynes advocates shooting of English Sparrows and Red Squirrels but adds: "it is not for children. It is hard work — unpleasant work — and should be done by real men who know the bird from all others." He says further, "I know one man, who with a twenty-two calibre rifle, has for years kept his home farm of a hundred acres, clear of red squirrels, house cats and European Sparrows." The task of ridding a given place of bird enemies becomes increasingly easy. In one case "200 squirrels were shot the first year, perhaps 50 the second and now the shooting of half a dozen a year is all that is necessary." The cat problem Mr. Baynes recognizes as a most serious one. He says "no sensible person would advocate the extermination of cats, but I do believe that a serious effort should be made to get rid of unnecessary ones"...and people should "take care of such cats as they consider worth keeping....It is unneighborly to kill one's neighbor's cat, but just as unneighborly to permit a cat to kill one's neighbor's birds."

Mr. Baynes' wonderful success with bird clubs at Meridan, N. H., and elsewhere in New England is well known and here he offers helpful suggestions for others who would follow his method.

Mr. Baynes gives the scientific ornithologist full credit for his large share in the work of bird preservation, an acknowledgment too often ignored in these days of "conservationists." He argues that the scientific collector should be allowed to go about his work unhampered by petty

restrictions and says that the complaint against the scientific man "is usually the cry of some conservationist who wishes he were scientific but is not." He adds "one of the strongest arguments in favor of preserving birds, is that they have great economic value; the facts which support this argument have been ascertained, not by the men who shout them from the housetops but by quiet, modest ornithologists who sit in their laboratories and whose names are seldom seen in the newspapers. Other men 'on the firing line,' do wonderfully effective work but sometimes they do not seem to realize that this work is made possible, not so much by the noise of their own big guns, as by the ammunition supplied to them by the scientific men who work without making any noise at all."

All in all this book of Mr. Baynes' is just what hundreds of people are looking for, in every part of the country, to help them in establishing closer relations with their wild bird neighbors. The illustrations are very attractive and the text well gotten up.—W. S.

Job on Wild Fowl Propagation.¹—Like Mr. Baynes, Mr. Job has developed a branch of wild bird preservation which is peculiarly his own—that of the propagation of wild species. The need of Quail and Ruffed Grouse for stocking purposes has long been recognized and for some years past their artificial propagation has been successfully carried on in various places. In the case of wild ducks however the possibilities are only just beginning to be appreciated and undoubtedly their is a great future for the development of this work. In the two bulletins before us Mr. Job describes his experience and that of others, presenting in detail such information on the various phases of the problem as prospective breeders will require. Speaking of the breeding of ducks he says "It is coming to be a source not only of pleasure but of great practical good, to breed wild water-fowl by such methods as I have described. Every state should propagate and liberate wild ducks of such species as it is found are likely to breed in its domain, since it is proved that young wild ducks are strongly inclined to breed near where they were reared." The Wood Duck which a decade ago was called a "vanishing game-bird" is now being reared by thousands and the species is being reestablished and made abundant. Many owners of large estates, we are told, are already interesting themselves in propagating wild ducks on native swamp lands, and in this way it seems quite possible to offset the reduction in the numbers of many species, caused by the draining and cultivation of their former nesting grounds in the Dakotas, Manitoba, Saskatchewan, etc. Mr. Job's timely 'bulletins' will meet the needs of a constantly increasing number of wild-fowl breeders.—W. S.

¹ Propagation of Upland Game-Birds. By Herbert K. Job. Bulletin No. 2. Nat. Asso. Audubon Soc., 1974 Broadway, N. Y. City, April, 1915. Price 25 cents. (pp. 33-72).

Propagation of Wild Water-Fowl. By Herbert K. Job. Bulletin No. 3. Nat. Asso. Audubon Soc., 1974 Broadway, N. Y. City, May, 1915. Price 25 cents. (pp. 73-104).

Laing's 'Out with the Birds.'¹—Mr. Laing seems not only to know his birds but to know how to tell us about them, and as we turn the pages of his book we share with him the enthusiasm of the nature lover and the excitement of the bird photographer. The unique feature of 'Out with the Birds' is that it treats of a region not generally touched upon by nature writers—Manitoba, and naturally the birds that occupy the attention of the bird student are not those which usually figure in our outdoor bird books. When spring awakens, it is not to the accompaniment of Bluebird warble, but the honking of Geese on the prairie and the "tinkling, fairy melody" of the Lapland Longspur chorus on the eve of departure for farther north. The morning awakening begins with the booming of the Sharp-tailed Grouse, the lisping song of the Prairie Horned Lark, high in the air, and the clamor of the ducks in the marshes.

The mating antics of the Grouse are fully described and we learn of the habits of various ducks, happily free from the usual accompaniment of shotgun and hunters' anecdotes. We learn too of the life of the White-rumped Shrike, Franklin's Gull, Black Tern and Snow Goose. Mr. Laing's syllabic representations of the songs of certain familiar species are original and quite as effective as the more familiar ones. For example the Towhee's song as he hears it is "Sweet, bird sin-n-n-ng" and the White-throated Sparrow far away from the New England home of "Old Sam Peabody" says "Oh, dear Canada! Canada! Canada!"

The illustrations, while they do not average up to the best that our bird photographers of today produce are attractive and add much to the interest of the book. One serious defect is the lack of an index which makes it difficult for the bird student to pick out from the text the information on any given species.—W. S.

Cooke on Bird Migration.²—This little pamphlet is, so far as its object and scope are concerned, a new edition of a similar one published some twelve years³ ago, but it is much fuller and replete with additional information. It covers the subject quite fully under the headings Causes of Migration, Relation of Migration to Weather, Day and Night Migrants, Distance of Migration, Routes of Migration, Direct and Circuitous Migration Routes, Eccentric Migration Routes, Wide and Narrow Migration Routes, Slow and Rapid Migration, How Birds find their Way, Migration and Molting Casualties during Migration, Are Birds exhausted by Long Flight? Evolution of Migration Routes, Normal and Abnormal Migration, Relative

¹ Out With the Birds. By Hamilton M. Laing. Illustrated with Photographs. New York. Outing Publishing Company, MCMXIII. Svo. pp. 1-249. \$1.50, postage 12 cts. extra.

² Bird Migration. By Wells W. Cooke. U. S. Dept. of Agriculture. Bulletin No. 185. April 17, 1915. pp. 1-47.

³ Some New Facts about the Migration of Birds. Yearbook U. S. Dept. Agr. for 1903.

Position during Migration, Relation between Migration and Temperature, Variations in Speed of Migration, The Unknown. The pamphlet is clearly written and places the subject before the public in such a way as to make fascinating reading while it will undoubtedly interest a large number of people in the study and recording of bird migration and so ultimately serve to increase the data bearing on the subject. To the scientific man this up to date treatment of one of the most interesting phenomena of bird life will also prove of great interest, but he will look in vain for any reference to other papers on the subject by the author or anyone else, where he can follow up the matter and compare the various opinions and theories that have been advanced. Such references may not be required in Farmer's Bulletins or similar publications of the Department of Agriculture, but in one of this sort, which appeals to scientists as well as laymen, it seems that the universal custom in scientific publications should have been adhered to and the value of the pamphlet thereby measurably increased.

While not for a moment questioning the accuracy of Prof. Cooke's results in his studies of bird migration it seems pertinent in this connection to call attention to an unfortunate tendency in most publications on this subject in America, *i. e.* that of publishing ultimate results or theories without presenting the detailed data upon which they are based. It may be claimed that European publications on the subject represent a maximum of detailed data and a minimum of conclusions, and this may be true, but even so it is decidedly more in accord with the methods employed in other lines of scientific work.

In describing a new species or working out the geographic range of a group of subspecies, pages are often devoted to the citation of detailed data, where the results of the study is summed up in a few words. The same method could be employed with advantage in works on bird migration, but too often we do not even know upon whose observations results are based, or how many records or observers contributed to them. Furthermore migration tables or comparisons are not definite facts but are averages and computations often involving the rejection of some of the material, and the personal equation enters into this work to such an extent that it seems absolutely essential that the most important details involved in obtaining results should be presented. For instance, to take an example from Prof. Cooke's paper, the isochronal migration line of April 20 for the Black and White Warbler passes through Philadelphia, yet in 'Cassinia,' 1912, p. 9, Prof. Cooke gives April 17 as the average time of first arrival for Philadelphia while in 'Bird Lore,' 1905, p. 203, April 27 is given (Germantown = Philadelphia). So also in 'Bird Lore,' 1905, p. 205, we find May 14 given as the average date of arrival of the Black-poll Warbler for Englewood, N. J., but the isochronal line for May 15 runs far north of this locality. Evidently these lines are not based upon all the data at hand, some have been accepted and others rejected, on good grounds no doubt, but the student who would judge of

this matter is blocked at once by the absence of data or explanation. When we realize that nearly all computations as to the speed and direction of migration depend upon the accuracy of these isochronal lines it is obvious that other students of bird migration will naturally demand the same presentation of detailed data that is customary in other fields of scientific research.—W. S.

Faxon on 'Relics of Peale's Museum.'¹—Dr. Faxon has done a commendable piece of work in publishing an annotated catalogue of the types of Wilson, Bonaparte and Ord formerly in the Philadelphia (= Peale's) Museum and now in the Museum of Comparative Zoölogy at Cambridge. The history of the collection which precedes the catalogue is very interesting reading, and when we consider the vicissitudes through which it passed we are inclined to marvel that any of the specimens were fortunate enough to survive!

We entirely agree with Dr. Faxon that the known history of the specimens and the careful comparisons that he has made with figures and descriptions clearly establish them as the types, even though the original labels were lost.

Fifty-three of these ancient types are now safely preserved and catalogued in the Museum of Comparative Zoölogy and together with the type of the Cape May Warbler in Vassar College, and those of the Mississippi Kite and Broad-winged Hawk in the Philadelphia Academy, they probably comprise all that are extant of the originals upon which the descriptions of Wilson, Ord and Bonaparte in the 'American Ornithology' and its continuation were based.—W. S.

Mathews' 'Birds of Australia.'²—Mr. Mathews' great work continues to appear regularly and maintains its high standard of excellence. The publishers announce that with the completion of Vol. IV, the subscription list will be absolutely closed. No more than 260 copies will be issued and "should not all of these be taken up the surplus will be destroyed."

The two parts now before us complete the Anseriformes and Pelecaniformes. The discussion of nomenclature is very full and the classification and generic subdivisions of the latter group are gone into in great detail. Many pages are devoted to replies to criticisms as to the treatment of certain groups and recognition of certain subspecies and genera, while the 'British Museum Catalogue,' 'B. O. U. List' and 'A. O. U. Check-List' as well as several individual authors come in for some sharp criticism. In all cases of nomenclatural discussion however, Mr. Mathews seems very fair, abiding rigidly by the International Code, without any quibbling over individual cases.

¹ Relics of Peale's Museum. By Walter Faxon. Bull. Mus. Comp. Zoöl. LIX, No. 3. pp. 119-148. July, 1915.

² The Birds of Australia. Vol. IV, Part 2, February 17, 1915. Part 3, June 23, 1915.

The question of recognition of genera and subspecies is of course a matter of personal opinion, though he brings out some important and original facts in treating of the Gannets and Frigate Bird.

In consideration of the general accuracy of minute details we might call attention to the apparent omission of a synonym under *Mesocorbo ater ater*. We are informed in the last paragraph that the bird figured is the type of *M. a. territorii* but this name occurs nowhere else in the article. So also with *Hypoleucus varius whytei* under *H. v. perthi*.

We note as new forms only the following *Phalacrocorax carbo indicus* (p. 171) India; *Scæophaethon rubricauda rothschildi* (p. 303) Laysan, Niuhau; *S. r. brevirostris* (p. 303) Bonin Isls. Most of the new names required in the treatment of the Pelecaniformes have been previously published in the 'Austral Avian Record'.—W. S.

Recent Monographs by Oberholser.¹—Mr. Oberholser has recently published the results of three careful systematic studies of the American Spotted Owl; the Ruddy Kingfisher; and Long-tailed Goatsucker of the far East.

He finds that the four recognized races of the Spotted Owl resolve themselves into two valid forms. *Strix o. occidentalis* of the Pacific Coast region of which *S. o. caurina* is a synonym and *S. o. lucida* ranging from Colorado and western Texas to northern Mexico, of which *S. o. huachucae* is a synonym. The presence of a dark and light phase of plumage in this species is responsible in part for the description of so many supposed races.

Of the Kingfisher *Entomothera coromanda* nine races are recognized of which five are new. *E. c. mizorhina* (p. 645) N. Andaman Isl.; *E. c. neophora* (p. 646), Tapanuli Bay, Sumatra; *E. c. pagana* (p. 648), N. Pagi Isl., Sumatra; *E. c. ochrothorectis* (p. 652), Masbate Isl., Philippines, and *E. c. bangsi* (p. 654) Ishigaki Isl., Riu Kiu Isls.

The goatsucker, *Caprimulgus macrurus*, is also divisible into nine races, *C. m. mesophanis* (p. 590), Ambrina Isl. and *C. m. anamesus* (p. 593), Singapore Isl., being new. These papers straighten out three difficult groups of birds very satisfactorily.—W. S.

Nature and Science on the Pacific Coast.²—This little volume is

¹ Critical Notes on the Subspecies of the Spotted Owl, *Strix occidentalis* (Xantus). By Harry C. Oberholser. Proc. U. S. Nat. Mus. 49, pp. 251-257. July 26, 1915.

A Review of the Subspecies of the Ruddy Kingfisher, *Entomothera coromanda* (Linnæus). By Harry C. Oberholser. Proc. U. S. Nat. Mus. 48, pp. 639-657. May 18, 1915.

A Synopsis of the Races of the Long-tailed Goatsucker, *Caprimulgus macrurus* Horsfield. Proc. U. S. Nat. Mus., 48, pp. 587-599. May 3, 1915.

² Nature and Science on the Pacific Coast. A Guide-book for Scientific Travelers in the West. Edited under the Auspices of the Pacific Coast Committee of the American Association for the Advancement of Science. Illustrated with Nineteen text figures, twenty-nine half-tone plates and fourteen maps. Paul Elder and Company, Publishers. San Francisco. 12 mo., pp. 1-294.

admirably adapted to its purpose — that of furnishing in concise form such information as the numerous visitors to the coast during the Panama Pacific Exposition, who are interested in nature, will be likely to desire. The work will however have a permanent value to the numerous tourists who are constantly visiting California, and as a general work of reference.

The several chapters are written by specialists on the subjects of which they treat and are accompanied by illustrations and by a brief bibliography from which books treating the matter in further detail may be selected.

Dr. Joseph Grinnell not only edits the volume for the Committee but also treats of 'The Vertebrate Fauna of the Pacific Coast' exclusive of the fishes, and in a few pages gives one a good idea of the diversity of forms represented, and their distribution in the several life zones and faunal areas. There are thirty other chapters on various topics, zoölogical, botanical, geological, mineralogical, etc. Dr. Grinnell's contribution has also been issued as a separate.— W. S.

Murphy on 'The Penguins of South Georgia.'¹— Several papers dealing with the results of Mr. Murphy's expedition to South Georgia have appeared in 'The Auk' and elsewhere and a number of scientific societies have been made familiar with the avifauna of the island through his lectures and admirable lantern slides. In the present paper the photographs from which many of the lantern slides were made appear as half-tone plates, while the text places on permanent record his observations on the life history of the penguins which constitute the main population of South Georgia.

The two species which are still plentiful are the "Johnny" Penguin (*Pygoscelis papua*) and the King Penguin (*Aptenodytes patagonica*), and only one other was observed by Mr. Murphy, the Ringed Penguin (*Pygoscelis antarctica*) and of it only three individuals. Later information however showed also the presence of the Macaroni Penguin (*Eudyptes chrysolophus*).

Mr. Murphy presents a very interesting account of the habits, molt, coloration, etc., of the two species which he was able to study and compares his experience with that of others.

The "Johnny" Penguin he states "has not in any degree the fearless and courageous disposition of its Antarctic congener *Pygoscelis adeliae*," and he shows further that it lacks the jumping and diving ability of that species. This he attributes to the fact that it has "a Subantarctic range and breeds on no land which has an ice-shelved coast." So that the need for such phenomenal jumping power disappears.

Mr. Murphy emphasizes the current misstatements regarding penguins. Taking for example such a work as the 'Cambridge Natural History'

¹ The Penguins of South Georgia. By Robert Cushman Murphy. Science Bull. Mus. Brooklyn Inst. Arts. and Sci., Vol. 2, No. 5, pp. 103-133. August 2, 1915.

we find it stated that (1) the flippers have highly compressed bones with no power of flexure; (2) the tongue is rudimentary; (3) they lay two coarse flavored eggs (4) the young are hatched blind; (5) the parent feeds the young by inserting its bill into that of the nestling. All of these statements Mr. Murphy found to be erroneous: the tongue is in most if not all species well developed; the eggs are from one to three in different species; the eyes of the young are open at hatching and the young inserts its bill into that of the parent when feeding not *vice versa*.

Mr. Murphy has made an important contribution to our knowledge of the Spheniscidæ which may take its place along with Levick's 'Antarctic Penguins' and other recent publications on the subject. His photographs are excellent but the printing of some of the half tones has been very poorly done.— W. S.

Chapman on New Birds from Central and South America.¹—

Dr. Chapman in continuing his studies of the extensive Colombian collections obtained by himself and his collectors, finds additional new forms both in Colombia and in neighboring countries, which he proceeds to name in the present paper. *Odontophorus guianensis panamensis* (p. 363) is described from Panama and the relationship of the other subspecies discussed. The races of *Leptotila rufaxilla* are considered, of which two are described as new, *L. r. hellmayri* (p. 368), Trinidad; and *L. r. pallidipectus* (p. 369) Buena Vista, Colombia. A partial revision of the South American Sparrow Hawks results in the recognition of seven races of which *Cerchneis sparverius cauca* (p. 375) Cauca Valley, Colombia, and *C. s. fernandensis* (p. 379) Island of Juan Fernandez, off Chile; are new.

The following additional new forms are proposed: *Asio flammeus bogotensis* (p. 370), Bogota; *Rhynchortyx cinctus australis* (p. 365), Barba-coas, Col.; *Columba subrinacea peninsularis* (p. 366), Cristobal Colon, Ven.; *Chamepelia rufipennis cauca* (p. 367), Cauca Valley; *Pyrhura melanura pacifica* (p. 382), Buenavista Nariño, Col.; *Psittacula conspicillata cauca* (p. 383), Cauca Valley, *Curucujus massena australis* (p. 384), Barba-coas, Col.; *Andigena nigrirostris occidentalis* (p. 385), San Antonio above Cali, Col.; *Chloronerpes rubiginosus buenavista* (p. 386), Buena Vista, Col.; *Atlapetes gutturalis brunnescens* (p. 387), Boquete, Chiriqui.— W. S.

Cory on New South American Birds.²— Mr. Cory's continued study of the South American collections received at the Field Museum results in the description of the following new forms: *Threnetes leucurus rufigastra*

¹ Descriptions of Proposed New Birds from Central and South America. By Frank M. Chapman. Bull. Amer. Mus. Nat. Hist., XXXIV, pp. 363-388. May 27, 1915.

² Notes on South American Birds, with Descriptions of New Subspecies. By Charles B. Cory. Field Museum of Natural History Publication 183. Ornithological Series, I, No. 9, pp. 303-335. August 7, 1915.

(p. 303), Moyobamba, Peru; *Leucippus fallax richmondi* (p. 303), Margarita Isl.; *Piaya cayana ceare* (p. 304) Ceara, Brazil; *P. melanogaster ochracea* (p. 304) Yurimaguas, Peru; *Chrysoptilus punctigula zulix* (p. 305), Zulia, W. Peru; *Veniliornis tenuinotus ceare* (p. 306), Ceara, Brazil; *Scapanus melanoleucus ceare* (p. 306), Ceara, Brazil; and *S. pallens peruviana* (p. 307), Molinopampa, Peru. Following these is a 'Key to the South American Species and Subspecies Belonging to the Genus Piaya.' This does not seem to be a very happy treatment of the subject, in-as-much-as the statements of several authors are ignored without explanation and several subspecies are omitted without any mention whatever. Thus *P. c. cabanisi* Allen is ignored although Hellmayr states that it is a valid race (Nov. Zool. XVII, No. 3, p. 401) while we find no reference to *P. c. boliviana* Stone. We moreover look in vain for remarks "antea" referred to at bottom of p. 310. Mr. Cory's paper concludes with a 'Revision of the Sparrow Hawks of South America and Adjacent Islands,' which includes diagnoses of three new forms, *Cerchueis sparveria andina* (p. 323), Quito, Ecuador; *C. s. intermedia* (p. 325), Villavicencio, Colombia; and *C. s. perplexa* (p. 327), Lower Essequibo River, British Guiana, making fourteen in all which are recognized by the author.—W. S.

