

1960

PARLIAMENT OF NEW SOUTH WALES

REPORT OF THE TRUSTEES
OF THE
AUSTRALIAN MUSEUM
FOR THE
Year ended 30th June, 1960

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ANNUAL REPORT

OF THE TRUSTEES OF THE AUSTRALIAN MUSEUM

For the Year ended 30th June, 1960

To His Excellency The Governor:

The Trustees of the Australian Museum have the honour to submit their 106th Annual Report for the year ended 30th June, 1960.

During February, Professor P. D. F. Murray resigned as a Trustee in consequence of having relinquished his Chair at the University of Sydney. Professor Murray's resignation was received with regret and an appreciation of his services as a Trustee has been recorded. Professor R. L. Crocker was elected to fill the vacancy on the Board.

The year has been one in which considerable progress has been made in all phases of the Museum's activities and particularly in the reorganisation and modernisation of exhibits in the public galleries. This progress has been made possible, to a great extent, by the keenness and interest of the staff and we desire to make appreciative acknowledgment of their wholehearted support in the improvement and development of the Museum.

THE NEW WING

It is with the greatest satisfaction that we are able to report that the first portion of the new wing, consisting of a sub-basement and basement, was completed in June. The two storeys have provided storage for the extensive Anthropological and Bird collections, and also office and laboratory accommodation for Curators. The Department of Art and Design is also housed in the sub-basement.

Additional storage accommodation is now available in the offices vacated by Curators and there is ample storage space for all the research collections and for their expansion over a long period of time. It will now be possible to reorganise the collections so that specimens will be readily and usefully accessible.

In our previous Report we expressed the hope that on completion of the first portion of the new wing it would be possible for work to continue on the remaining upper storeys of the building.

We are now able to announce that sufficient finance has been provided by the Government for the completion of the new wing and that a contract for its construction will shortly be signed. The new extension will consist of four modern floors for use as exhibition galleries, and a