Burns on Periods of Incubation.¹—Mr. Burns has done a good work in compiling a list setting forth the time of incubation for some 225 species and races of North American birds. Comparatively few careful studies of this subject have been made, most oölogists being more anxious to secure the egg shells intact than to ascertain how many days will elapse before the young break out of them. The figures given are therefore often estimates or guesses rather than the result of actual observation, and something authoritative has been a great desideratum. The only weak point in Mr. Burns' paper is that he does not quote his authority for the individual figures, and the list of authors and correspondents from whose statements the list is compiled, must necessarily represent a considerable range of accuracy. Even if the figures for which he could personally vouch were so marked it would have added a large measure of strength to his paper, as his care and accuracy are well known. The use of the query as denoting "possible inaccuracy" is not clear, as we note in the case of the Sparrow Hawk the period of incubation is given as "29-30(?) days" whereas in 'The Auk' for July, 1913, Miss Althea R. Sherman, in a most careful study of this species, ascertained the period from deposition to hatching in four eggs of this species to be from earliest to latest 35, 31, 30 and 29 days respectively. At all events Mr. Burns's list is an excellent foundation upon which to build. Let there be more energy devoted to this phase of the subject and less to the amassing of egg shells, and let observers check up their results with Mr. Burns' list.—W. S.

¹ Comparative Periods of Deposition and Incubation of Some North American Birds. By Frank L. Burns. Wilson Bulletin, No. 90. March, 1915. pp. 275-286.

Henshaw on American Game Birds.¹ — This paper follows exactly the plan of two earlier publications on 'Common Birds of Town and Country' which appeared previously in the 'National Geographic Magazine,' the one having been originally issued as a bulletin of the U. S. Department of Agriculture. There are 72 colored illustrations from original paintings by Louis Agassiz Fuertes. Of these 16 represent gallinaceous birds, 28 geese and ducks, 17 waders, 3 pigeons and doves and 8 cranes and rails, but as several species often appear together the total number treated is nearly 100. The text presents the range of each species and a brief account of its habits. Only those familiar with the cost of producing the high grade of colored illustrations here presented will appreciate the expense to which the 'National Geographic Magazine' has gone in producing this series of portraits of North American birds; while the educational value of the undertaking, in bringing this mass of ornithological information to thousands of homes that would not otherwise obtain it, is impossible to estimate.— W. S.

Taverner on The Double-crested Cormorant and Its Relation to the Salmon Industry.² — In this pamphlet Mr. Taverner presents the results of an investigation of the food of the Cormorants at Percé Village and Gaspé basin, Quebec, undertaken during the summer of 1914. Incidentally much interesting information on the nesting of the birds is presented, while the food habits are treated at considerable length. It was found that, during the period of observation at least, the Cormorants feed on other species of fish and do not molest the Salmon, while evidence collected inclined the writer to regard them as entirely blameless of this charge. They do however inconvenience the fisherman, when herring are scarce, by stealing the few which they catch for bait. The fishing clubs of the vicinity we learn offer bounties of 25 cents per head for Cormorants, Shelldrakes, Kingfishers and Divers and \$2. for a Kingfisher's nest with the female bird! Mr. Taverner's paper is an interesting and valuable contribution.— W. S.

Shufeldt on the Osteology of the Limpkin and Stone Plover.³ — In two detailed and fully illustrated papers Dr. Shufeldt describes the skeletons of these two birds and compares them with those of related groups. The Limpkin he regards as affiliated more closely with the Rails

¹ American Game Birds. By Henry W. Henshaw. National Geographic Magazine XXVIII. No. 2. August, 1915. pp. 105-158.

² The Double-crested Cormorant (*Phalacrocorax auritus*) and its Relation to the Salmon Industries on the Gulf of St. Lawrence. By P. A. Taverner. Canada Dept. of Mines. Museum Bulletin, No. 13. April 30, 1915. pp. 1-24

³ On the Comparative Osteology of the Limpkin (*Aramus vociferus*) and its Place in the System. By R. W. Shufeldt. Anatomical Record, Vol. 9, No. 8. August, 1915. pp. 591-606.

On the Comparative Osteology of *Orthorhamphus magnirostris* (the Long-billed Stone Plover). By Dr. R. W. Shufeldt. Emu, XV, Part 1, July 1, 1915. pp. 1-25.

than with the Cranes, although it represents a family distinct from the Rallidae. This conclusion illustrates how difficult it is to arrive at any generally acceptable classification of birds, so great do the opinions of individuals differ. Dr. P. Chalmers Mitchell in a recent investigation of this same problem on the basis of osteology comes to a diametrically opposite opinion! (Abst. Proc. Zool. Soc. London, May 25, 1915). The Stone Plover Dr. Shufeldt finds to be probably not closely allied to the Bustards as has sometimes been claimed. On the other hand it shows clearly the relationship between the *Limicola* and the *Longipennis*, and "so far as osteology goes, beautifully bridges across one of the gaps, for we find both pluvialine and larine characters intimately blended all through the skeleton." Dr. Mitchell's views upon this point would be interesting for comparison.—W. S.

Recent Publications of the Biological Survey.—Prof. Cooke¹ in a report on the shorebirds points out their value as game and the importance of preserving them from extinction. The Wilson's Snipe, Woodcock, Upland Plover and Eskimo Curlew are the species especially considered and their former abundance and rapid decrease in numbers are reviewed and the causes pointed out. As an illustration of the unchecked slaughter of these birds in the southern States the record of a gunner in Louisiana is cited, who in 20 years from 1867 to 1887 killed 69,087 Wilson's Snipe!

Mr. Alex. Wetmore² has been making a field study of the mortality of ducks, shorebirds, herons, etc., in the neighborhood of Great Salt Lake where large numbers of these birds have died under apparently similar conditions to those which attended like mortality at Tulare and Owens Lakes, California.

The cause of the trouble has not been positively determined but seems in all probability to be alkaline poisoning from the water. The increase in irrigation it is suggested has taken up vast quantities of alkali from the soil and in dry seasons the water naturally becomes heavily charged with it. Investigations by experts fail to show that bacteria, nematodes or poison from smelting works have had serious effect upon the birds.

Another valuable paper recently issued is a new edition of Mr. McAtee's 'Important Wild-Duck Foods,'³ which is in great demand among breeders of wild fowl.—W. S.

Da Costa on the Economic Value of the Birds of São Paulo, Brazil.⁴

¹ Our Shorebirds and their Future. By Wells W. Cooke. Yearbook U. S. Department of Agriculture for 1914, pp. 275-294.

² Mortality Among Waterfowl around Great Salt Lake, Utah. (Preliminary Report.) By Alex. Wetmore. Bull. 217 U. S. Department of Agriculture. May 26, 1915.

³ Eleven Important Wild-Duck Foods. By W. L. McAtee. Bull. 205 U. S. Department of Agriculture. May 20, 1915.

⁴ Os Pequenos Amigos da Agricultura. Por. J. Wilson Da Costa. Published with the aid of the Secretary of Agriculture of São Paulo, 1914, pp. 1-118, illustrated.

As a pioneer publication on economic ornithology for Brazil, this brochure is worthy of attention by those interested in the value of birds in their relation to agriculture. Chapters are devoted to the dangers attendant on extensive deforestation, the function of certain useful birds and animals, the breeding of wild forms in captivity, birds that are useful, animals friendly to agriculture, the usefulness of hummingbirds and bees, predacious insects, and the economic services of domesticated birds.

Grave dangers are foreseen in the extensive destruction of forests in many areas, not only to the native fauna but to climatic conditions in general. After a few notes on the value of certain mammals the author takes up the question of the birds useful to agriculture, sketching briefly the services of the various orders and families and giving an account of a few common species in each group. Attracting birds about fields and houses is recommended by the placing of pans of water and boxes containing grain and seeds.

The Black Vulture is said to do harm in carrying germs of various epizootics, on the authority of Dr. H. von Ihering. The other two vultures found (*Cathartes aura* and *C. urubitinga*) are apparently not included in this statement. They have been seen destroying snakes. More than sixty species of woodpeckers are found in Brazil. The author remarks that they constitute a "comissão sanitaria phitopathologica" for the forest trees. Attention is drawn to the destruction of injurious ants by *Colaptes campestris*. The Anis are said to destroy many cattle ticks (a belief not yet substantiated in stomach examinations in the Biological Survey). They feed on other insects and lizards as well. The Guira Cuckoo (known locally as *Almo de gato*) also lives on insects. The illustrations are in the main from photographs of mounted birds. The drawing (p. 35) labelled Ani is apparently some species of *Molothrus*.

In an appendix (pp. 106-118) is a short account of the wild pigeons of Brazil. It includes a discussion of their habits, nidification, food and range.

Though we may hesitate in endorsing fully some of the statements made in regard to the food of certain species, the author is to be commended for his efforts in behalf of the birds native to his country. Our knowledge of economic conditions in regard to Tropical American species is slight and it is hoped that the present contribution is the forerunner of more detailed investigations — A. W.

Third Report on Food of Birds in Scotland.—The report upon investigations of the food of birds in Scotland in 1913-1914, by Miss Laura Florence, has been published.¹ It catalogs the stomach contents of 891 birds, the total number now examined being 2897. As usual the report is made up of detailed analyses of individual stomachs, with brief summaries for each species. No general conclusions are drawn. Miss Florence is now at Stanford University preparing herself for a career in Economic

¹ Trans. Highland and Agr. Soc. Scotland. Fifth series, Vol. 27, 1915, pp. 1-53.

Entomology. It will be an occasion for congratulation to have an experienced bird student added to the ranks of entomologists.— W. L. M.

Economic Ornithology in Recent Entomological Publications.— Katydidids are said to have caused the loss of as much as a fourth of the crop in certain orange groves of California in 1914. The entomologists who describe the depredations — Messrs. J. R. Horton and C. E. Pemberton — state that “birds undoubtedly play an important part in reducing the number of adults each year.”¹ “In 1911,” they also say “a small chipping sparrow was noted in some abundance among trees of various Katydid-infested orchards, and was apparently very busily capturing Katydidids. Birds are undoubtedly the most important enemies of the Katydid in this section” (p. 11).

On the other side of the ledger must be set down the activities of bird enemies of *Calosoma sycophanta* a predacious beetle, introduced into New England on account of its value as a destroyer of the gipsy-moth. Messrs. A. F. Burgess and C. W. Collins in their report on this beetle say: “It is undoubtedly true that this species is eaten to some extent by birds, and the hairy woodpecker has been charged with destroying it on several occasions. The crow has been observed to feed on the beetles and also to carry them to their nests which were occupied by young birds.”²

The authors, however, report a satisfactory increase and spread of the beetle.

The widespread outbreak of the army-worm, in 1914, called forth the publication of a number of bulletins, most of which acknowledge the value of birds as enemies of this pest. We quote from two of these reports. Dr. W. E. Britton, State Entomologist of Connecticut, states that “Of the birds occurring in Connecticut, the most important destroyers of the army-worm are the blackbirds, starlings, robins, thrushes, bobolinks, catbirds, and barn swallows. Even the much despised English sparrow has been observed to feed upon them.”³

With relation to an invasion of army-worms in Canada, Mr. Arthur Gibson says:⁴ “The wild birds are an important aid in outbreaks of noctuid caterpillars, and in 1914 large numbers of army-worms were devoured by them. Blackbirds were frequently noticed feeding upon the caterpillars in Ontario, and also in New Brunswick, as were also crows. During a local outbreak of the army-worm near Treesbank, Man., in 1913, Mr. Norman Criddle, Field Officer of the Branch, observed, in August, thousands of crows feeding upon the larvae. They were also seen to dig out and eat the pupae. A large flock of probably three thousand birds visited the infested locality every day from the time Mr. Criddle first noticed the worms until at least two weeks after the larvae had pupated. In western

¹ Bull. 256, U. S. Dept. Agr., July 27, 1915, p. 13.

² Bull. 251, U. S. Dept. Agr., July 27, 1915, p. 18.

³ Ann. Rep. Conn. Agr. Exp. Sta. for 1914, Part III, p. 166, 1915.

⁴ Bull. 9, Ent. Branch, Dept. Agr., Dominion of Canada, 1915, pp. 16-17.

Ontario, the English sparrow was reported to have fed freely upon the worms during the past season, and in Nova Scotia the writer saw the Vesper Sparrow devouring the caterpillars. Other wild birds which previously have been seen to feed upon the army-worm are the Bobolink, Robin, Meadow-lark, Bluebird, Kingbird, Blue-jay, Flicker, Cat-bird, Phoebe, Cowbird, Baltimore Oriole, Chipping sparrow, Chickadee, and Quail. The Sharp-tailed Grouse, common in Manitoba, feeds on smooth caterpillars, and doubtless would devour the army-worm. The same statement undoubtedly holds good for other birds than the above mentioned, which find their food in the open. The value of protecting our native insectivorous birds will thus be readily seen, and farmers, gardeners, etc., should do all they possibly can to protect them from being shot and their nests from being robbed." — W. L. M.

The Ornithological Journals.¹

Bird-Lore. XVII, No. 3. May-June, 1915.

Bird Photography for Women. By Miss E. L. Turner.—With numerous photographs of British birds.

Bird-Life in Southern Illinois. IV. Changes Which Have Taken Place in Half a Century. By Robert Ridgway.—An admirable discussion of decrease in birds in general and of this region in particular.

Migration of North American Birds. By W. W. Cooke.—Brown Creeper and Gnatcatchers. Plumage notes by F. M. Chapman, colored plate by Fuertes.

Bird-Friends in Arizona. By W. L. and Irene Finley.—Contains a splendid series of photographs of desert birds followed by a similar article in the July-August issue.

Bird-Lore. XVII, No. 4. July-August, 1915.

The Making of Birdcraft Sanctuary. By Mabel Osgood Wright.

Louis Agassiz Fuertes.—Painter of Bird Portraits. By F. M. Chapman (from the American Museum Journal).

Our Tree Swallows. By M. Louise Brown.

How the Sapsucker rears its Young. By C. W. Loveland.

The Kingbird — Educational Leaflet by T. G. Pearson, with colored plate by Horsfall.

The Condor. XVII, No. 3. May-June, 1915.

A Summer at Flathead Lake, Montana. By Aretas A. Saunders.

An Apparent Hybrid between Species of the Genera *Spatula* and *Querquedula*. By H. S. Swarth.—A male shot at Del Rey, Cal., Dec. 13, 1914.

An Annotated List of the Birds of Kootenai County, Idaho. By H. J. Rust.—149 species listed.

¹ The name of the editor and publisher of each journal will be found in the January number of 'The Auk.'

The Condor. XVII, No. 4. July–August, 1915.

Nesting of the Bohemian Waxwing in Northern British Columbia. By Ernest M. Anderson.

Notes on Some Birds of Spring Canyon, Colorado. By W. L. Burnett.

Woodpeckers of the Arizona Lowlands. By M. French Gilman.—A particularly interesting and well illustrated paper.

Further Notes from the San Bernardino Mountains. By A. van Rossem and W. M. Pierce.—Notes on 34 species.

The Wilson Bulletin. XXVII, No. 2. June, 1915.

Notes on the Red-winged Blackbird. By Ira N. Gabrielson.

Notes from the Laurentian Hills [Quebec]. By L. McI. Terrill.—Nesting of Yellow-bellied Flycatcher, Golden-crowned Kinglet and Blackburnian Warbler.

Corrections and Additions to the Preliminary List of the Birds of Essex County, N. J. By L. S. Kohler.

A List of the Birds of Clay County, South Dakota. By S. S. Visser.

The Oölogist. XXXII, No. 5. May 15, 1915.

The Nesting of the Western Goshawk. By E. R. Forrest.

The Oölogist. XXXII, No. 6. June 15, 1915.

Farralone Rail. By E. E. Sechrist.—Nesting near San Diego, Cal.

The Elusive Kentucky Warbler. By A. J. Kirn.—Nesting in Oklahoma.

The Oölogist. XXXII, No. 7. July 15, 1915.

The Northern Raven [breeding in Pennsylvania]. By S. S. Dickey.

As a supplement to this issue is published "A Bibliography of Scarce or Out of Print North American Amateur and Trade Periodicals Devoted More or Less to Ornithology." By Frank L. Burns. This is a valuable compilation of 147 titles, and is more than a mere bibliography of the journals since the more important articles in many of them are cited.

The list is of course not exhaustive, although probably all the journals of any value are included. It would however have added to its value if the author had stated whether the journals mentioned were only such as he had personally handled and verified, or all of which he was able to secure information. Mention might be made here of a similar catalogue published by Wm. J. Fox, assistant librarian of the Academy of Natural Sciences of Philadelphia, in the Bulletin of Bibliography, April, 1908.

The Oölogist. XXXII, No. 8. August 15, 1915.

Nesting of the Yellow Rail in North Dakota. By F. Maltby.

Nesting of the Greater Yellowlegs in Manitoba. By F. S. Norman.

A Systematic Study of the Diving Process of *Erismatura jamaicensis*. By A. Cookman.

Proceedings of the Nebraska Ornithologists' Union. Vol. VI, Part 3. July 10, 1915.—Contains reports of the sixteenth Annual Meeting and on Bird Migration at Lincoln, Neb., spring, 1913.

The Ibis. X Series. Vol. III, No. 2. April, 1915.

Notes on the Ornithology of the Matopo District, Southern Rhodesia.

By L. Beresford Mouritz.—An annotated list of 237 species, completed in the July number.

Notes on the Ornithology of Cyprus. By F. R. S. Baxendale.—Thirty-eight species considered.

Report on the Birds collected by the late Mr. Boyd Alexander during his last Expedition to Africa. Part III. The Bird of Annobon Island. By D. A. Bannerman.—17 species.

On a Collection of Birds from British East Africa and Uganda, presented to the British Museum by Capt. G. B. Cosens.—Part II. Accipitrimorphes — Cypseli. By C. H. B. Grant. With Field Notes by the Collector W. P. Lowe.—This installment brings the list of species up to 170. Under a number of species all of the subspecies are considered and many questions of synonymy worked out. *Irrisor erythrorhynchus ruwenzoreæ* (p. 286) from Ruwenzori is described as new. In the July number the groups Colii-Pici are considered and the list carried to 212. The same careful study of allied races marks this part also.

The "Mauritius Hen" of Peter Mundy. By W. L. Sclater.—Interesting comments on the references to the Dodo and "Mauritius Hen" (*Aphanapteryx brækii*) an extinct Rail, in the recently published 'Travels' of Peter Mundy

Coloration as a Factor on Family and Generic Differences. By Percy R. Lowe.—This is the full text of Mr. Lowe's address before the British Ornithologists' Club already noticed.

Mixed Bird-parties. By C. F. M. Swynnerton.—An interesting description of such assemblages in various parts of the world, which are explained on the basis of systematic coöperative hunting.

A Note on *Loxia pytyopsittacus* Bork. By C. B. Ticehurst.—Plea for its recognition as a valid form.

The New B. O. U. List of British Birds. By Dr. E. Hartert.—A valuable review by the principal author of the British 'Hand-list' which emphasizes the opinion expressed in these columns that differences in bird names today are dependent mainly on questions of ornithology rather than of nomenclature. Several corrections to the 'List' are also given in the Correspondence columns.

The Ibis. X Series. Vol. III, No. 3. July, 1915.

Notes on Bird-Migration at the Mouth of the Yenesei River, Siberia, as observed in the autumn of 1914. By Maud D. Haviland.—An important paper, among other statements the author says "any acceleration or delay in the annual shrinkage of the Polar ice-cap must react to the extent of 200 or 300 miles perhaps in the restriction or extension of the summer range of a species."

The Birds of Cameroon Mountain. By David A. Bannerman.—This is Part IV of the reports on the late Mr. Boyd Alexander's collections. Sixty-five species are listed. A list of species known to have been obtained about the base of the mountain is added.

Notes on Some Waders. By Ernst Hartert and Annie C. Jackson.—

A critical consideration of several species of *Charadrius*. *C. alexandrinus seebohmi* (p. 529) Aripo, northern Ceylon, is described as new and the type of "*Ægialitis homeyeri*" is shown to be made up of portions of two species.

On Some Petrels from the North-east Pacific Ocean. By G. M. Mathews and Tom Iredale.—As the authors state this is practically a 'remontographing' of certain genera in the course of which *Bannermania* (p. 578) is proposed as a new genus for *Oceanodroma hornbyi*, the type of which still remains unique; also *Cymochorea owstoni* (p. 581), Yokohama Bay, Japan; *Puffinus bannermani* (p. 594), Bonin Isl.; *Neonectris griseus pescadoreis* (p. 602), Pescadores Isl.; *N. g. missus* (p. 603), Kuril Isl.; *Bulweria bulweri pacifica*, (p. 607), Bonin Isl.; *Calonectris* (p. 592) for *Puffinus leucomelas*; *Microzalias*, (p. 597), for *P. nativitatis*.

Studies on the Charadriiformes.—I On the Systematic Position of the Ruff (*Machles pugnax*) and the Semipalmated Sandpiper (*Ereunetes pusillus*), together with a Review of some Osteological characters which differentiate the *Eroliinæ* (Dunlin group) from the *Tringinæ* (Redshank group). By P. R. Lowe.—Both of these birds in osteological characters are unquestionably members of the *Eroliinæ* whereas they have been universally regarded as *Tringine* in their affinities.

Bulletin of the British Ornithologists' Club. No. CCVI. April 28, 1915.

Mr. D. A. Bannerman describes *Dryoscopus angolensis cameroonensis* (p. 105) Cameroon Mountain; Dr. Van Someren proposes *Apalis nigriceps collaris* (p. 107) from Uganda.

Mr. C. F. M. Swynnerton discusses the coloration of eggs and the mouths of nestlings, and suggests that to a certain extent these may be due to protective mimicry. Certain eggs are found to be distasteful to 'egg-enemies' and others similarly colored may be cases of mimicry. The coloration of the mouths of certain nestlings was considered as the possible result of warning coloration. Mr. Stuart Baker opposed these theories.

Bulletin of the British Ornithologists' Club. No. CCVII. May 28, 1915.

Dr. van Someren (p. 116) described the following new birds from Uganda, *Cuculus mabiræ*, *Scoptelus pallidiceps*, *Bleda exima ugandæ*.

Dr. P. R. Lowe described a downy young of *Chionis minor* and stated that the osteology of the bird showed distinct affinity to the Skuas.

Mr. D. A. Bannerman presented a revision of the *Puffinus kuhli* group describing as new *P. k. fortunatus* (p. 120) from the Canary Islands. He recognizes five races, reducing the American *P. borealis* to a race of *kuhli*.

Bulletin of the British Ornithologists' Club. No. CCVIII. July 7, 1915.

Dr. van Someren described the following new birds from Uganda; *Turdus ugandæ* (p. 125), *Turdinus albipectus minutus* (p. 126); *Macropsphenus flavicans ugandæ* (p. 126); *Chlorocichla gracilirostris chagwensis* (p. 127); *Andropadus ugandæ* (p. 126); *Chlorocichla indicator chlorosaturata* (p. 127). The meeting was mainly devoted to a discussion on "The Effect of Environment on the Evolution of Species."

British Birds. VIII, No. 12. May 1, 1915.

The B. O. U. List of British Birds.— An interesting and instructive review by the authors of the 'Hand List.'

British Birds. Vol. IX, No. 1. June 1, 1915.

Additions and Corrections to the 'Hand-List of British Birds.' By the Authors.— This corresponds to an 'A. O. U. Supplement' but is commendably fuller in discussion of details of nomenclature, etc.

Notes on the Breeding Habits of the Gray Phalarope [*Phalaropus fulicarius*]. By Maud D. Haviland.— With photographs taken at the mouth of the Yenesei.

British Birds. IX, No. 2. July 1, 1915.

Notes on the Moults and Sequence of Plumages in Some British Ducks. By Annie C. Jackson.— This is an exceedingly valuable contribution to a mooted problem and it is gratifying to find that after the examination of a large lot of material the author comes to the conclusion that "in the ducks, 'colour change' plays no part and, that the different plumages are simply and naturally acquired by a moult only."

The central tail feathers of the Mallard which Mr. Millais in his 'British Diving Ducks' cites as evidence of color change are found to be molted twice a year instead of once as he supposed, which disposes of any necessity for color change.

Mr. T. Iredale and Dr. Hartert discuss certain questions of nomenclature. Two of these affect the 'A. O. U. Check-List' and demand our consideration, *i. e.*, *Hirundo* vs. *Chelidon*, and *Colymbus* vs. *Podiceps*. We consider that Mr. Iredale and the 'B. O. U. List' are correct in both instances. The type of *Hirundo* is *rustica* and that of *Colymbus* is *arcticus* both fixed by Gray. Dr. Hartert's plea that "Gray's action *in this case* should be rejected, because he was in ignorance" of the work of others, is the same old argument for exceptions to the rule. If we do not "construe" rules "rigidly," why have rules at all?

British Birds. IX, No. 3. August 2, 1915.

Notes on a Long-eared Owl Nesting on the Ground in Norfolk. By J. H. Gurney and Miss E. L. Turner.— With photographs from life.

Aviculture Magazine. VI, No. 7. May, 1915.

Patagonian Plovers and Trumpeter Birds. By Mrs. Gregory.

Spring Bird-notes from Various Scottish Islands. By The Duchess of Bedford (concluded in No. 8).

Jottings on Common Indian Birds. By Aubyn Trevor-Battye (concluded in No. 8).

Avicultural Magazine. VI, No. 8. June, 1915.

The Bird Market of Caracas. By Albert Pain.

Avicultural Magazine. VI, No. 9. July, 1915.

The Mikado Pheasant (with colored plate). By Mrs. Johnstone.

Cuckoo's Habits in the Breeding Season. By H. D. Astley.

Avicultural Magazine. VI, No. 10. August, 1915.

Birds in Flanders. By Dr. B. E. Potter.

- Bird Notes from the Fjords. By R. Staples-Browne.
- The Emu.** XV, Part 1. July, 1915.
- On the Comparative Osteology of *Orthorhamphus magnirostris* (the Long-billed Stone-Plover). By R. W. Shufeldt.
- New Records for South-Western Australia. By W. B. Alexander.
- Rookeries of the White-breasted Cormorant (*Phalacrocorax gouldi*). By A. W. Swindells.
- Lewin's "Birds of New South Wales." By G. M. Mathews.
- Descriptions of Nests and Eggs New to Science. By H. L. White.
- Descriptions of Nests and Eggs of *Monarcha canescens* and *Neochmia gebracton albiventer*. By W. Macgillivray.
- Observations around Anglesea, Victoria. By H. A. Purnell.
- The Emu.** XIV, Part 4. April, 1915.
- An Expedition to the Musgrave and Everard Ranges. By Capt. S. A. White.—A region previously unexplored and found to be exceedingly dry owing to an almost continuous drought of nine years, 94 species listed.
- Notes on the Genus *Pycnoptilus*. By F. E. Howe.—With excellent photographs of the nest and bird.
- Birds of Wangaratta District, Australia. By Miss Gladys M. Cheney.—Annotated list of 204 species.
- Further Notes on the Emu Wren (*Stipiturus malachurus*). By Miss J. A. Fletcher.
- Nine half-tone plates of Australian Cuckoos' eggs with the sets in which they were found, illustrate an article which appeared in the January number and incidentally show what striking differences are often exhibited in the color of the egg of the Cuckoo and the birds upon which it is parasitic.
- The South Australian Ornithologist.** Vol. II, Part 2. April, 1915.
- Birds of the Cairns District, Queensland. No. 2. By G. M. Mathews.
- Birds Observed at Stonyfell, S. A. By R. Crompton.
- Another New Bird for Australia. By S. A. White. — *Acanthiza marianae* (p. 45) N. W. Australia.
- A Sketch of the Life of Samuel White — Ornithologist. By S. A. White (concluded in Part 3).
- The South Australian Ornithologist.** II, Part 3. July, 1915.
- Birds of the Cairns District, Queensland, No. 3. By G. M. Mathews.
- Grebes as Feather-eaters. By F. R. Zeitz.
- The Austral Avian Record** III, No. 1. June 30, 1915.
- On *Columba pallida* Latham. By G. M. Mathews — with a reproduction of the original plate in colors.
- On the Ornithology of the Dictionnaire des Sciences Naturelles (Levrault). By G. M. Mathews and T. Iredale.—The authors do not claim that their list is absolutely complete and we are able to call attention to one oversight. A new genus *Aethia* (Vol. I, Suppl., p. 71) based upon *Alca cristatella*.
- Raperia godmanae*. A New Bird from Lord Howe Island. Now Extinct. By G. M. Mathews. Genus and species new (p. 21).
- Two new subspecies. By G. M. Mathews.

Ixobrychus minutus victoria (p. 24) Geelong, Vic.; *Ethelornis magnirostris whillocki* (p. 24) Port Hedland, Mid-west Australia.

Revue Francaise d'Ornithologie. VII, No. 71. March 7, 1915.

On Hybridization in the genus *Paradisca*. By A. Menegaux — suggested as a possible explanation of certain "intermediate" species.

Birds and the Cholera. By X. Raspail.

Study of a Collection of Birds from India. By A. Engel (continued in April and May).

Revue Francaise d'Ornithologie. VII, No. 73. May 7, 1915.

Song Birds of the Environs of Vendome. By E. Coursimault — continued in June number.

Revue Francaise d'Ornithologie. VII, No. 74. June 7, 1915.

List of Birds Observed in Marocco, 1884-1914. By Hans R. Vaucher — continued in July number.

Observations on the Birds of the Dunes of Newport, Belgium. By Count de Tristan.

Messenger Ornithologique. VI, No. 2. 1915.

Birds of Ussuri-land. By S. A. Buturlin.— Contains the following new form, *Perisoreus infaustus maritimus* (p. 104) Samargi River.

Remarks on the Avifauna of the Province of Kouban. By E. S. Ptouchenko.

Erythropus vespertinus transrhipæus nom. emend. (p. 126). By S. A. Buturlin.— In place of *E. v. obscurus* v. Tschusi (p. 128).

Uragus sibiricus ussuriensis subsp. nov. (p. 128). By S. A. Buturlin. Lake Khanka.

Pinicola enucleator sakhalinensis subsp. nov. (p. 129). By S. A. Buturlin. Chakvo, Saghalien.

Nucifraga caryocatactes altaicus subsp. nov. (p. 131). By S. A. Buturlin. Altaiskaia, Altai.

Strix uralensis yenesseensis subsp. nov. (p. 133). By S. A. Buturlin. From Krassnoyarsk.

A New Wryneck.— *Jynx torquilla harterti* subsp. nov. (p. 135). By G. I. Poljakov.— From S. W. Altai.

A New Waxwing — *Bombycilla garrulus centralasiæ* subsp. nov. (p. 137). By G. I. Poljakov — Zaisan district.

Pinicola enucleator altaicus subsp. nov. (p. 139). By G. I. Poljakov and S. A. Buturlin. Finn Lake, Marka Kul, S. W. Altai.

Contribution to the Geographic Distribution of the Genus *Sitta*. By J. B. Domaniewski. — A new form, *Sitta europæa sztolcmani* (p. 142) is described.

The Name of the Siberian Herring Gull. By S. A. Buturlin.— *Larus taimyrensis taimyrensis* Buturl. for the eastern race and *L. t. antelius* (Iredale) for the western.

On the White-winged Magpie (*Pica pica bactriana* Bp.) as a distinct subspecies.

Ornithologisches Jahrbuch. XXV, 5-6, September-December, 1914.

- Contribution to the Ornithology of Sirmien. By E. Rossler.
On the Avifauna of the Upper Otzthaler Alps in Tyrol. By C. E. Hellmayr.
- Migration of *Mormon arcticus* in the Mediterranean Region. By A. v. Jordans.
- Ornithological Observations in the Vicinity of Jerichow. By U. Bährmann.
- Journal für Ornithologie.** Vol. 63, Heft 2. April, 1915.
Bernard Hantzsch's Ornithological Collections from Baffinland. By Eric Hesse.— 38 species listed and discussed at length. The relationships of the Snow and Blue Geese are considered.
Wing Feather Characteristics in the Birds of North West Germany. By H. Reichling.
Remarks on the Eggs of Birds of Paradise. By H. Schalow.
- Ornithologische Monatsberichte.** May, 1915.
New Birds from the Eastern Frontier of Cameroon. By O. Neumann. — *Francolinus bicalcaratus adamauæ* (p. 73), Garna Adamaua; *Palæornis krameri centralis* (p. 73) Gondokoro, *Caprimulgus houyi* (p. 73) Bodanga; *Crateropus reinwardti houyi* (p. 74) Gore, N. E. Cameroon.
- Ornithologische Monatsberichte.** June, 1915.
New African Species. By A. Reichenow. *Bucanodon leucogrammicum* (p. 90), Sanyi, German E. Afr.; *Barbatula leucolema urungensis* (p. 91), Urungu, s. end of Tanganika; *Malaconotus olivaceus pallidirostris* (p. 91), Patugese Guinea; *Campephaga quiscalina münzneri* (p. 91) Mahenge, German E. Africa; *Dicrurus münzneri* (p. 91) Sanyi, German E. Africa; *Cinnyris hofmanni* (p. 91), Magogoni, German E. Africa; *Chlorophoneus münzneri* (p. 91), Sanyi.

Ornithological Articles in Other Journals.¹

- Anderson, R. M.** Canadian Arctic Expedition, 1913-14 and Preliminary List of Birds Collected (Summary Report Geol. Survey, Canada, 1914). — 52 species.
- McGregor, R. C.** Description of a New Species of *Prionochilus* from the Highlands of Luzon (Philippine Jour. of Sci. IX, 6. Nov. 1914).— *P. anthonyi*, Polis Mt., Luzon (p. 531) with colored plate.
- Cole, L. J. and Kirkpatrick, W. F.** Sex Ratios in Pigeons, together with Observations on the Laying, Incubation and Hatching of the Eggs. (Bull. 162, Agr. Exper. Sta., R. I. State College.)
- Taverner, P. A.** Suggestions for Ornithological Work in Canada. (Ottawa Naturalist, April and May, 1915.)

¹ Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

Clarke, W. Eagle. On the Occurrence of the Eastern Short-toed Lark, at Fair Isle: An Addition to the British Avifauna. (Scottish Naturalist, May, 1915).— *Calandrella brachydactyla longipennis*.

Clarke, W. Eagle. Notes on the Migratory Birds Observed at Fair Isle in 1914. (do.)

Robertson, J. and Mackeith, T. T. The Birds of Renfrewshire. (Scottish Naturalist, June and August, 1915.)

Baxter, Evelyn V. and Rintoul, L. J. Report on Scottish Ornithology in 1914. Including Migration. (Scottish Naturalist, July, 1915.)— An extended and interesting report covering nearly 100 pages.

Tulloch, John S. Nesting of the Gannet in Shetland: An Extension of its Breeding Range. (Scottish Naturalist, August, 1915.)

Haviland, Maud D. Notes on the Courtship of the Lapwing. (The Zoologist, June 15, 1915.)

Haviland, Maud D. Notes on the Breeding Habits of the Willow-Grouse (*Lagopus lagopus*) at the Mouth of the Yenesei River, Siberia. (The Zoologist, July 15, 1915.)

Gurney, J. H. Ornithological Report from Norfolk (1914).

Osgood, W. H., Preble, E. A., and Parker, G. H. The Fur Seals and Other Life of the Pribilof Islands, Alaska, in 1914. (Bull. U. S. Bureau of Fisheries, XXXIV, June 19, 1915.)— Birds briefly treated, pp. 121-125.

Chapman, Frank M. Louis Agassiz Fuertes — Painter of Bird Portraits. (American Museum Journal, May, 1915.)— With beautiful reproductions of some of his work.

Murphy, R. C. The Penguins of South Georgia. (do.)— The subject is treated more fully in a paper reviewed on p. 514 *antea*.

Baynes, E. H. Bird Baths and Drinking Pools. (do., April, 1915.)— From his book reviewed p. 507 *antea*.

Bangs, O. Three new subspecies of Birds from Eastern Mexico and Yucatan. (Proc. Biol. Soc. Wash., XXXVII, May 27, 1915, pp. 125-126.) — *Tityra semifasciata deses* (p. 125), Chichen Itza; *Turdus migratorius phillipsi* (p. 125), Las Viegas, Vera Cruz; *Cyanocompsa parellina beneplacita* (p. 126), Santa Leonor, Tamaulipas.

Fleming, J. H. A New Turnagra from Stephens' Island, N. Z. (do., May 27, pp. 121-124.)— *Turnagra capensis minor* (p. 121).

Ridgway, Robert. Description of Some New Forms of American Cuckoos, Parrots and Pigeons. (do., May 27, pp. 105-108.)— *Coccyzus minor palloris* (p. 105), Pigres, Costa Rica; *C. m. rileyi* (p. 105), Barbuda; *Morococcyx erythropygus mexicanus* (p. 105), Juchitan, Oaxaca, Mex.; *Ara militaris mexicana* (p. 106), Manzanillo, Mex.; *Conurus holochlorus strenuus* (p. 106), Omete, Nicaragua; *Grammopsittaca lineola maculata* (p. 106), E. Peru?; *Amazona vittata gracilipes* (p. 106), Culebra Isl., W. I., *Notioenas for Columba maculosa* (p. 106), *Chlorocenas inornata exsul* (p. 106); Porto Rico; *Zenaidura macroura tresmariae* (p. 107), Marie, Madre Isl.; *Z. ruficauda robinsoni* (p. 107), Honda, Colombia; *Melopelia asiatica mearnsi* (p. 107), Nogales, Arizona; *Leptotila verreauxi nuttingi* (p. 107), Ometepe, Nicaragua.

Lincoln, F. C. Description of a New Bob white from Colorado. (do. May 27, pp. 103-104) — *Colinus virginianus taylori* (p. 103), Laird, Yuma Co. Colo.

Ridgway, R. A New Pigeon from Chiriqui, Panama. (do., June 29, 1915, pp. 139-140.) — *Oenænas chiriquensis* (p. 139).

Cahn, A. R. The Status of Harris's Sparrow in Wisconsin and Neighboring States. (Bull. Wisc. Nat. Hist. Soc., XIII, No. 2, pp. 102-108.)

Lowe, John N. The Birds of Green Lake County, Wisconsin. (do., pp. 62-87.) — 209 species listed.

Pride, A. Notes on the Habits of the Rhea. (Proc. Royal Phys. Soc. Edinburgh, XIX, pp. 200-202.)

Scharff, R. F. On the Irish Names of Birds. (Irish Naturalist, May, 1915.)

Patten, C. J. Eider Ducks at Inishtrahull with Remarks on the Status of this Bird in Ireland. (do.)

Grevé, C. Early Bird Migration in East Sea, Province of Russland. (Zool. Beobachter, LVI, No. 3.)

Salvadori, T. *Campephaga analis* Verr. and Des Murs. (Boll. Mus. Zool. Anat. Comp., XXIX, Dec., 1914.)

Visher, S. S. Notes on the Significance of the Biota and of Biogeography. (Bull. Amer. Geogr. Soc., XLVII, No. 7.)

Lloyd-Jones, Orren. Studies on Inheritance in Pigeons. II. A Microscopical and Chemical Study of the Feather Pigments. (Jour. Exper. Zool., XVIII, pp. 453-500.)

Hartert, E. Notes on Falcons. (Novit. Zool., XXII, pp. 167-185.) All Gyrfalcons are regarded as subspecies of *F. rusticolus*, *F. r. rusticolus* inhabits northern Europe; *islandus* Iceland, *candicans* Arctic America and Greenland, *obsoletus* Labrador and *urulensis*, Siberia. There is much individual variation in color.

Hartert, E. A Small Collection of Birds from Hausaland, Northern Nigeria. (do., pp. 244-266.) 144 species listed.

Kirkman, F. B. Dates of Publication of the Sections of the "British Bird Book" (do., p. 386).

Wild Life. Beautiful illustrations and life histories, mostly of British Birds. In April number, Stone Curlew and Buff-backed Heron; May, Blackcock and Cormorant; June, Wood Lark, and Shoveller; July, Kestrel, Hobbie and Ringed Plover.

Ogawa M. Notes on Mr. Alan Owston's Collection of Birds from the Islands lying between Kiushu and Formosa. (Annotations Zoologicæ Japonensis. V, Part IV, pp. 175-232, pls. IX-XI, Tokyo Zool. Soc., July, 1905.) — *Geocichla major* (p. 178), Amami-Oshima; *Merula celænopis yakushimensis* (p. 180) Yakushima; *Zosterops japonica insularis* (p. 186), Tanegashima and Yakushima; *Corvus macrorhynchus osai* (p. 196), Loochoo, Isls., *Picus owstoni* (p. 203), Amami-Oshima; and *Nannocnus ijimæ* (p. 215), Yagachi, Okinawashima and Ishigaki, are described as new. The whole list totals 124 species and there is a table showing the fauna of each island

or island group. Mr. Ogawa is unfortunate in not designating type specimens and definite type localities for his new species, an oversight which may cause confusion in the future.

Van Name, W. G. Bird Collecting and Ornithology. (Science, June 4, 1915.)—A reply to J. Grinnell's 'Conserve the Collector.'

Sumner, F. B. Some Reasons for Saving the Genus. (Science, June 18, 1915.)—This and the following are directly in line with an editorial note in the July issue of 'The Auk.'

Van Name, W. G. Losing the Advantages of the Binomial System of Nomenclature. (Science, August 6, 1915.)

Oregon Sportsman. April to June. Contains excellent colored plates of western game birds by Brooks and Horsfall with descriptive text by W. L. Finley.

Forbush, E. H. The Starling. (Circular 45, Mass. State Board of Agriculture.)—An historical and economic account of the species.

Brooks, Earle A. Forty Common Birds of West Virginia. (Arbor and Bird Day Manual, Dept. Free Schools, Charleston, W. Va., March 26, 1915.)

Publications Received.—**Baker, Dr. Frank.** The National Zoological Park and Its Inhabitants. (Smithsonian Report for 1914, pp. 445-478, pll. 1-41.)

Baynes, Ernest Harold. Wild Bird Guests. E. P. Dutton & Co., New York, Svo, 1915, pp. 326. \$2.00 net.

Brooks, Earl A. Forty Common Birds of West Virginia. (Arbor and Bird Day Manual. Department of Schools, Charleston, W. Va., March 26, 1915.)

Burns, Frank L. Comparative Periods of Deposition and Incubation of Some North American Birds. (Wilson Bull. No. 90, pp. 277-286, March, 1915.)

Chapman, Frank M. Descriptions of Proposed New Birds from Central and South America. (Bull. Amer. Mus. Nat. Hist., Vol. XXXIV, Art. XI, pp. 363-388. May 27, 1915.)

Cole, Leon J. and Kirkpatrick, W. F. Sex Ratios in Pigeons, together with Observations on the Laying, Incubation and Hatching of the Eggs. (Bull. 162, Agr. Exper. Sta. R. I. State Coll., April, 1915.)

Cooke, Wells W. (1) Bird Migration. (Bull. 185, U. S. Dept. Agr., April 17, 1915.) (2) Our Shore birds and their Future. (Yearbook U. S. Dept. Agr., 1914, pp. 275-294.)

Cory, Charles B. Notes on South American Birds, with Descriptions of New Subspecies. (Publ. 183, Field Mus. Nat. Hist. Ornith. Series, I, No. 9, pp. 303-335, Aug. 7, 1915.)

Dall, Wm. H. Spencer Fullerton Baird, a Biography. Svo, pp. i-xvi + 1-462, 19 illustrations. 1915. \$3.50 net.

Edmanson. Bird Homes Catalogue. E. E. Edmanson & Co., 124 So. Norton St., Chicago, Ill.

Faxon, Walter. Relics of Peale's Museum. (Bull. Mus. Comp. Zoöl., LIX, No. 3, pp. 119-148, July, 1915.)

Forbush, E. H. (1) The Starling. (Circular No. 45, Mass. State Board of Agr., May, 1915.) (2) Bird Houses and Nesting Boxes. (do. Circular, No. 47. April, 1915.)

Fraser, W. B. Biennial Report of the State Game and Fish Commissioner of the State of Colorado. 1913-1914.

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Gurney, J. H. Ornithological Report from Norfolk (1914). (The Zoologist, April, 1915, repaged 1-26.)

Harper, Francis. A Sojourn in the Primeval Okefinokee. (Brooklyn Mus. Quarterly, II, No. 4, April, 1915, pp. 226-244.)

Henshaw, H. W. American Game Birds. (Nat. Geogr. Magazine, XXVIII, No. 2, August, 1915, pp. 105-158.)

Ingersoll, Ernest. The Audubon Movement. (Circular No. 1, Nat. Asso. Audubon Societies.)

Job, Herbert K. (1) Propagation of Upland Game-Birds. (Bull. 2, Nat. Asso. Aud. Soc., April, 1915. Price, 25 cts.) (2) Propagation of Wild Water-Fowl. (Bull. 3, do., May, 1915. Price, 25 cts.)

Laign, Hamilton M. Out with the Birds. Outing Publishing Co., New York. 1913, 8vo, pp. 1-249. \$1.50.

Lowe, Percy R. Coloration as a Factor in Family and Generic Differentiation. (Ibis, April, 1915, pp. 320-346.)

Mathews, Gregory M. The Birds of Australia. Vol. IV, Part 2, February 17, 1915, and 3, June 23, 1915. London, Witherby & Co.

McAtee, W. L. Eleven Important Wild Duck Foods. (Bull. 205, U. S. Dept. Agr., May 20, 1915.)

McGregor, Richard C. Description of a New Species of *Prionochilus* from the Highlands of Luzon. (Philippine Jour. of Sci., IX, No. 6, Sec. D, Nov., 1914, pp. 531-533.)

Murphy, Robert C. The Penguins of South Georgia. (Sci. Bull. Mus. Brooklyn Inst., Vol. 2, No. 5, pp. 103-133, pll. 19-43, Aug. 2, 1915.)

Oberholser, Harry C. (1) A Synopsis of the Races of the Long-tailed Goatsucker, *Caprimulgus macrurus* Horsfield. (Proc. U. S. N. M., Vol. 48, pp. 587-599, May 3, 1915.) (2) A Review of the Subspecies of the Ruddy Kingfisher, *Entomothera coromanda* (Linnæus). (do., pp. 639-657, May 18, 1915.) (3) Critical Notes on the Subspecies of the Spotted Owl, *Strix occidentalis* (Xantus). (do., Vol. 49, pp. 251-257, July 26, 1915.)

Osgood, Wilfred H., **Preble**, E. A., and **Parker**, Geo. H. The Fur Seals and Other Life of the Pribilof Islands, Alaska, in 1914. Bull. U. S. Bureau of Fisheries, XXXIV, Document No. 820. June 19, 1915, pp. 1-172, pll. 1-18, maps 1-24. Price 50 cts.

Palmer, T. S. Directory of Officials and Organizations Concerned with the Protection of Birds and Game, 1915. (Circular U. S. Biol. Survey, Aug. 11, 1915.)

Schalow, Herman. Bemerkungen über die Eier der Paradiesvögel. (Jour. f. Ornith., April, 1915, pp. 268-295.)

Shufeldt, R. W. (1) On the Comparative Osteology of *Orthorhamphus magnirostris* (the Long-billed Stone Plover). (Emu, XV, Part 1, July, 1915, pp. 1-25.) (2) On the Comparative Osteology of the Limpkin (*Aramus vociferus*) and its Place in the System. (Anatomical Record, Vol. 9, No. 8, Aug., 1915, pp. 591-606.) (3) Science, Ornithology and the War. (Wilson Bull., XXVII, No. 2, June, 1915, pp. 344-347.) (4) Eggs of North American Water Birds, Parts 1 and 2. (Blue-bird, May and August, VII, Nos. 8 and 11.) (5) Making Friends with a Young Barred Owl. (Our Dumb Animals. Vol. 48, No. 4, Sept., 1915.)

Stanwood, C. J. The Hermit Thrush. (Outdoor World and Recreation, May, 1915.)

Strong, R. M. On the Habits and Behavior of the Herring Gull, *Larus argentatus* Pont. (Smithsonian Report for 1914, pp. 479-509.)— [Reprinted from 'The Auk.' Somewhat abridged but with additional matter!]

Swarth, H. S. An Apparent Hybrid Between Species of the Genera *Spatula* and *Querquedula*. (Condor, XVII, pp. 115-118, May, 1915.)

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Watson, J. B. and **Lashley**, K. S. Homing and Related Activities of Birds. (Vol. VII, Papers from Dept. Marine Biology, Carnegie Inst. of Wash. Publ. 211.)

Warren, B. H. Birds and Their Enemies. Some Unusual Nesting Sites of Barn Swallows. (Everhart Mus. Scranton Pennsylvania, Nat. Hist., Leaflet No. 7, Aug. 20, 1915.)

Wetmore, Alex. Mortality among Waterfowl around Great Salt Lake, Utah. (Bull. 217, U. S. Dept. Agr., May 26, 1915.)

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American Museum Journal, The, XV, Nos. 4 and 5, April and May, 1915.

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Bird-Lore, XVII, Nos. 3 and 4, May-June, July-August, 1915.

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- Condor**, The, XVII, Nos. 3 and 4, May-June, July-August, 1915.
- Current** Items of Interest, Nos. 24 and 25, January 16, and May 17, 1915.
- Emu**, The XIV, Part 4, XV, Part 1, April and July, 1915.
- Fins**, Feathers and Fur, Bull. Minn. Game and Fish. Com. No. 2, June, 1915.
- Forest** and Stream, LXXXV, Nos. 5 to 8, May to August, 1915.
- Ibis**, The, (10) III, Nos. 2 and 3, April and July, 1915.
- Messenger** Ornithologique, VI, No. 2.
- Oölogist**, The, XXXII, Nos. 5 to 8, May to August, 1915.
- Oregon Sportsman**, III, Nos. 3 to 7, March to July, 1915.
- Ornithologisches** Jahrbuch, XXV, No. 5-6, Sept.-Dec., 1914. (April 20, 1915.)
- Ottawa** Naturalist, The, XXIX, Nos. 1, 2 and 3-4, April, May and June-July, 1915.
- Philippine** Journal of Science, IX, Nos. 4 to 6, X, No. 1, August, September and November, 1914, January, 1915.
- Proceedings** Acad. Nat. Sci. Phila., LXVII, Nos. 1 and 2, Jan.-March, and April-August, 1915.
- Proceedings** Nebraska Ornith. Union, VI, Part 3, July 10, 1915.
- Revue** Française d'Ornithologie, VII, Nos. 71 to 75, March to July, 1915.
- Royal** Soc. for Protection of Birds, 24th Ann. Report, for 1914.
- Science**, N. S., XLI, Nos. 1062-1069, XLII, Nos. 1070-1080.
- Scottish** Naturalist, The, Nos. 41 to 44, May to August, 1915.
- South** Australian Ornithologist, II, Parts 2 and 3, April and July, 1915.
- Wilson** Bulletin, The, XXVII, No. 2, June, 1915.
- Zoölogist**, The, XIX, Nos. 220-223, April to July, 1915.

CORRESPONDENCE.

Methods of Recording Bird Songs.

EDITOR OF 'THE AUK,'

Dear Sir:— With great interest I read the "Suggestions for Better Methods of Recording and Studying Bird Songs," which appeared in the April issue of 'The Auk.' All methods of notation used in bird-work are open to some criticism and suggested improvements should be welcomed. This is particularly true in the study of bird-song, which has not enjoyed the scientific analysis from students, it should have had.

The title, given to the paper by Mr. Aretas A. Saunders, would indicate an entirely new method of notation. A perusal of the subject matter proves such is not the case. What he suggests is a modification of the old method of musical notation. An enlarged form of musical staff is used and notes are pitched within the limits of one octave. The chief difference consists in the representation of the notes by horizontal lines instead of by the musical dot at the top of a vertical line and the abandonment of the indication of rhythm for the sake of ascertaining a song's duration. Now a method of notation should be as comprehensive, accurate and simple as the subject under study will allow. Is Mr. Saunders' improved method more comprehensive, more accurate or more simple than the old. It must be one of these three to justify its employment in place of the older method.

In order to answer this, let us follow Mr. Saunders' order. He enumerates five characters of bird music, about which we desire knowledge: "pitch, duration, intensity, pronunciation and quality." Now this enumeration is peculiar to Mr. Saunders. The usual enumeration, followed by students of music, is "pitch, time, intensity, and quality" and these four factors are said to cover all that we can learn about any kind of music. "Time" is a much more comprehensive term than "duration" and covers not only the relatively unimportant factor of "duration," but also "metre" and the extremely important factor of "rhythm." The omission of time and with it rhythm is a serious one and at the outset renders doubtful any improvement by this method.

But avoiding for a moment a discussion of rhythm, I shall take up in order the five points he has selected. To begin with the third and fifth characters, he admits *quality* and *intensity* cannot be recorded accurately by his method. Of the fourth, *pronunciation*, he says:— "It is probably true that a purely musical note has no real vowel sound and that the only difference in such notes is that of quality and *not*¹ pronunciation." Of consonant sounds he has recognised only one, the "liquid L" and he represents this by a loop in his record, which at once blurs the pitch of that particular note. Such a blurring of the important factor of pitch can be avoided in the old method by recording these rare consonantal suggestions with graphic symbols above the staff. But the truth is that, if pronunci-

¹ Italics are not in the original paper.

ation does appear occasionally in bird songs, it is of very slight importance and should be classed as a minor factor under the heading of "quality", which covers also the much more important factor of "over-tones" or the so-called "harmonics" of a tone. These *do* exist in many bird tones and are the cause of the difference between the simple, clear-whistled tone of the Piping Plover and the complex rich tone of the Wood Thrush.

There remain but two of Mr. Saunders' "points" to consider, *pitch* and *duration*. "Pitch" is truly a very important factor and, with the possible exception of time, the most important of all, for from pitch we gain some idea of the bird's intuitive knowledge of the fundamental relations of one tone to another. It should be represented with exactitude, if that is possible. Now there are of course in some songs notes which seem patently discordant with the rest of the song. And in regard to these Mr. Saunders would have his readers believe that his method of notation is an improvement, because it records them. But does it? Helmholtz's study of sound proves that in order to represent a discordant note out of harmony even in the natural scale, it would be necessary to have a staff, composed of at least 528 horizontal lines for the one octave between Middle C and the next C above it, instead of the 12 of this new system, for there are at least that many possible tones within the compass of that octave. And for the octave, which is used to confine the song of the Vesper Sparrow, there would have to be at least 4224 different lines to record *one song!* Such a system I imagine would be too cumbersome even for Mr. Saunders. The fact is that our author has not tried to represent flatted and sharped notes with accuracy, but merely to indicate that they are flat or sharp. This is of no advantage to another song-student, for unless the flatted note is indicated precisely, it is impossible to be sure it was not an harmonically true note in the more complex natural scale, which the birds probably use. Every student of music knows that the modern scale of twelve notes and its method of notation is a condensation of the natural scale for the sake of simplicity and convenience. On the other hand the proposed system is more cumbersome without insuring one whit more of accuracy. It is a more cumbersome one, because it requires 12 lines instead of 5 to record a simple song and, for a song of great range such as the Hermit Thrush's, would require 36 lines, whereas the whole of that master song, ascending and descending over the confines of three octaves, can be neatly recorded by the old method on a staff of 5 lines! This new method is not so accurate for the recording of pitch, because short horizontal lines are employed against a horizontal staff instead of the vertical line crowned with a clear round dot. Indeed it is very difficult to determine from Mr. Saunders' printed records, when he is attempting to record a note on the pitch and when a trifle off of it.

It is at once apparent that the horizontal line is used for "pitch" in order that the vertical may be reserved for "duration." Indeed our whole system of notation, the evolution of centuries, has been changed in order to record this one thing, which has always been ranked by musicians as of very slight importance, *e. g.* the duration of a song in seconds. The length of a song

is of about as much value as the length of the white on the outer primary of a Junco. What we want to know about color is its arrangement or the relative proportion of the various colors on a bird, resulting in color pattern. What we want to know about duration is the *relative* duration of the individual notes of a song and this would result in some idea of the song's rhythm. Now the existence of rhythm is denied by Mr. Saunders, although oddly enough, it is shown to exist even by his own records. But of this later! The curious thing about it is that duration has always been indicated by the old system and can be quickly ascertained from any complete record. For instance in Mr. Matthews' record of the Vesper Sparrow's song in his 'Field Book of Wild Birds and Their Music,' the metronome time is given as one quarter note equals 120, which means that 120 of the quarter notes in that song, if it possessed that many, would occupy the time of one minute. From this one graphic symbol it is easy to calculate the duration of that song as exactly $5\frac{1}{2}$ seconds. If it were at all important to give this factor prominence, it would be much simpler to place the symbol "D $5\frac{1}{2}$ S" at the end of the musical staff than to cover the staff with a great number of useless vertical lines.

But far the most defective part of Mr. Saunders' system is its omission of rhythm. Even the non-musical bird student has recognised its existence, whether consciously or not. This is evident in such syllabic renditions of songs as "Técher, técher, técher, técher," which indicates quite clearly the observer perceived the fact that the first note of each couplet in that particular Ovenbird's song received a periodically reiterated accent and this is rhythm. It is also indicated in the rendering of the White-throat's song as "Óld Sáim Péabody, Péabody, Péabody." Both of these birds have a splendid sense of rhythm, quite as good, if not better than the average musical performer of the human race. This is even more true of the Whip-poor-will, whose sense of rhythm is so perfect that his constant reiteration of the accented "Whíp" can be timed by a metronome exactly. Indeed his rhythm is too perfect to satisfy the human desire for variation, which humans obtain by means of the "ritard" and the "acceleration" and this song, therefore, becomes mechanical and monotonous. That the greater bird songsters are not so monotonous only proves their greater sense for real rhythmical effects, which can seldom be beautiful, when rigidly bound to a mechanical time. It is often true that one cannot check up the greater songsters' rhythm with a stop-watch, such as Mr. Saunders uses, but neither could one do the same with the best human singers, for they frequently ritard and accelerate their time to avoid this very mechanical rhythm, which he seems to believe so essential to music.

That rhythm does exist in bird songs is curiously proved by Mr. Saunders' own records. In three of his nine, the rhythm is absolutely perfect, indeed mechanical and in the other six it probably existed, although obscured by his method of notation, which among other factors does not record the "accent". For instance in his record of the Robin's song there is a periodical alternation of sets of notes and pauses. Each set of notes consumes

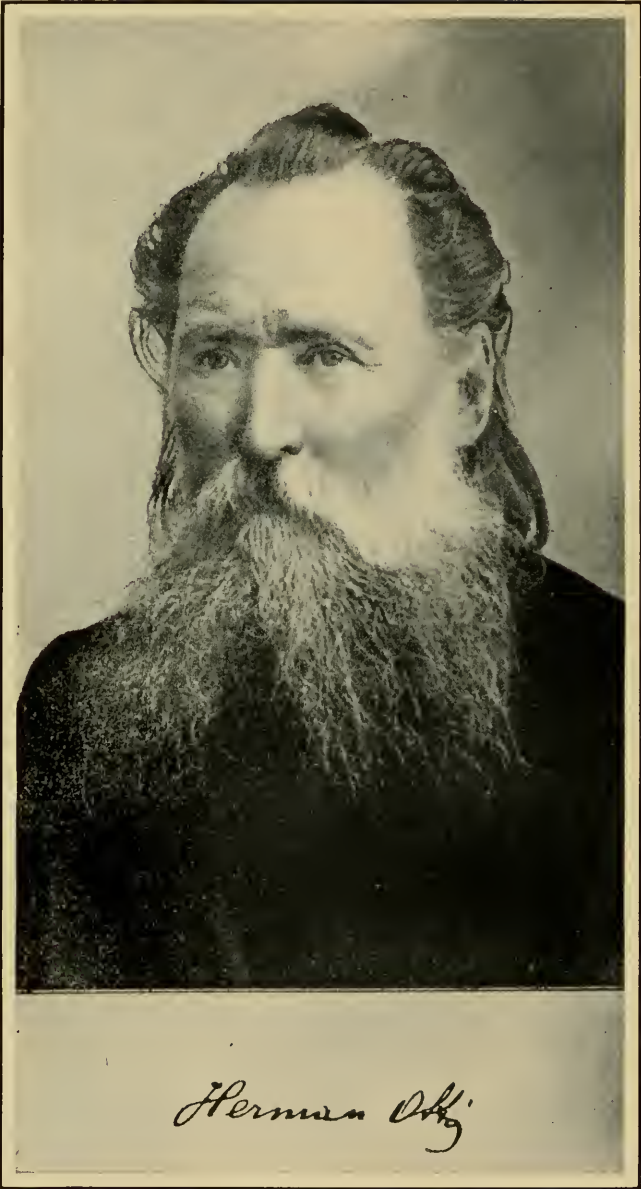
exactly the same amount of time, four tenths of a second, and each pause consumes two tenths of a second or exactly half the amount, credited to each set of notes. If we separate each set of notes and its adjoining pause into a measure we would have five equal measures and if we give each set of notes and its pause their proportionate amount of beats, we would give two beats to each set of notes and one to each pause. The whole song would then consist of five measures in perfect 3 time and to know this, e. g. that a wild bird uses naturally a measure of time, employed by humans for many centuries, is a great deal more interesting and important than to learn the detached fact, that the whole song consumed two and $\frac{8}{10}$ seconds by a stop watch. It must be admitted there are a few songs, which do not follow any given time through to the end, but Mr. Saunders is wrong, when he says that the old method "does not allow the record" of such songs. The irregular rhythm of the Thrasher's song is perfectly represented by the old method in Mr. Matthews' book and could not be represented so well by this new method.

By this discussion I believe I have proved that of Mr. Saunders' five chosen characters of song, two, *quality* and *intensity*, have not been recorded at all by his method; two, *pronunciation* and *duration* are unimportant and can and have been recorded by the old method; and the last, *pitch*, is not recorded so accurately. Finally a sixth factor of the utmost importance, *rhythm*, is entirely abandoned. The suggested method is therefore not so comprehensive as the old and, incidentally I have shown, it is not so simple nor so accurate.

Near the close of this paper Mr. Saunders remarks apropos of the qualities necessary for the student for the recording of bird songs that "a knowledge of music is essential also, but it need not be great." In my opinion the student should have at least an accurate knowledge of Harmony, but at any rate he should certainly know the meaning of ordinary musical terms. A common error of this kind is to confuse the meaning of the word "trill" with that of a "repeated note." As such a mistake renders many records inaccurate, it is necessary to point out that a "trill" is *not* a series of notes on the *same* pitch, repeated so rapidly that their number cannot be counted, but is a rapid and regular *alternation* of two notes of entirely *different* pitch.

In conclusion I would like to state that the old system of notation is just as much a "graphic method" as Mr. Saunders' or any other. More than any other graphic system it is a splendid system of symbols, which has been evolved and improved by ages of use and is now better known to the public than any system of notation, used in the other departments of bird-work. It has its limitations and will probably be improved along the line of recording more accurately the natural scale, but such improvements as Mr. Saunders suggests are in the nature of a retrograde movement toward something less comprehensive and less simple.

ROBERT THOMAS MOORE.



DR. OTTO HERMAN.

NOTES AND NEWS.

GRAF HANS VON BERLEPSCH, an Honorary Fellow of the American Ornithologists' Union, died on February 27, 1915, in the sixty-fourth year of his age. He was one of the original Corresponding Members of the A. O. U. and was elected to Honorary Fellowship in 1890. He was one of the leading authorities on the birds of South America and had published many papers on the subject. Of late years he made a special study of attracting wild birds and had devised various styles of bird nesting boxes as well as methods of pruning trees and shrubs to encourage nest building in them. His estates in Germany where his ideas were put to practical tests were veritable bird sanctuaries. His loss will be widely felt in ornithological circles both among the museum systematists and the great host who are interested in the preservation of wild bird life.

DR. OTTO HERMAN, a Corresponding Fellow of the American Ornithologists' Union, died in Budapest, Hungary, on December 27, 1914, in the eightieth year of his age. He was born in Breznóbánya, June 27, 1835. His parents came from Zips, his father, Karl Herman, being a lying in surgeon in moderate circumstances. The surroundings of his home were extremely favorable to the development of the young, growing naturalist and all nature soon strongly impressed him. His father was a classmate of Johann Salamon Petényi, at that time the leader in Hungarian ornithology, and encouraged his son in all his juvenile expeditions, during which period young Herman made a collection of birds, preparing all the skins himself.

There being little money in natural science, his father became much concerned as to what to do with him as the time approached for his self-support, and finally sent him to the Polytechnic school in Vienna where he graduated and took a position as a factory draughtsman. Uncongenial as the life was he determined to win, and displayed the iron will, quick perception and faith in himself which were ever characteristic of him. Misfortunes, however, overtook him; first his father's death, then the discovery that he had been out of his country without permission, for which the government compelled him to serve twelve years in the army. Think of a nature like his being subjected to the iron ruling of military discipline!

It was but another instance of the square peg in the round hole, or, as a distinguished American ornithologist once put it: "To make a square peg fit in a round hole is impossible. One of two things must happen. Either the peg wears round, and sinks into the hole at last, or, if it stays square, works loose, and is gone. Nothing but friction in either case."¹

After the war between Poland and Russia in 1863, when Herman had volunteered as a soldier in the army of the former, he made application for the vacant position of taxidermist in the Museum of Siebenbürgen. Having

¹ The Medical Record, September 29, 1883, p. 343.

secured this position he was rapidly carried up the ladder of fame. With marked energy he helped to build up the zoological collections of the museum; wrote his first paper on ornithology, and diligently studied every phase of nature as it was brought to his attention. Later he became deeply interested in politics and was a member of the Hungarian Parliament, where he was instrumental in having laws passed which greatly advanced scientific research in Hungary. In 1877, he founded the official organ of the Hungarian Museum of Natural History and was its editor for ten years. The second International Ornithological Congress at Budapest was almost entirely under his management and its notable success was due to his powers of organization and capacity for work. The establishment of the Royal Hungarian Central Bureau for Ornithology was another conception of Herman's which was realized largely through his enterprise and 'Aquila', its official organ, was brought into existence and conducted by him through twenty large volumes.

His extensive investigations on bird migration are well known throughout the world.

While it is through his numerous ornithological works that he is probably best known, he made many valuable and often extensive contributions to entomology, ethnography, politics, political economy, folk-lore and Hungarian historical sketches. Among these may be mentioned a notable classic in three volumes on the spiders of Hungary and works on the Hungarian fisher-folk and Hungarian fisheries. Otto Herman was a man of great breadth of mind, enormous energy and an untiring worker. In his death not only did Hungary lose one of its most illustrious scientists, but the world lost a man who, through his own efforts, powerfully advanced the cause of science and human civilization, and who stood for all that was noble and great in his every undertaking.¹ — R. W. SHUFELDT.

EGBERT BAGG, a Member of the American Ornithologists' Union, died July 11, 1915, at his home in Utica, N. Y. He was one of the original Associates of the Union, elected in 1883, and became a Member in 1914. Mr. Bagg was born in Utica, August 10, 1850, son of Egbert Bagg and Cornelia Hunt, and was educated in the Utica public schools, Hobart College and Cornell University. He was a successful business man and interested in the civic affairs of his native city, serving as school commissioner for some years. He was an active member of the Oneida Historical Society and other literary organizations. Among his ornithological publications were 'The Birds of Oneida County, N. Y.,' 1894, and numerous notes on rare or interesting species which came under his observation.

EWEN SOMERLED CAMERON, a Member of the American Ornithologists' Union, and a frequent contributor to 'The Auk' died at the Southern

¹ In preparing this sketch I have employed data drawn from my numerous letters from Dr. Herman, and also the obituary notices by Lambrecht (Ornith. Monatsb. XL, pp. 138-142) and Stefan (Aquila XXI, 1914), for translating which I am indebted to my wife. The portrait is reproduced from another notice by Lambrecht (Bartlangkutatas, 1915, III., Heft. 1).

California Sanitarium, Lamanda Park, Pasadena, California, on May 25, 1915. His death was caused by an abscess on the brain, the result of two accidents when horses fell with him. He had been dangerously ill for four months. Mr. Cameron was born December 19, 1854, and was the son of Allan Gordon Cameron of Barcaldene Ledaig, Argyllshire, Scotland; but for many years he has resided at Marsh, Dawson Co., Montana.

All of his spare time was devoted to ornithology which had been his favorite study from boyhood. He published 'The Birds of Custer and Dawson Counties, Montana,' in 'The Auk,' for 1907 and 1908, and a number of admirable detailed studies of characteristic species of that region, which were enhanced by the photographic illustrations contributed by his wife, who had a keen sympathetic interest in his ornithological work. Mr. Cameron also contributed to 'The Ibis,' 'Country Life' and 'The Field.' He was elected a Member of the British Ornithologists' Union in 1889, an Associate of the A. O. U. in 1903, and a Member in 1910, and a Fellow of the Zoological Society of London in 1888.

PROF. FREDERICK WARD PUTNAM, an Associate of the American Ornithologists' Union, died on August 14, 1915, in the seventy-seventh year of his age. Prof. Putnam was famous as an archæologist and ethnologist, being professor of American archæology and ethnology at Harvard University, Curator of the Peabody Museum of Archæology and Ethnology and author of many papers upon Archæological subjects. His interests extended beyond the field of his specialty and in early life he was active in several branches of zoölogy. In 1876-8 he was in charge of the Agassiz collection of fishes at the Museum of Comparative Zoölogy, and was one of the founders and editors of the 'American Naturalist.' His principal contribution to ornithology was a 'Catalogue of the Birds of Essex Co., Mass.,' published in 1856, which is virtually a list of the birds of the State. Prof. Putnam was born in Salem, Mass., April 16, 1839.

FRANK B. ARMSTRONG, of Brownsville, Texas, well known throughout this country and Europe as a collector and taxidermist, died at his home, on August 20, 1915, in the fifty-third year of his age. He was a native of St. John, N. B., of English parentage and was born on May 10, 1863. He was raised and educated in Medford, Mass., whither his parents had moved, and after graduating from the public schools he studied taxidermy in Boston under C. J. Maynard. About 1885, he travelled to Laredo, Texas, and collected extensively in that vicinity and in Mexico until 1890, when he moved to Brownsville. He was a skillful taxidermist and made excellent bird skins, and specimens bearing his name are to be found in all the large collections in America.

DR. THOMAS S. ROBERTS had been appointed Associate Curator of the Zoölogical Museum and Professor of Ornithology in the University of Minnesota and expects shortly to devote his entire time to this work. His address will be Room 209, Millard Hall, University of Minnesota, Minneapolis, Minn.

INDEX TO VOLUME XXXII.

[New generic, specific, and subspecific names are printed in **heavy-face** type.]

- ACANTHIS** *cannabin*a fringillirostris, 287.
Acanthiza *marianæ*, 526.
Accipiter *cinereus*, 484.
 *eudiab*olus, 125.
 *fasciatus poly*cryptus, 384.
 gentilis albidus, 484.
 g. schvedowi, 484.
 hiogaster rooki, 129.
 novæ hollandiæ, 484.
 striatus venator, 128.
 torquatus buruensis, 120.
Acrocephalus *strepera strepera*, 284.
Actitis *macularia*, 227, 368, 464.
Æchmophorus *occidentalis*, 461.
Ægialitis *homeyeri*, 524.
 meloda, 97, 500.
 nivosa, 465.
 semipalmata, 97, 302, 465.
Æstrelata *arminjoniana*, 342.
 chionophora, 342.
 trinitatis, 342.
 alba, 342.
 mollis, 342.
 wilsoni, 342.
Æthia, 526.
Æthomyias *nigrifrons*, 260.
Agathopis *micropterus*, 418.
Agelaius *phœniceus aciculatus*, 256.
 phœniceus floridanus, 21.
 p. fortis, 448.
 p. phœniceus, 21.
Agriocharis *ocellata*, 167, 250.
Agrobates *galoctotes galoctotes*, 284.
Aix sponsa, 108, 463.
Ajaja *ajaja*, 167.
Alabama, birds of, 213-215.
- Alaska*, birds of, 114, 295-305.
Albatross, Black-footed, 300.
Alcedo *ispida pallida*, 282.
Aleyone *richardsi bougainvillei*, 125.
 aolæ, 125.
Alectœnas, 259.
 Allen, Arthur A., review of his 'Birds in their Relation to Agriculture in New York State,' 251.
 Allen, Francis H., the status of the Song Sparrow and the Chipping Sparrow as early birds, 110; a near view of an Iceland Gull, 495.
Alphagygis, 127.
Amazona vittata gracilipes, 529.
 American Ornithologists' Union, proposed revision of the By-Laws, 134; San Francisco meeting of the, 140, 271, 388; thirty-third stated meeting of the, 488-493.
Amizilis rutila rutila, 167.
 yucatanensis yucatanensis, 169.
Ammodramus savannarum australis, 25.
Ammomanes deserti katherinæ, 286.
Ammoperdix heyi, 279.
Amnydrus tristrami tristrami, 289.
Anas fulvigula maculosa, 318.
 platyrhynchos, 96, 462.
Andigina nigrirostris occidentalis, 515.
Andropadus ugandæ, 524.
Anhinga, 165.
Anous stolidus, 48, 345.
 melanogenys, 48.
Anser albifrons gambeli, 463.
Anthoscopus caroli hellm yri, 130.

- Anthreptes collaris garguensis, 251.
 Anthus campestris campestris, 286.
 daviesi, 130.
 rubescens, 191.
 spraguei, 191, 239.
 trivialis, 286.
 Antrostomus carolinensis, 15.
 vociferus vociferus, 15.
 Anumbius, 146, 148.
 Apalis nigriceps collaris, 524.
 Aphanapteryx broekii, 523.
 Aptenodytes forsteri, 373.
 patachonica, 514.
 Apus apus apus, 283.
 murinus murinus, 283.
 Aquila antiqua, 375.
 Ara militaris mexicana, 529.
 Arainæ, 152.
 Aramides cajanea venezuelensis,
 374.
 c. peruviana, 374.
 Aramus vociferus, 517.
 Archilochus colubris, 17.
 Ardea herodias adoxa, 484.
 h. fannini, 302, 464.
 h. occidentalis, 484.
 h. repens, 484.
 h. wardi, 483.
 repens, 483.
 rufa mutata, 483.
 occidentalis, 483.
 würdemanni, 483.
 Arenaria interpres, 48.
 morinella, 465.
 melanocephala, 465.
 Arkansas, birds of, 362.
 Armstrong, F. B., obituary of,
 541.
 Arremonops verticalis, 168.
 Asarcia spinosa, 167.
 Asio flammeus bogotensis, 515.
 Astragalinus tristis tristis, 24, 238.
 Astur brevipes, 282.
 Asturina plagiata, 167.
 Atlapetes gutturalis brunnescens,
 515.
 'Auk' review of ornithological liter-
 ature, 269; vignette, 144.
 'Auk,' Index, full names of authors
 in, 143; review of, 242.
 Auklet, Cassin's, 297.
 Rhinoceros, 297.
 Auriparus flaviceps lamprocephalus,
 106.
 'Austral Avian Record,' review, of
 127, 259, 526.
 Australia, birds of, 376, 512.
 Avicultural magazine, review of,
 126, 259, 380, 525.
 BÆOLOPHUS bicolor, 193, 331.
 Bagg, Egbert, obituary of, 540.
 Bailey, Florence M., review of her
 'Handbook of Birds of the West-
 ern United States, Fourth Edition,'
 115.
 Bailey, H. H., proposed revision of
 the By-Laws of the American
 Ornithologists' Union, 134.
 Bailey, S. Waldo, the Plum Island
 Night Herons, 424-441.
 Baily, Wm. L., young Kingbirds on
 a cherry and dragonfly diet, 368.
 Baird, Spencer F., notice of biog-
 raphy of, 505.
 Baldpate, 225, 462.
 Bangs, Outram, Cabot's types of
 Yucatan birds, 166-170; the
 Bermuda Crow, 229; notes on
 dichromatic herons and hawks,
 481-484.
 Bannermania, 524.
 Barbatula leucokæma urungensis,
 528.
 Bartramia longicauda, 448.
 Batara, 150.
 Bavarian Ornithological Society,
 notice of 'Proceedings,' 382.
 Baynes, Ernest Harold, review of
 his 'Wild Bird Guests. How to
 Entertain Them,' 507.
 Beal, F. E. L., review of his 'Food

- of the Robins and Bluebirds of the United States,' 252.
- Bee-eater, European, 282.
- Bell, E. Gordon, Starlings (*Sturnus vulgaris*) in New Hampshire, 496.
- Bent, A. C., Yellow-billed Loon (*Gavia adamsi*) in Colorado: a correction, 494.
- 'Berajah,' review of, 381.
- Bergtold, W. H., the Yellow-crowned Night Heron in Colorado, a correction, 97; time of incubation, 134; the Indigo Bunting in Colorado, 498; Black-throated Blue Warbler in Colorado, 498.
- Berlepsch, Graf Hans von, obituary of, 539.
- Bermuda, birds of, 229.
- Betts, Norman deW., notes from Wisconsin, 237.
- 'Bird-Lore,' review of, 123, 256, 378, 521.
- 'Bird Notes,' review of, 127, 259, 381.
- 'Bird Notes and News', notice of, 118, 381.
- Bird protection, notice of publications on, 377.
- Bittern, 237.
American, 497.
Cory's Least, 98, 482.
Least, 319, 482.
- Blackbird, Brewer's, 23, 503.
Red-winged, 21, 160, 163, 178, 438.
Rusty, 23.
Yellow-headed, 21, 107.
- Black-cap, 285.
- Blackstart, Palestine, 284.
- Bleda exima ugandæ, 524.
- Bluebird, 2, 194.
- 'Blue-Bird,' review of, 124, 257.
- Blue Jay, Florida, 163.
- Bobolink, 21, 101.
- Bob-white, 321.
- Bombycilla cedrorum, 184, 232.
garrula, 369.
g. centralasiæ, 527.
- Bonasa umbellus umbellus, 238.
- Bo'sun Bird, 46.
- Botauroides parvus, 375.
- Botaurus lentiginosus, 97, 237.
- Bowles, J. H., European Widgeon in Washington, 225.
- Brachyrampus, 379.
marmoratus, 299, 463.
- Bradornis pallidus tessmanni, 261.
- Braislin, Wm. C., the American Bittern on Long Island, N. Y., 97.
- Brant, Black, 463.
- Branta canadensis canadensis, 448.
c. hutchinsi, 449, 457.
c. minima, 449, 463.
c. occidentalis, 449, 459.
nigricans, 452, 463.
- Brazil, birds of, 41-50, 332-348, 518.
- 'British Birds,' review of, 125, 258, 380, 525.
- British Columbia, birds of, 107.
- British Ornithologists' Club, review of 'Bulletin,' 125, 257, 380.
- B. O. U. List, review of, 243.
- Brooks, W. Sprague, the Blue Goose (*Chen caerulescens* (Linn.)) in Rhode Island, 226.
- Brown, Nathan Clifford, the Evening Grosbeak at Portland, Maine, 102; the records of the Tennessee and Cape May Warblers in southern Maine, 104; addendum, 234.
- Brush Hill Bird Club, notice of first report of, 255.
- Buarremon matucanensis, 125.
- Bubo bubo ussuriensis, 26.
virginianus neochorus, 128.
v. saturatus, 303.
v. virginianus, 228.
- Buccanodon leucogrammicum, 528.
- Budytes flava flava, 286.
melanocephala, 286.

- Buffle-head, 458.
 Bulbul, Palestine, 288.
 Bulweria bulweri pacifica, 524.
 Bunting, Black-headed, 288.
 Cretzschmar's, 288.
 Indigo, 28, 498.
 Lark, 107.
 Ortolan, 288.
 Painted, 28, 329.
 Burns, Frank L., the Red-throated Loon (*Gavia stellata*) at Berwyn, Pa., 225; occurrence of the Pectoral Sandpiper (*Pisobia maculata*) near Salem, N. J., 226; the Cape May Warbler (*Dendroica tigrina*) as an abundant autumnal migrant and as a destructive grape juice consumer at Berwyn, Pa., 231; review of his 'Comparative Periods of Deposition and Incubation of Some North American Birds,' 516.
 Burrill, A. C., what bird lovers owe to the late Professor King, 239.
 Buteo borealis borealis, 447.
 b. calurus, 167.
 lineatus lineatus, 100.
 l. texanus, 322.
 Butorides brunnescens, 481.
 virescens, 481.
 v. cubanus, 482, 484.
 v. brunnescens, 482, 484
 v. virescens, 481.
 Buzzard, Black, 11.
 Turkey, 2, 4, 10, 11.
 CACATUA galerita, 263.
 gymnopsis, 384.
 Caccabis chukar synaica, 279.
 Cacomantis blandus, 129.
 Cahn, A. R., Notes on a captive Virginia Rail, 91-95; LeConte's Sparrow in Wisconsin, 497.
 Calamospiza melanocorys, 107.
 Calandra brachydactyla brachydactyla, 286.
 Calcarius lapponicus alascensis, 457, 458.
 l. lapponicus, 447.
 pictus, 457, 458.
 Calidris leucophæa, 97, 464.
 California, birds of, 59.
 'California Fish and Game,' notice of, 255.
 Callisitta azurea expectata, 258.
 Calonectris, 524.
 Camaroptera caniceps, 260.
 Cameron, E. S., obituary of, 540.
 Campephaga quiscalina münzneri, 528.
 Campylorhynchus, 147, 148, 150.
 trochilirostris, 151.
 Canada, birds of, 61, 442-459.
 Canary, Syrian, 288.
 Canvas-back, 237, 463.
 Caprimulgus europæus meridionalis, 282.
 hirundinaceus crissalis, 374.
 houyi, 528.
 macrurus, 513.
 m. mesophanis, 513.
 m. anamesus, 513.
 Caracara, Audubon's, 2, 100.
 Cardinal, 27, 328.
 Florida, 160, 163.
 Cardinalis cardinalis cardinalis, 27, 328.
 c. magnirostris, 328.
 Carduelis carduelis carduelis, 287.
 c. major, 381.
 Carpodacus erythrinus kubanensis, 382.
 mexicanus frontalis, 383.
 purpureus purpureus, 24, 447.
 synoicus, 288.
 s. petræ, 288.
 Carpodectes, 128.
 Carpospiza brachydactyla, 287.
 'Cassinia 1914,' review of, 376.
 Casuarius papuanus goodfellowi, 125.
 Catbird, 3, 10, 500.

- Catoptrophorus semipalmatus inornatus, 464.
- Centropus pygmaeus, 130.
senegalensis tschadensis, 260.
superciliosus loandæ, 258.
s. sokotræ, 258.
grilli wahlbergi, 380.
- Centurus carolinus, 238.
dubius dubius, 168.
- Cephus columba, 299, 461.
- Cerchneis sparveria andina, 516.
s. caucæ, 515.
s. distincta, 374.
s. fernandensis, 515.
s. intermedia, 516.
s. margaritensis, 374.
s. ochracea, 374.
s. perplexa, 516.
s. peruviana, 374.
tinnunculus, 282.
- Cercomela melanura melanura, 284.
- Ceriornis caboti, 170.
- Cerorhinca monocerata, 297.
- Certhia familiaris americana, 192, 505.
- Certhiola caboti, 170.
- Ceryle alcyon alcyon, 324.
a. caurina, 303.
- Ceyx solitaria mulcata, 257.
- Chæmepelia passerina passerina, 322.
rufipennis caucæ, 515.
- Chætura pelagica, 16.
- Chalcomitra senegalensis atra, 251.
adamanae, 260.
tanganjicae, 260.
- Chalcopelia afra kilimensis, 251.
chalcopsila intensa, 251.
c. media, 251.
- Chapman, F. M., the more northern species of the genus *Scytalopus* Gould, 406-423; review of his 'Diagnosis of Apparently New Colombian Birds. III,' 114; review of his 'Descriptions of Proposed New Birds from Central and South America, 515.
- Charadrius alexandrinus seebohmi, 524.
dominicus, 47.
- Charitonetta albeola, 463.
- Chat, Hooded, 284.
Pied, 284.
White-rumped, 284.
Yellow-breasted, 191, 330.
- Chaulelasmus streperus, 462.
- Chelidon, 524.
rustica rustica, 283.
r. transitiva, 283.
daurica rufula, 283.
- Chen cærulescens, 226.
hyperboreus hyperboreus, 367, 463.
rossi, 449.
- Chersophilus duponti, 384.
- Chestnut blight, birds as carriers of, 378.
- Chickadee, 3, 202-203.
Carolina, 193, 498.
Chestnut-backed, 305.
Hudsonian, 501.
- Chicken, Atwater's Prairie, 322.
- Chiff Chaff, 285.
- Chionis minor, 524.
- Chloris chloris chlorotica, 287.
- Chlorocichla gracilirostris chagwensis, 524.
indicator chlorosaturata, 524.
- Chlorœnas inornata exsul, 529.
- Chloronerpes rubiginosus buena-vistæ, 515.
r. yucatanicus, 168.
- Chlorophoneus münzneri, 528.
olivaceus taylori, 130.
- Chlorostilbon canivetii canivetii, 167.
- Chondestes grammacus grammacus, 26.
- Chordeiles virginianus chapmani, 16, 325.
v. virginianus, 15, 447.

- Chrysoptilus punctigula zuliæ, 516.
 Chuck-will's-widow, 15, 159.
 Cinclodes, 148, 149.
 Cinnerys hofmanni, 528.
 mediocris garguensis, 251.
 novæguineæ, 129.
 osea, 286.
 reichenowi kikuyensis, 251.
 venusta blicki, 251.
 zenobia marginata, 130.
 Cistothorus stellaris, 192.
 Clangula clangula americana, 463.
 islandica, 225.
 Cleptornis palauensis, 260.
 Coale, H. K., the present status of
 the Trumpeter Swan (*Olor bucci-*
 nator), 82-90; San Lucas Verdin
 in Arizona, 106.
 Coccyzus americanus americanus,
 324.
 minor palloris, 529.
 m. rileyi, 529.
 Cœreba caboti, 170.
 Colaptes auratus auratus, 325.
 a. luteus, 232, 448.
 Colinus eatoni, 375.
 virginianus floridanus, 207.
 v. virginianus, 204-207, 321.
 v. taylori, 530.
 Colius striatus jebelensis, 251.
 Collinge, W. E., review of his
 'Some Observations on the Food
 of Nestling Sparrows,' and his
 'Economic Importance of British
 Wild Birds,' 254.
 Collocalia esculenta maxima, 258.
 stresemanni, 129.
 hirundinacea excelsa, 258.
 nitens, 258.
 Colluricincla brunnea tachycripta,
 384.
 Colombia, birds of, 114.
 Colorado, birds of, 97, 358, 494, 498.
 Columba domestica, 306-316.
 flavirostris, 167.
 leucocephala, 167.
 Columba livia schimperi, 281.
 plumbea propinqua, 374.
 rufina andersoni, 374.
 r. tobagensis, 374.
 subvinacea peninsularis, 515.
 s. zullia, 374.
 Colymbus, 525.
 dominicus brachypterus, 167.
 holbœlli, 461.
 nigricollis californicus, 461.
 oligoceanus, 375.
 Compsothlypis americana usneæ,
 187.
 'Condor,' review of, 123, 256, 379,
 521.
 Coniornis altus, 292.
 Connecticut, birds of, 63.
 Conopophaga, 150.
 Conurina, 152.
 Conurus holochlorus strenuus, 529.
 Cooke, Wells W., bird migration in
 the Mackenzie Valley, 442-459;
 review of his 'Distribution and
 Migration of North American
 Rails,' 113; review of his 'Pre-
 liminary Census of Birds of the
 United States,' 253; review of
 his 'Bird Migration,' 510; review
 of his 'Our Shore Birds and their
 Future,' 518.
 Coot, 464.
 Cormorant, Brandt's 462.
 Double-crested, 95, 500.
 Pelagic, 302.
 White-crested, 462.
 Corthylio, 234, 235.
 calendula calendula, 236.
 c. cinerascens, 236.
 c. grinnelli, 236.
 c. obscurus, 236.
 Corvus affinis, 289.
 brachyrhynchos brachyrhyn-
 chos, 21, 229.
 caurinus, 304.
 corax principalis, 304.
 macrorhynchus osai, 530.

- Corvus ossifragus*, 21.
 vociferus, 169.
- Cory, Charles B., review of his 'Notes on South American Birds, with Descriptions of New Species,' 515; review of his 'Descriptions of New Birds from South America and Adjacent Islands,' 374.
- Cossypha bocagei albimentalis*, 260.
- Coturnix coturnix coturnix*, 280.
- Cowbird, 21.
- Crag-Martin, Pale, 283.
- Crake, Baillon's, 281.
 Corn, 281.
- Crandall, Lee S., Gray Sea Eagle off Nantucket, 368.
- Crane, Little Brown, 464.
 Sandhill, 2, 155, 159, 163, 166.
- Crateropus jardinei hypobrunneus*, 261.
 reinwardti houyi, 528.
 squamiceps squamiceps, 283.
- Crateroscelis virgata*, 260.
 albigula, 160.
- Creeper, Brown, 192, 371, 505.
- Crex crex*, 281.
- Crossbill, American, 304.
- Crow, 229, 438, 451.
 American, 21.
 Bermuda, 229.
 Fish, 11, 21, 163.
 Florida, 2, 11, 163.
 Northwestern, 304.
- Cryptoglaux acadica*, 303.
 funerea richardsoni, 101, 228, 502.
- Crypturellus*, 130.
- Crypturus tataupa*, 130.
 peruviana, 374.
- Cuckoo, Yellow-billed, 324.
- Cuculus mabiræ*, 524.
- Culver, D. E., Piping Plover at Cape May, N. J., 97.
- Curlew, Eskimo, 226.
 Hudsonian, 302, 465.
 Curlew, Long-billed, 321.
- Curtis, M. R., notice of his 'Factors Influencing the Size, Shape and Physical Constitution of the Egg of the Domestic Fowl,' 118.
- Curucujus massena australis*, 515.
- Cyanistes cyanus*, 261.
 pleskei, 261.
- Cyanocitta cristata cristata*, 232, 447.
 c. florincola, 20, 326.
- Cyanocompsa parellina beneplacita*, 529.
- Cyclarhis flaviventris yucatanensis*, 168.
- Cygnus passmori*, 85.
- Cynochorea owstoni*, 524.
- DA COSTA, notice of his 'Economic Value of the Birds of Brazil,' 518.
- Dafila acuta*, 463.
- Dall, William H., review of his 'Spencer Fullerton Baird. A Biography,' 505.
- Dearborn, N., notice of his 'Bird Houses and How to Build Them,' 117.
- Delaware, birds of, 71.
- Delaware Valley Ornithological Club, twenty-fifth anniversary meeting, 269.
- Demiegretta sacra*, 483.
- Dendrocincla*, 147.
- Dendrocolaptidæ, 145-153.
- Dendrocygna*, 374.
- Dendroica æstiva æstiva*, 187.
 bryanti bryanti, 168.
 cærulescens cærulescens, 109, 110, 187, 232, 498.
 c. cairnsi, 109, 110.
 castanea, 188, 230, 447.
 cerulea, 188.
 coronata, 187.
 discolor, 189.
 dominica albilora, 189.
 fusca, 188, 230.

- Dendroica magnolia*, 109, 188, 232, 447.
palmarum hypochrysea, 189.
p. palmarum, 189, 230, 447.
pennsylvanica, 109, 188.
striata, 188, 232, 448.
tigrina, 104, 105, 106, 187, 231, 233, 234, 447, 498.
vigorsi, 498, 504.
virens, 109, 189, 447.
- Dendromus aureicuspis*, 381.
Dendropicos fuscescens cosensi, 380.
lafresnayi loandæ, 380.
Dendroplex, 147.
Dichromanassa peali, 483.
rufescens, 483.
rufa, 167.
- Dichromatism, 481-484.
 Dickcissel, 28, 329.
 Dickey, Samuel S., rare birds near Waynesburg, Pa., 236; the resident Chickadee of southwestern Pennsylvania, 498.
Dicrurus münzneri, 528.
Diomedea nigripes, 300.
Dolichonyx oryzivorus, 21.
 Dove, Ground, 322.
 Mourning, 2, 4, 238.
 Rock, 306-316.
 Turtle, 281.
 Western Mourning, 322.
 Dowitcher, Long-billed, 464.
Drymophila, 150.
Dryoscopus angolensis camerounensis, 524.
 Duck, Florida Black, 155, 159, 160.
 Harlequin, 225, 302, 463.
 Lesser Scaup, 2, 463.
 Mottled, 318.
 Ring-necked, 239, 463.
 Ruddy, 463.
 Scaup, 463, 500.
 Wood, 102, 162-163, 165, 463.
Dulciornis alisteri mayi, 126.
Dumetella carolinensis, 191, 232, 500.
- Dunlin, 281.
 Dunlop, Eric B., notes on some Manitoban birds, 500.
Drymornis, 147.
Dryobates borealis, 324.
 pubescens microleucus, 128.
 scalaris parvus, 168.
 villosus sitkensis, 303.
Dryoscopus angolensis camerounensis, 524.
- EAGLE, Bald, 236.
 Gray Sea, 368.
 Northern Bald, 303.
 Economic Ornithology in recent Entomological publications, review of, 253, 520.
Ectopistes migratorius, 29-41.
 Egret, 3, 4, 161.
 Reddish, 483.
Egretta dimorpha, 125.
 Eider, King, 454.
 Pacific, 452, 454.
 Eifrig, C. W. G., concealing posture in Grebes, 95; Cory's Least Bittern in Illinois, 98; an albinistic Bobolink, 101; notes on some birds of the Maryland Alleghanies; an anomaly in the Check-List, 108; Bachman's Sparrow near Chicago, Illinois, 496.
Elainea ridleyana, 50.
Emberiza cæsia, 288.
 prageri, 382.
 hortulana, 288.
 melanocephala, 288.
 m. orientalis, 261.
Empidonax difficilis difficilis, 304.
 flaviventris, 447.
 minimus, 20, 448.
 trailli alnorum, 20, 447.
 t. trailli, 20.
 virescens, 20.
 'Emu,' review of, 126, 381.
Entomothera coromanda, 513.

- Entomothera* *c. bangsi*, 513.
c. mizorhina, 513.
c. neophora, 513.
c. ochrothorectis, 513.
c. pagana, 513.
Eoecornis ardetta, 375.
Ereunetes mauri, 302, 464.
pusillus, 202, 236, 448, 524.
Erismatura jamaicensis, 463.
Erythropus vespertinus trans-
riphæus, 527.
Estrilda atricapilla keniensis, 251.
Ethelornis magnirostris whitlocki,
527.
Eudypetes chrysolophus, 514.
Eumomota s. superciliosa, 168.
Euphagus carolinus, 23, 447, 503.
cyancephalus, 23, 383.
Eupsychortyx nigrigularis, 167.
- FALCO columbarius suckleyi*, 107.
falconella, 375.
percontator, 168.
peregrinus, 381.
p. anatum, 303.
pyrrhogaster, 381.
sparverius sparverius, 445.
s. sparveroides, 480.
- Faxon, Walter, *Junco* breeding in
Concord and Lexington, Mass.,
497; review of his 'Relics of
Peale's Museum,' 512.
- Feilden, G. St. C., review of his
'Notes on some Birds of Trinidad
and Tobago,' 122.
- Fernando Noronha, birds of, 41, 50.
- Finch, Palestine Green, 287.
Purple, 24, 178.
Sinai Rosy, 288.
- Flicker, 2, 10, 160, 232, 325, 449.
- Florence, Laura, review of her re-
port on the food of birds in
Scotland, 121, 519.
- Florida, birds of, 1-14, 154-166,
211-213.
- Florida *cærulea*, 167, 479.
- Floyd, Charles B., Brown Thrasher
wintering in Mass., 370.
- Flycatcher, Acadian, 20.
Alder, 20, 240.
Crested, 10, 18, 163, 325.
Eastern Spotted, 283.
Least, 20.
Olive-sided, 19.
Scissor-tailed, 18.
Traill's, 20.
Yellow-bellied, 19.
Western, 304.
- Forbush, E. H., notice of his
'Seventh Annual Report of the
State Ornithologist of Massa-
chusetts,' 377.
- Formicariidæ, 150.
- Francolinus bicalcaratus adamauæ*,
528.
hildebrandti helleri, 251.
- Franzen, J. W., Willow Ptarmigan
in Minnesota, 99.
- Fratercula arctica arctica*, 495.
corniculata, 296.
- Fregata, 384.
aquila, 47.
ariel, 259.
ariel subsp.?, 345.
minor, 259.
minor nicolli, 345.
- Fregilupus varius*, 382.
- Frigate-bird, 47.
- Fuertes, Louis Agassiz, another
European Widgeon in Virginia,
367.
- Fulica americana*, 464.
- Fulmar, Pacific, 300.
- Fulmarus glacialis ghipischa*, 300.
- Furnarius, 148.
- GADWALL, 462.
- Galerida cristata*, 125.
- Gallinago delicata*, 368, 464.
- Gallinula galeata*, 320.
- Gallinule, Florida, 11, 320.
Purple, 320.

- Garrulus diaphorus*, 380.
 minor, 384.
Gavia adamsi, 454, 494.
 immer, 461.
 pacifica, 296, 454, 461.
 pusilla, 375.
 stellata, 225, 367, 461.
 Generic limits, 387.
Geobates, 147.
Geocichla princei grauceri, 260.
 gurneyi oberländeri, 260.
 g. tanganjicae, 260.
 major, 530.
Geopelia shutridgei, 127.
 Georgia, birds of, 207-210.
Geothlypis trichas ignota, 190.
 t. trichas, 190, 330.
 Gill, Theodore Nicholas, obituary
 of, 139; in memoriam, 391-
 405.
Glaucidium brasilianum ridgwayi,
 167.
Glyphorhynchus, 149.
Gnateatcher, Blue-gray, 106, 193.
Golden-eye, 463.
 Barrow's, 225.
Goldfinch, 24, 238, 287.
Goose, Blue, 226.
 Cackling, 463.
 Canada, 449, 450.
 Hutchin's, 452.
 Ross's, 452.
 Snow, 367, 463.
 White-checked, 463.
 White-fronted, 463.
Goshawk, White, 484.
 Gould, Jos. E., birds observed in
 Trinity churchyard, N. Y. City,
 371.
Grackle, Boat-tailed, 10, 24, 158.
 Bronzed, 24.
 Florida, 1, 10, 23, 160, 163.
 Purple, 232.
 Tristram's, 289.
Grammopsittaca lincola maculata,
 529.
Great-tit, Palestine, 286.
Grebe, Eared, 461.
 Holbøll's, 461.
 Pied-billed, 461.
 Western, 461.
Greenshank, 281.
 Grinnell, J., a new subspecies of
 Screech Owl from California, 59-
 60; review of 'Nature and Science
 on the Pacific Coast,' edited by,
 513.
Griscom, Ludlow, the Little Black
 Rail on Long Island, N. Y., 227;
 Prairie Horned Lark in Rhode
 Island in summer, 229.
Griscom, Ludlow and Harper,
 Francis, the Bohemian Waxwing
 (*Bombycilla garrula*) at Ithaca,
 N. Y., 369.
Grosbeak, Alaska Pine, 239.
 Blue, 28, 329.
 Evening, 102.
 Rose-breasted, 27, 445.
Grouse, Ruffed, 238.
Grus americana, 447.
 canadensis, 457, 464.
 marshi, 375.
Guillemot, Pigeon, 299, 461.
Guiraca caerulea caerulea, 28, 168,
 329.
Gull, Audouin's, 281.
 Bonapartes, 462.
 California, 462.
 Glaucous, 281, 454.
 Glaucous-winged, 300, 462.
 Heermann's, 462.
 Herring, 300.
 Iceland, 495.
 Sabine's, 454.
 Short-billed, 452, 462.
 Western, 462.
Guracava difficilis, 251.
Guttera, 383.
Gygis crawfordi, 48, 345.
 candida, 48.
 alba, 48.

- HEMATOPUS bachmani*, 302, 465.
Halcyon chloris keiensis, 130.
 leucocephala ogilviei, 258.
 malimbicus prenticei, 251.
 senegalensis cinereicapillus,
 251.
Haliaeetus albicilla, 368.
 leucocephalus alascanus, 303.
 l. leucocephalus, 236, 323.
Hankin, E. H., review of his 'Animal Flight,' 245.
Harelda hyemalis, 463.
Harper, Francis, see Griscom, Ludlow.
Hartert, Ernst, review of his 'Die Vögel der palaarktischen Fauna,' 248.
Hawk, Black Pigeon, 167.
 Cuban Sparrow, 480.
 Duck, 303.
 Florida Red-shouldered, 10, 13.
 Florida Sparrow, 4.
 Levant Sparrow, 282.
 Marsh, 159.
 Red-shouldered, 100, 163.
 Red-tailed, 445.
 Texas Red-shouldered, 322.
Heald, F. D. and Studhalter, R. A., review of their 'Birds as Carriers of the Chestnut-Blight Fungus,' 119.
Helinaia swainsoni, 186.
Helmitheros vermivorus, 186.
Helodromas solitarius, 238.
 s. cinnamomeus, 464.
Henshaw, H. W., review of his 'Report of Chief of Bureau of Biological Survey,' 252; review of his 'American Game Birds,' 517.
Herman, Otto, obituary of, 539.
Herodias eulophotes, 124.
Heron, Black-crowned Night, 3, 4, 165, 424-441.
 Great Blue, 2, 3.
 Great White, 483.
 Green, 4, 430, 481.
Heron, Little Blue, 2, 4, 158, 165, 483.
 Louisiana, 3, 4, 165.
 Northwestern Coast, 302, 464.
 Purple, 281.
 Reef, 483.
 Ward's, 2, 3, 4, 158.
 Yellow-crowned Night, 97, 158, 236.
Herpotheres cachinnans, 167.
Hesperiphona vespertina vespertina, 102.
Hesperornis montana, 293.
 regalis, 290.
Hierophasis dissimilis, 383.
Hippolais languida, 285.
 pallida pallida, 285.
Hirundo, 525.
 erythrogastra, 184, 236.
 rustica, 236.
 urbica urbica, 283.
Histrionicus histrionicus, 225, 302, 463.
Hornaday, William T., review of his 'Wild Life Conservation in Theory and Practice,' 248.
Hornbill, Giant, 113.
Hull, E. D., the Double-crested Cormorant in the Chicago area, 95; note on the feeding of the Mallard, 96.
Hummingbird, Ruby-throated, 17.
Hyliota slatini, 260.
Hylocichla aliciae aliciae, 193, 447.
 fuscescens fuscescens, 109, 193, 237.
 guttata pallasi, 104, 232, 447, 505.
 mustelina, 193, 331.
 ustulata swainsoni, 194, 448.
 u. ustulata, 305.
Hypocharmosyna rubrigularis krakeri, 384.
Hypoleucus varius perthi, 513.
 v. whitei, 513.
Hypotriorchis subbuteo irkutensis, 260.

- 'IBIS,' review of the, 124, 257, 522.
 Ibis, White, 4, 10, 158, 161, 163, 165.
 Wood, 3, 4, 161.
 Icteria virens virens, 191, 330.
 Icterus galbula, 23.
 gularis yucatanensis, 168.
 m. mesomelas, 169.
 spurius, 22.
 Ihering, Herman von, the classification of the family Dendrocolaptidae, 145-153.
 Illinois, birds of, 95, 98, 101, 348, 367, 496.
 Incubation, time of, 134.
 Indiana, birds of, 348.
 Indicator minor alexanderi, 380.
 exilis leona, 380.
 e. ansorgei, 380.
 Ingersoll, E., review of 'Alaskan Bird-Life,' edited by, 114.
 Iornornis martinicus, 320.
 Iowa, birds of, 234, 354.
 Iridoprocne bicolor, 184.
 Irrisor erythrohynchus ruwenzoræ, 523.
 Ithaginis cruentus kuseri, 263.
 tibetanus, 125.
 Ixobrychus exilis, 319, 482, 483.
 minutus victoria, 527.
 neoxenus, 99, 482, 483.
 Ixoreus naevius naevius, 305.
 n. meruloides, 452.
 Ixulus flavicollis baileyi, 125.
 JAEGER, Parasitic, 299, 461.
 Jay, Blue, 232, 466.
 Canada, 500.
 Florida, 2, 20, 326.
 Florida Blue, 2.
 Jewel, L. L., the diving instinct in Shorebirds, 227.
 Job, Herbert K., review of his 'Propagation of Upland Game Birds,' 509; review of his 'Propagation of Wild Water-fowl,' 509.
 Johnson, Charles Eugene, a four-winged wild-duck, 469-480.
 'Journal für Ornithologie,' review of, 260, 528.
 Junco, 201.
 hyemalis carolinensis, 109.
 h. hyemalis, 26, 497.
 h. oreganus, 304.
 oreganus, 304.
 Junco, Carolina, 109.
 Oregon, 304.
 Slate-colored, 26, 371, 497.
 Jynx ruficollis cosensi, 380.
 torquilla harterti, 527.
 KANSAS, birds of, 358.
 Karua leucomela mayi, 126.
 Kennard, F. H., on the trail of the Ivory-bill, 1-14; the Okaloa-coochee Slough, 154-166.
 Kentucky, birds of, 215-218.
 Kestrel, 282.
 Killdeer, 11, 465.
 King, F. H., 239.
 Kingbird, 18, 368.
 Arkansas, 18, 495.
 Kingfisher, 282.
 Belted, 2, 163, 324.
 Northwestern Belted, 303.
 Kinglet, Golden-crowned, 305, 505.
 Ruby-crowned, 193.
 Sitka, 107.
 Western Golden-crowned, 305.
 Kite, Everglade, 159.
 Swallow-tailed, 10, 11, 154, 163.
 Kittiwake, Pacific, 300, 461.
 Knot, 464.
 Kopman, H. H., list of the birds of Louisiana, 15-29, 183-194.
 Kretzmann, Paul E., the Arkansas Kingbird (*Tyrannus verticalis*) in eastern Minnesota, 495.
 Kuroda, N., notice of his recent ornithological publications, 116.
 LAGOPUS lagopus lagopus, 99.

- Laing, Hamilton M., review of his 'Out with the Birds,' 510.
- Laiscopus collaris whymperi, 379.
- Lane, James W., Cape May Warblers destructive to grapes on Long Island, 498.
- Lanius collurio collurio, 286.
excubitor aucheri, 285.
ludovicianus ludovicianus, 108, 184.
l. migrans, 185.
nubicus, 285.
serrator niloticus, 286.
- Lanivireo flavifrons, 185.
solitarius solitarius, 185, 447.
- Lark, Calandra, 286.
Eastern Calandra, 286.
Hoyt's Horned, 447.
Mt. Herman Horned, 286.
Prairie Horned, 20.
Short-toed, 286.
Sinai Desert, 286.
- Larus argentatus, 300.
audouini, 281.
brachyrhynchus, 452, 462.
californicus, 462.
glaucescens, 300, 462.
heermanni, 462.
hyperboreus, 281, 450.
leucopterus, 495.
occidentalis, 462.
philadelphia, 462.
pristinus, 375.
taimyrensis, 527.
t. antelius, 527.
- Leptophaëton, 197.
- Leptotila rufaxilla hellmayri, 515.
r. pallidipectus, 515.
verreauxi nuttingi, 529.
- Lestornis crassipes, 291.
- Leucippus fallax richmondi, 516.
- Leucophoyx c. candidissima, 167.
- Levick, G. Murray, review of his 'Antarctic Penguins,' 372.
- Licmetis nasica, 263.
- Limicolavis pluvianella, 375.
- Limpkin, 517.
- Limosa hæmastica, 445.
- Linnæus, Eastern, 287.
- Lobipes lobatus, 302, 464, 500.
- Lochmias, 148, 149.
- Locustella fluviatilis, 284.
- Löfström Lawrence L., bird notes from Cambridge, Isanti County, Minn., 501.
- Loon, 461.
Pacific, 296, 454, 461.
Red-throated, 225, 367, 461.
Yellow-billed, 454, 494.
- Lophoceros nasutus maraisi, 130.
- Lophodytes cucullatus, 462.
- Lophortyx gambellii sanus, 128.
- Louisiana, birds of, 15-29, 213-215.
- Loxia curvirostra minor, 304.
pytropsittacus, 523.
- Luscinia luscinia, 284.
- Lunda cirrhata, 296, 461.
- McATEE, W. L., review of his 'How to Attract Birds in North-eastern United States,' 252; notice of his 'Eleven Important Wild Duck Foods,' 518.
- McIlhenny, E. A., review of his 'The Wild Turkey and Its Hunting,' 115.
- Machetes pugnax, 226, 524.
- Mackenzie, L. L., the Red-throated Loon (*Gavia stellata*) in Jackson Park, Ill., 367.
- Macrorhamphus griseus scolopæceus, 457, 464.
- Macropygia amboinensis meeki, 384.
rufa krakeri, 384.
- Macrosphenus flavicans ugandæ, 524.
- Maine, birds of, 102, 104, 234.
- Malaconotus olivaceus pallidirostris, 528.
- Mallard, 96, 225, 449, 462.
- Manitoba, birds of, 500, 510.
- Mareca americana, 225, 462.

- Mareca penelope*, 225, 367, 462.
Margarornis, 149.
Marila americana, 237, 462.
 affinis, 462.
 collaris, 239, 462.
 marila, 462, 500.
 valisineria, 237, 462.
 Martin, Purple, 2, 183.
 Sand, 283.
 Maryland, birds of, 73, 108.
 Massachusetts, birds of, 63, 104,
 230, 367, 368, 370, 495, 497, 499.
 Mathews, Gregory M., Phaëthon
 catesbyi Brandt, 195-197; re-
 view of his, 'The Birds of Aus-
 tralia,' 116, 512.
 Mathewsena, 127.
 Meadowlark, 21, 180.
 Southern, 2, 22, 160, 163, 326.
 Mearns, E. A., reviews of his papers
 on new African birds, 251.
 Mearns, Louis di Zarega, obituary,
 268.
Megalestris maccormicki, 373.
Megaquiscalus major major, 24.
Melanerpes erythrocephalus, 237,
 324.
Melanocorypha calandra calandra,
 286.
 bimaculata, 286.
Melanorhynchus umbrinus, 260.
Meleagris gallopavo silvestris, 207-
 224, 322.
Melilestes chloreus, 260.
Melirrhophetes rufocrissalis, 260.
*Melittophagus variegatus bang-
 weoloensis*, 258.
 v. loringi, 251.
Melopelia asiatica mearnsi, 529.
 a. trudeaui, 167.
Melospiza georgiana, 27, 447.
 lincolni lincolni, 27.
 melodia melodia, 27.
 m. rufina, 304.
 Merganser, 462.
 Hooded, 462.
 Merganser, Red-breasted, 462.
Mergus americanus, 462.
 serrator, 462.
Merops apiaster, 282.
 Merrill, D. E., Audubon's Caracara
 in New Mexico, 100.
Merula celanops yakushimensis,
 530.
Merulaxis griseicollis, 414.
 squamiger, 414.
 Mesites, 382.
 Mesitornis, 382.
Mesocarbo ater ater, 513.
 a. territorii, 513.
 Mesœnas, 382.
 'Messenger Ornithologique,' review
 of, 261, 527.
 Michigan, birds of, 348.
Micranous leucocapillus, 48, 345.
Micrastus melanoleucus, 168.
Micrecca poliocephala, 260.
Micropalama himantopus, 447.
 Microzalias, 524.
 Migration, 442-459, 510.
 Miller, W. DeW., the Whimbrel,
 Ruff, Buff-breasted Sandpiper,
 and Eskimo Curlew on Long
 Island, N. Y., 226; Richardson's
 Owl and other owls in Franklin
 County, New York, 228; Cor-
 thylio — a valid genus for the
 Ruby-crowned Kinglet, 234; re-
 view of his 'Notes on Ptilosis with
 Special Reference to the Feather-
 ing of the Wing,' 373.
Mimus gilvus gracilis, 168.
 polyglottos polyglottos, 191.
 Minerva, 375.
 Minnesota, birds of, 99, 354, 495, 501.
 Mississippi, birds of, 213-215.
 Missouri, birds of, 354.
 Mitchell, H. H., Mallards wintering
 in Saskatchewan, 225; Lewis's
 Woodpecker taken in Saskatche-
 wan, 228; Crows nesting on the
 ground, 229.

- Mniotilta varia, 185, 232, 448.
Mockingbird, 2, 10, 163, 191.
Molothrus ater ater, 21.
Momotus yucatanensis, 168.
Monarcha chalybeocephalus manu-
mudari, 384.
Montana, birds of, 225, 238.
Monticola saxatilis, 284.
 solitarius solitarius, 284.
Moore, Robert T., methods of
recording bird songs, 535.
Moroccoeyx erythropygius mexi-
cana, 529.
Motacilla alba alba, 286.
Munro, J. A., two new records for
British Columbia, 107.
Murphy, Robert Cushman, ten
hours at Fernando Noronha,
41-50; the Atlantic range of
Leach's Petrel (*Oceanodroma
leucorhoa* (Vieillot)), 170-173;
a note on the migration at sea of
shore birds and swallows, 236;
the bird life of Trinidad Islet,
332-348; review of his 'The
Penguins of South Georgia,' 514.
Murphy, R. C., and Rogers, C. H.,
a winter record for the Palm
Warbler on Long Island, N. Y.,
230.
Murre, California, 299, 461.
Murrelet, Ancient, 298, 461.
 Marbled, 299, 461.
Muscicapa striata neumanni, 283.
Muscivora forficata, 18.
Myiarchus crinitus, 18, 325.
Myiobius, 145.
Myiochanes virens, 19.
Myornis, 408, 410.
 senilis, 410.
Myrmotherula, 150.
- NANNOCNUS ijimæ, 530.
Nannus hiemalis hiemalis, 192.
 h. pacificus, 305.
 troglodytes pallidus, 283.
- Nantucket, birds of, 368.
Nasica, 147.
National Association of Audubon
Societies, review of 'Annual
Report for 1914,' 117.
Nebraska, birds of, 358.
Nebraska, Ornithologists' Union,
notice of 'Proceedings,' 379, 522.
Nelson, E. W., a bird census of the
United States, 267.
Neonectris griseus missus, 524.
 g. pescadorei, 524.
Neopsittacus muschenbroeki al-
pinus, 125.
Nettion carolinense, 302, 458, 462,
469-480.
New Hampshire, birds of, 240, 496.
New Jersey, birds of, 71, 97, 226,
370, 498.
New Jersey Audubon Society, no-
tice of 'Annual Report for 1914,'
255.
New Mexico, birds of, 100.
New York, birds of, 68, 97, 226,
227, 228, 230, 237, 369, 371, 495.
Nichols, J. T., Spotted Sandpiper
and water, 368.
Nighthawk, 15.
 Florida, 16, 325.
Nightingale, 284.
Night-jar, 282.
Noddy, 48, 345.
North Carolina, birds of, 207-213.
Nothoprocta ambigua, 374.
Notiœnas, 529.
Nova Scotia, birds of, 368.
Nucifraga caryocatactes altaicus,
527.
 columbiana, 371.
Numenius americanus, 302, 460.
 borealis, 226, 447.
 hudsonicus, 302, 465.
 phaëopus, 226.
Numida meleagris (?), 342.
Nuteracker, Clarke's, 371.
Nuthatch, Brown-headed, 10, 193.

- Nuthatch, Red-breasted, 192.
White-breasted, 192.
- Nuttallornis borealis, 19.
- Nycticorax cyanocephalus falk-
landicus, 125.
nycticorax naevius, 424, 441.
- Nyctidromus albicollis obscurus,
374.
- Nyctinassa violacea, 236.
- Nyroca ferina, 261.
nyroca, 261.
- OBERHOLSER, H. C., review of his
'A Synopsis of the Races of the
Long-tailed Goatsucker, Capri-
mulgus macrourus,' 513; review
of his 'A Review of the Subspe-
cies of the Ruddy Kingfisher,
Entomothera coromanda (Lin-
naeus),' 513; review of his
'Critical Notes on the Subspecies
of the Spotted Owl, Strix oeci-
dentalis (Xantus), 513.
- Obituary Notices, 133, 268, 539.
- Oceanites oceanicus, 46.
- Oceanodroma, 379.
beali, 301.
beldingi, 301.
furcata, 300.
hornbyi, 524.
leucorhoa, 170-173.
l. kaedingi, 301.
- Odontophorus guianensis panamen-
sis, 515.
plumbeicollis, 374.
- Enanthe isabellina, 284.
leucopyga, 284.
lugens lugens, 284.
melanoleuca finchii, 284.
enanthe rostrata, 284.
monacha, 284.
stapanza, 380.
- Enœnas chiriquensis, 530.
- Ohio, birds of, 218-224.
- Oidemia americana, 463.
deglandi, 447, 463.
- Oidemia perspicillata, 463.
- Oklahoma, birds of, 362.
- Olor buccinator, 82-90.
columbianus, 82, 84, 85, 463.
americanus, 85, 86.
- 'Oologist' review of the, 124, 257,
379, 522.
- Onychorhynchus, 145.
- Oporornis agilis, 190, 504.
formosus, 190.
philadelphia, 190, 505.
- 'Oregon Sportsman,' notice of, 255.
- Oreopsittacus arfaki intermedius,
260.
a. major, 125.
- Oriole, Baltimore, 23.
Orchard, 22.
- Oriolus musicus, 169.
- 'Ornithologische Monatschrift,'
notice of, 127.
- 'Ornithologische Monatsberichte,'
notice of, 128, 261, 381, 528.
- 'Ornithologisches Jahrbuch,' no-
tice of, 260-527.
- Orthorhamphus magnirostris, 517.
- Ostrich, 279.
- Otocoris alpestris bicornis, 286.
a. hoyti, 447.
a. praticola, 20.
- Othyphantes edmundi, 261.
- Otus asio bendirei, 60.
a. gilmani, 60.
a. kennicotti, 60.
a. mecalli, 323.
a. **quercinus**, 60.
choliba margaritæ, 374.
- Ovenbird, 189, 232, 237, 241.
- Owl, Barred, 163, 228.
Butler's, 282.
Dusky Horned, 303.
Florida Barred, 4, 10.
Florida Burrowing, 155.
Hawk, 228.
Great Horned, 159, 228.
Long-eared, 228.
Richardson's, 101, 228, 502.

- Owl, Saw-whet, 303.
Texas Screech, 323.
- Oxyechus vociferus, 465.
- Oyster-catcher, Black, 302, 460.
- PACHYCEPHALA hypoleuca, 260.
pectoralis goodsoni, 129.
- Palæornis krameri centralis, 528.
- Palestine, birds of, 273.
- Palmer, T. S., on obituary notices, 133; in memoriam Theodore Nicholas Gill, 391-405.
- Pangburn, Clifford H., some New York City notes, 237.
- Partridge, Chukar, 279.
Hey's, 279.
- Parus ater prageri, 382.
major terræ-sanctæ, 286.
- Passer domesticus, 51-59, 198.
d. biblicus, 52, 287.
d. arboreus, 53.
d. ahasver, 53.
d. chephreni, 53.
d. indicus, 53, 287.
d. pyrrhonotus, 53.
d. tingitanus, 52.
d. niloticus, 53, 287.
hispaneolensis transcaspicus, 288.
maobiticus maobiticus, 288.
- Passerculus sandwichensis alaudinus, 457.
s. savanna, 25, 439.
- Passerella iliaca iliaca, 27, 447.
i. townsendi, 305.
- Passerherbulus henslowi henslowi, 25.
lecontei, 25, 457, 458, 497.
maritimus fisheri, 25.
m. sennetti, 327.
nelsoni nelsoni, 25, 447, 501.
- Passerina ciris, 28, 329.
cyanea, 28, 498.
- Peal's Museum, 512.
- Pearl, Raymond, notice of his 'Improving Egg Production by Breeding,' and 'The Brooding Instinct in its Relation to Egg Production,' 118.
- Pearl, Raymond and Surface, F. M. notice of their 'Variation and Correlation in the Physical Characters of the Egg,' 118.
- Pelecanus erythrorhynchos, 462.
- Pelican Brown, 2.
White, 462.
- Pelidna alpina alpina, 281.
- Penguin, Adelle, 372.
Emperor, 373.
- Pennsylvania, birds of, 106, 225, 231, 236, 498.
- Penthestes carolinensis carolinensis, 193, 498.
hudsonicus hudsonicus, 501.
rufescens rufescens, 305.
- Perdix daurica suschkini, 261.
- Perisoreus canadensis canadensis, 500.
c. sanfordi, 128.
infaustus maritimus, 527.
- Peristera geoffroyi, 49.
- Petrel, Fork-tailed, 300.
Kaeding's, 301.
Leach's, 170-173.
Wilson's, 46.
- Petrochelidon fulva pallida, 102.
lunifrons lunifrons, 184.
l. tachina, 102.
- Petronia petronia puteicola, 287.
- Peucea aestivalis bachmani, 26, 327, 496.
- Pewee, Wood, 19, 240.
- Phacellodomus, 148.
- Phætho æthereus, 47, 197.
americanus, 195.
candidus, 195.
catesbyi, 195-197.
flavirostris, 195.
fulvus, 47.
lepturus, 46, 195.
rubricauda, 197.
- Phalacrocorax auritus auritus, 95.
500, 517.

- Phalacrocorax a. cinctatus*, 462.
carbo indicus, 513.
d. ditophus, 95.
macropus, 481, 485-488.
marinavis, 375.
mediterraneus, 375.
pelagicus pelagicus, 302.
penicillatus, 462.
 Phalarope, Northern, 302, 464, 500.
Phasianus alfhildæ, 375.
americanus, 375.
mioceanus, 375.
mongolicus bergii, 261.
roberti, 376.
Pheuticus chrysopeplus laubmanni,
 382.
Philemonopsis meyeri canescens,
 260.
 Phillips, Charles L., the Black-
 burnian and Bay-breasted War-
 blers at Martha's Vineyard,
 Mass., 230.
 Phillips, John C., notes on American
 and Old World English Spar-
 rows, 51-59; the old New Eng-
 land Bobwhite, 204-207; Snow
 Geese and Swans in Massa-
 chusetts, 367; some birds from
 Sinai and Palestine, 273-289;
 review of his 'Experimental
 Studies of Hybridization among
 Ducks and Pheasants,' 249.
Philohela minor, 108.
Philydor, 147, 150.
Phlegœnas beccarii admiralitatis,
 129.
Phlœotomus pileatus abieticola, 109,
 238.
Phœbe, 2, 19, 463.
*Phœnicurus phœnicurus phœni-
 curus*, 284.
*Phyllastrephus leucolæma came-
 runensis*, 260.
lorenzi, 260.
Phyllobasileus, 235.
Phylloscartes paulista, 251.
Phylloscopus bonelli orientalis, 285.
sibilatrix sibilatrix, 285.
collybita, 285.
Piaya, 516.
cayana ceareæ, 516.
melanogaster ochracea, 516.
Pica pica bactriana, 527.
Piconotus capensis xanthopygos,
 283.
Picoides arcticus, 503.
Picolaptes, 147, 148.
Picus dubius, 168.
owstoni, 530.
parvus, 168.
Pigeon, Rock, 281.
Pinicola enucleator alascensis, 239.
e. altaicus, 527.
e. sakhalinensis, 527.
eschatosus, 128.
Pintail, 449, 463.
*Pipilo erythrophthalmus ery-
 throphthalmus*, 27.
Pipit, 191.
Sprague's, 191, 239.
Tawny, 286.
Tree, 286.
Pipra aureola scarlatina, 382.
Piranga erythromelas, 183, 232, 237.
ludoviciana, 183, 455.
rubra rubra, 183, 330.
roseogularis, 169.
Pisobia fuscicollis, 447.
maculata, 226, 236, 464.
minutilla, 464.
Planesticus grayi tamaulipensis, 168
migratorius migratorius, 194,
 232, 448.
Platycercinæ, 152.
Platypsaris aglaia yucatanensis,
 168.
Platyurus niger, 411.
Ploceus melanolema, 260.
Plover, Black-bellied, 465, 500.
Piping, 97, 500.
Semipalmated, 97, 302, 465.
Snowy, 465.

- Plover, Stone, 518.
Podager nacunda minor, 374.
Podilymbus podiceps, 95, 461.
Poccytes gramineus confinis, 457, 499.
 g. gramineus, 24.
Pogoniulus chrysoconus rhodesiæ, 380.
Poicephalus meyeri nævei, 125.
Poliolais alexanderi, 258.
Polioptila cærulea cærulea, 106, 193.
Polyborus cheriway, 100, 167.
Pomatorhinus horsfieldi trancoreensis, 263.
 ruficollis bakeri, 263.
Pomeroy, Harry Kirkland, obituary, 386.
Porphyrio mertonii, 130.
Porzana carolina, 464.
 pusilla, 281.
Potter, Julian K., Prothonotary Warbler at South Vineland, N. J., 370.
Prionochilus anthonyi,
 Progne subis subis, 183.
Protonotaria citrea, 186, 370, 503.
Pseudopitta, 260.
Pseudoseisura, 148.
Psilorhinus mexicanus vociferus, 169.
Psittacella modesta collaris, 125.
Psittaci, 151.
Psittacula conspicillata caucæ, 515.
Ptarmigan, Willow, 99.
Pterocles lichtensteini arabicus, 280.
 quadricinctus lowei, 125.
Ptilotis simplex, 260.
Ptychoramphus aleuticus, 297.
Publications Received, 131, 264, 384, 531.
Puffin, 495.
 Horned, 296.
 Tufted, 296, 461.
Puffinus bannisteri, 524.
 gravis (?), 342.
 griseus, 300.
 Puffinus kuhli borealis, 524.
 fortunatus, 524.
 leucomelas, 524.
 nativitatis, 524.
Putnam, F. W., obituary, 541.
Pygoscelis adeliæ, 372.
 antarctica, 514.
 papua, 514.
Pyrrherodias purpurea, 281.
Pyrrhura melanura pacifica, 515.
Pyrrhurinæ, 152.
QUAIL, Egyptian, 280.
 Florida, 4, 10.
Querquedula ciria, 281.
 discors, 462.
Quiscalus quiscula æneus, 24, 448.
 q. aglæus, 23.
 q. quiscula, 232.
RAIL, Clapper, 113.
 King, 238.
 Virginia, 91-95, 464.
Rallus elegans, 238.
 virginianus, 91-95, 464.
Raperia godmaniæ, 526.
Rathbun, Samuel F., list of water and shore birds of the Puget Sound region in the vicinity of Seattle, 459-465.
Raven, Fan-tailed, 289.
 Northern, 304.
Redbird, 10.
Redhead, 237, 463.
Redpoll, 200.
Redstart, 191, 232, 284, 449.
Redwing, Florida, 2, 21.
Reguloides, 235.
Regulus calendula calendula, 193, 233.
 c. grinnelli, 107.
 cuvieri, 235.
 satrapa satrapa, 193, 505.
 s. olivaceus, 305.
Reichenow, A., review of his 'Die Vögel,' 119.

- 'Revista Italiana Ornitologia,' review of, 382.
 'Revue Française d'Ornithologie,' review of, 382, 525.
 Rhea plumage, 142.
 Rhinoplax vigil, 113.
 Rhinopomastus cyanomelas intermedius, 130.
 Rhoads, Samuel N., notice of his expedition of Guatemala, 271.
 Rhode Island, birds of, 226, 229.
 Rhynchortyx cinctus australis, 515.
 Riparia riparia, 184, 283.
 obsoleta obsoleta, 283.
 Rissa tridactyla pollicaris, 300, 461.
 Roberts, Isaac G., Cape May Warbler eating grapes, 233.
 Roberts, T. S., appointment of, 541.
 Robin, 10, 106, 178, 194, 232, 240, 449, 466.
 Robins, C. A., winter birds at Warcham, Mass., 499.
 Rogers, C. H., see Murphy, R. C.
 Ruff, 226.
 Rupornis magnirostris conspecta, 167.

 SAGE, John Hall, thirty-third stated meeting of the American Ornithologists' Union, 488-493.
 Salpinctes guadeloupensis proximus, 123.
 obsoletus obsoletus, 234.
 Saltator atriceps raptor, 169.
 grandis, 169.
 g. yucatanensis, 169.
 Sanderling, 97, 464.
 Sandpiper, Buff-breasted, 226, 500.
 Least, 464.
 Pectoral, 226, 464.
 Red-backed, 464.
 Semipalmated, 236, 445.
 Solitary, 238.
 Spotted, 227, 368, 464.
 Stilt, 445.
 Western, 302, 464.
 Sandpiper, Western Solitary, 464.
 Sandpipers, 201.
 Sapsucker, Red-breasted, 304.
 Yellow-bellied, 458.
 Red-breasted, 304.
 Saskatchewan, birds of, 225, 228.
 Saunders, Aretas A., some suggestions for better methods of recording and studying bird songs, 173-183; Harlequin Duck in the Glacier National Park, Montana, 225; changes and additions to the 'List of the Birds of Gallatin County, Montana,' 238.
 Saxicola finschii neglecta, 261.
 cenanthe, 194.
 Sayornis phoebe, 19, 447.
 sayus, 457.
 Scæophæthon rubricauda, rothschildi, 513.
 Scapanus melanoleucus cearæ, 516.
 pallens peruviana, 516.
 Schorger, A. W., Leconte's Sparrow in Wisconsin, 101; Bluegray Gnatcatcher nesting in Wisconsin, 106.
 Sclerurus, 148.
 Scoptelus pallidiceps, 524.
 Scopus umbretta bannermani, 257.
 Scoter, 458.
 Surf, 463.
 White-winged, 447, 463.
 Scotland, birds of, 519.
 Scudder, Heyward, the bird's bath, 465-468.
 Scytalopus acutirostris, 409.
 nalis, 406-423, 408.
 argentifrons, 408, 421.
 bolivianus, 409.
 canus, 408, 412.
 erythropterus, 414.
 grandis, 409.
 griseicollis, 408, 412, 414.
 indigoticus, 409.
 infasciatus, 408, 414.

- Scytalopus latebricola*, 408, 416.
macropus, 409.
magellanicus, 407-411.
micropterus micropterus, 407, 417.
m. sancta-martæ, 408, 418.
niger, 408, 411.
obscurus, 409.
panamensis, 408, 420.
sylvestris, 408, 416.
senilis, 408.
s. spelunçæ, 409.
superciliaris, 409.
unicolor, 409.
- See-see, 279.
- Seiurus aurocapillus*, 189, 232, 237, 447.
motacilla, 190.
noveboracensis noveboracensis, 190.
n. notabilis, 457.
- Septornis*, 148.
- Serinus syriacus*, 288.
- Setophaga ruticilla*, 191, 232, 448.
- Shearwater, Sooty, 300.
- Sherman, Althea R., the Rock Wren at National, Iowa, 234.
- Shrike*, Eastern-Wood-chat, 286.
 Great Gray, 285.
 Loggerhead, 2, 108, 184.
 Masked, 285.
 Migrant, 185.
 Red-backed, 286.
- Shoveller, 462.
- Shufeldt, R. W., anatomical and other notes on the Passenger Pigeon (*Ectopistes migratorius*) lately living in the Cincinnati Zoölogical Gardens, 29-41; the fossil remains of a species of *Hesperornis* found in Montana, 290-294; fossil remains of the extinct cormorant *Phalacrocorax macropus* found in Montana, 485-489; notice of Otto Herman, 539; review of his 'Anatomical Notes on the Young of *Phalacrocorax atriceps georgianus*,' 114; review of his 'On the Skeleton of the Ocellated Turkey (*Agriocharis ocellata*) with notes on the osteology of other *Meleagridæ*,' 250; review of his 'Contributions to the Study of the "Tree Ducks" of the genus *Dendrocygna*,' 374; review of his Fossil Birds in the Marsh Collection of Yale University,' 375; notice of his 'On the Osteology of *Orthorhamphus magnirostris*,' 517; notice of his 'On the comparative Osteology of the Limpkin (*Aramus vociferus*) and its place in the System,' 517.
- Sialia sialis sialis*, 194.
- Simmons, George Finlay, on the nesting of certain birds in Texas, 317-331.
- Simpson, 'Gene M., review of his 'Pheasant Farming,' 252.
- Sinai, birds of, 273.
- Siskin*, Pine, 24, 304.
- Sitta canadensis*, 192.
carolinensis carolinensis, 192.
europæa sztolemani, 527.
pusilla, 193.
- Sittasomus*, 147, 148.
- Skua*, 373.
- Snake-bird, 11.
- Snethlage, Emilia, review of her 'Catalogue of the Birds of Amazonia,' 247.
- Snipe*, Wilson's, 368, 459.
- Somateria spectabilis*, 450.
v-nigra, 452.
- Song*, Bird, 173-183, 535.
- Sora*, 113, 464.
- South America, birds of, 374.
- 'South Australian Ornithologist,' 126, 259, 526.
- South Carolina, birds of, 108, 207-210.

- Sparrow, Bachman's, 26, 327, 496,
Chipping, 26, 110, 163, 240,
467, 499.
Dead Sea, 288.
Desert Rock, 287.
Eastern House, 287.
English, 2, 51-59.
Field, 26, 175, 500, 503.
Fox, 27.
Grasshopper, 25.
Henslow's, 25.
House, 198.
Lark, 26.
Leconte's, 497.
Lincoln's, 27.
Louisiana Seaside, 327.
Nelson's, 25, 501.
Palestine Rock, 287.
Savannah, 25, 241, 439.
Song, 27, 110, 175, 240, 371,
503.
Sooty Song, 304.
Spanish, 288.
Swamp, 27.
Texas Seaside, 327.
Townsend's Fox, 305.
Vesper, 24, 175, 241, 434, 499.
Western Chipping, 455.
White-crowned, 26.
White-throated, 26, 107, 232,
237, 503.
- Spatula clypeata, 462.
- Spelman, Henry M., Jr., the
Orange-crowned Warbler in Cam-
bridge, Mass., in December, 230.
- Speotyto cunicularia arubensis, 374.
c. beckeri, 374.
c. intermedia, 374.
- Sphyrapicus varius varius, 447, 458.
v. ruber, 304.
- Spinus pinus 24, 304.
- Spiza americana, 28, 329.
- Spizella monticola monticola, 447.
m. ochracea, 457.
pallida, 457, 458.
passerina arizonæ, 455.
- Spizella p. passerina, 26, 499.
pusilla pusilla, 500, 503.
- Spoonbill, Roseata, 161, 162, 163,
165.
- Sporophila incerta, 128.
- Squatarola squatarola, 465.
- Starling, 466, 496, 500.
- Stelgidopteryx serripennis, 184.
- Stercorarius parasiticus, 299, 461.
- Sterna aculeata, 168.
caspia, 500.
fuliginosa, 48, 345.
hirundo, 447.
paradisæa, 462.
sandvicensis aculeata, 168.
- Stone, Witmer, Cape May and Ten-
nessee Warblers in Philadelphia,
106; proposed revision of the By
Laws of the American Ornithol-
ogists' Union, 136; type locality
of Lewis's Woodpecker and
Clarke's Nutcracker, 371.
- Streptopelia interpres, 48.
- Streptopelia senegalensis sokotæ,
125.
- Strix butleri, 282.
occidentalis, 513.
o. caurina, 513.
o. huachucae, 513.
o. lucida, 513.
uralensis yennesseensis, 527.
- Struthio camelus, 279.
- Sturnella magna argutula 22, 326.
m. magna, 21.
- Sturnus vulgaris, 496.
- Sula atlantica, 375.
dactylatra, 258.
d. californica, 258.
cyanops, 258.
leucogaster, 47.
fusca, 47.
piscator, 345.
- Sun-bird, Palestine, 286.
- Swallow, 283.
Bank, 184.
Barn, 184, 236.

- Swallow, Cliff, 184.
European, 236.
Lesser Cliff, 102.
Palestine, 283.
Red-rumped, 283.
Rough-winged, 184.
Tree, 184.
- Swan, Trumpeter, 82-90.
Whistling, 463.
- Swift, 283.
Pallid, 283.
Chimney, 16.
- Sylvia atricapilla atricapilla*, 285.
curruca curruca, 285.
communis icterops, 285.
hortensis crassirostris, 285.
nisoria nisoria, 285.
ruppelli, 285.
- Synallaxis*, 146, 148, 150.
spixi, 151.
- Synthliboramphus antiquus*, 298,
461.
- TACHYPETES *aquila*, 47.
- Tanager, Scarlet, 183, 232, 237.
Summer, 183, 330.
Western, 183, 455.
- Tanyiptera hydrocharis vulcani*,
384.
- Tarsiger stellatus chirundensis*, 130.
- Taverner, P. A., review of his 'The
Double-crested Cormorant (*Phalacrocorax auritus*) and its Relation to the Salmon Industries on the Gulf of St. Lawrence,' 517.
- Teal, Blue-winged, 462.
Green-winged, 302, 462, 469-
480.
Garganey, 281.
- Telmatodytes palustris iliacus*, 99.
p. palustris, 192.
- Telmatornis rex*, 375.
- Tennessee, birds of, 215-218.
- Tern, Arctic, 462.
Caspian, 500.
Love, 43.
- Tern, Sooty, 345.
White, 48.
- Tetrao urogallus aquitanicus*, 257.
- Texas, birds of, 102, 317-331,
362.
- Thamnophilus*, 150.
doliatus yucatanensis, 168.
- Thayer, J. E., two species of Cliff
Swallow nesting in Kerr County,
Texas, 102; Wilson's Snipe win-
tering in Nova Scotia, 368.
- Thelazomenus*, 260.
pœcilocercus, 260.
- Thrasher, Brown, 3, 192, 232, 370,
500.
- Threnetes leucurus rufigastrea*, 515.
longicauda, 374.
- Thripias namaquus intermedius*,
380.
- Thripophaga, 148.
- Thrush, Blue, 284.
Gray-cheeked, 193.
Hermit, 194, 232, 371, 505.
Hopping, 283.
Northern Varied, 452.
Olive-backed, 194.
Rock, 284.
Russet-backed, 305.
Varied, 305.
Veery, 109, 193, 237.
Wood, 193, 331.
- Thryomanes albinucha*, 169.
bewicki bewicki, 192.
- Thryothorus ludovicianus ludovici-
anus*, 192, 238.
- Titmouse, Tufted, 3, 10, 163, 193,
331.
- Tityra semifasciata deses*, 529.
s. personata, 168.
- Totanus flavipes*, 464.
melanoleucus, 464.
- Towhee, 27.
- Townsend, Charles W., notes on the
Rock Dove (*Columba domestica*),
306-316.
- Toxorhamphus, 129.

- Toxostoma rufum*, 192, 232, 370, 500.
Tragopan blythi molesworthi, 125.
caboti, 170.
Triptorhinus paradoxus, 408.
Trichalopteryx erythrolæma woodi, 125.
Tringa canutus, 464.
nebularia, 281.
 Trinidad Islet, birds of, 332-348.
Trochalopteryx erythrocephala woodi, 263.
Trochilus yucatanensis, 169.
Troglodytes ædon ædon, 192.
albinucha, 169.
Tryngites subruficollis 226, 500.
Turdus migratorius phillipsi, 529.
ugandæ, 524.
 Turkey, Florida, 4-6, 160.
 Wild, 61-81, 115, 207-224, 322, 348-366.
Turnagra capensis minor, 529.
 Turnstone, Black, 465.
 Ruddy, 465.
Turtur turtur, 281.
 Tyler, W. M., the Cape May Warbler in eastern Massachusetts, 104; simultaneous action of birds; a suggestion, 198-203.
Tympanuchus americanus atwateri, 322.
lulli, 375.
Tyrannus tyrannus, 18, 448.
verticalis, 18, 495.
Tyto manusi, 129.
 UPUCERTHIA, 148, 149.
juninensis, 125.
Uragus sibiricus ussuriensis, 527.
Uria troile californica, 299, 461.
Urosticte benjamini rostrata, 382.
Urubituiga anthracina, 167.
 VENILIORNIS *tæniotus cearæ*, 516.
 Verdin, San Lucas, 106.
Vermivora bachmani, 186.
chrysoptera, 186, 504.
celata celata, 230, 448, 504.
c. lutescens, 305.
peregrina, 105, 187, 448.
pinus, 186.
Vireo, Blue-headed, 163, 185.
 Key West, 10.
 Philadelphia, 185.
 Red-eyed, 185, 232, 448.
 Warbling, 185.
 Western Warbling, 455.
 White-eyed, 163, 185.
 Yellow-throated, 185.
Vireo griseus griseus, 185.
Vireosylva gilva gilva, 185.
olivacea, 185, 232, 448.
philadelphica, 185, 447.
g. swainsoni, 455.
gracilirostris, 50.
 Virginia, birds of, 75, 367.
 WAGTAIL, Black-headed, 286.
 Blue-headed, 286.
 White, 286.
 Wallace, John H. Jr., notice of his 'Alabama Bird Day Book,' 377.
 Warbler, Bachman's, 186.
 Barred, 285.
 Bay-breasted, 188, 230.
 Black and white, 183, 232, 449, 465.
 Blackpoll, 188, 232, 449.
 Black-throated Blue, 109, 187, 232, 498.
 Black-throated Green, 109, 189.
 Blackburnian, 188, 230.
 Blue-winged, 186.
 Bonelli's, 285.
 Canadian, 109, 191.
 Cape May, 104, 105, 106, 187, 231, 233, 234, 498.
 Cerulean, 188.
 Chestnut-sided, 188.
 Connecticut, 190, 504.
 Golden-winged, 186, 504.

- Warbler, Hooded, 191.
Kentucky, 190.
Lutescent, 305.
Magnolia, 109, 188, 232.
Mourning, 190, 505.
Myrtle, 2, 187, 448.
Northern Parula, 187.
Olivaceous, 285.
Orange-crowned, 504.
Orphean, 285.
Palm, 189, 230.
Pine, 2, 160, 189, 498, 504.
Prairie, 189, 465.
Prothonotary, 186, 370, 503.
Reed, 284.
River, 284.
Rufous, 284.
Ruppells, 285.
Swainson's, 186.
Sycamore, 189.
Tennessee, 104, 106, 187, 449.
Upscher's, 285.
Wilson's, 191.
Worm-eating, 186.
Yellow, 187.
Yellow Palm, 186.
- Washington, birds of, 225, 459-465.
Water-Thrush, 190.
Louisiana, 190.
- Waxwing, Bohemian, 369.
Cedar, 184, 232.
- Weber, J. A., the Puffin (*Fratercula arctica arctica*) on Long Island, N. Y., 495; numerous migrant Pine Warblers at Fort Lee, N. J., 498.
- Weston, Francis M., Jr., some unusual breeding records from South Carolina, 108.
- Wetmore, Alexander, review of his 'A Peculiarity in the Growth of the Tail Feathers of the Giant Hornbill (*Rhinoplax vigil*), 113; notice of his 'Mortality among Waterfowl around Great Salt Lake, Utah,' 518.
- Wheatear, 194, 284.
Isabelline, 284.
Black-throated, 284.
- Whimbrel, 226.
- Whip-poor-will, 15, 159.
- White, S. A., review of his 'Scientific Notes on an Expedition into the Interior of Australia,' 376.
- White-throat, Eastern, 285.
Lesser, 285.
- Widgeon, European, 225, 367, 462.
Willet, Western, 464.
- Willet, George, summer birds of Forrester Island, Alaska, 295-305.
- Williamson, E. B., actions of the Red-shouldered Hawk, 100.
- 'Wilson Bulletin,' review of, 124, 256, 379, 522.
- Wilsonia canadensis, 109, 191.
citrina, 191.
pusilla, 191, 447.
- Wing, DeWitt C., Robins' nests, 106.
- Wisconsin, birds of, 101, 106, 237, 348, 497.
- Woodcock, 108, 464.
- Woodpecker, Arctic Three-toed, 503.
- Woodpecker, Downy, 160.
Ivory-billed, 1-14.
Lewis's, 229, 371.
Northern Pileated, 109, 238.
Pileated, 2, 3, 5, 10, 11, 13, 14, 163.
Red-bellied, 2, 3, 10, 11, 13, 160, 238.
Red-cockaded, 2, 324.
Red-headed, 10, 237, 324.
- Wren, 283.
Bewick's, 192.
Carolina, 4, 192, 238.
House, 192.
Long-billed Marsh, 192.
Prairie Marsh, 99.
Rock, 234.
Short-billed Marsh, 234.

- Wren, Western Winter, 305.
Winter, 109, 192.
- Wright, Albert Hazen, early records
of the Wild Turkey, 61-81, 207-
224, 348-366.
- Wright, Horace W., morning awak-
ening notes at Jefferson Highland.
N. H., 240.
- Wyman, L. E., Richardson's Owl
in Illinois, 101.
- XANTHOCEPHALUS xanthocephalus,
21, 107, 457.
- Xanthotis chlorokema, 260.
melanokema, 260.
- Xema sabini, 454.
- Xenicopsis, 147.
- Xenops, 147, 150.
- Xiphocolaptes, 147.
- YELLOW-LEGS, 464.
Greater, 464.
- Yellow-throat, Florida, 159, 190,
310.
Maryland, 190, 330.
- ZAMELODIA ludoviciana, 27, 445,
447.
- Zenaida auriculata, 49.
noronha, 49.
maculata, 49.
- Zenaidura macroura carolinensis,
238.
m. marginella, 322.
m. tresmariae, 529.
ruficauda robinsoni, 529.
- Zonotrichia albicollis, 26, 107, 232,
237, 241, 447-502.
leucophrys gambeli, 457.
l. leucophrys, 26.
- Zosterops japonica insularis, 530.
setschuana, 260.
stenoericota
poensis, 258.

ERRATA.

- Page 95, line 36, for *dilophus* read *auritus*.
" 100, " 19, for **Red-tailed** read **Red-shouldered**.
" 185, " 15, for *philadelphia* read *philadelphica*.
" 375, " 29, for *alphildae* read *alfhildae*.

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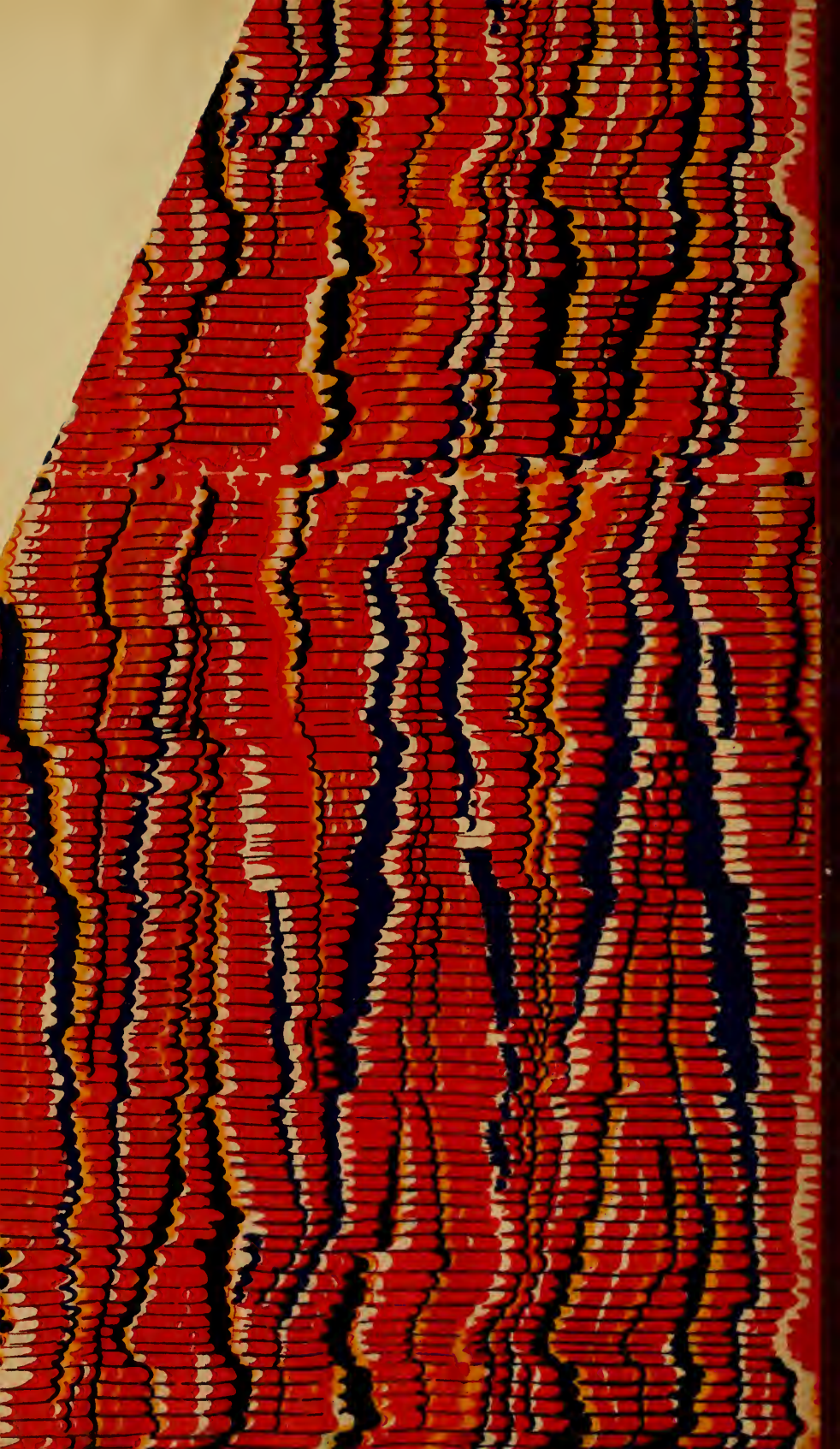
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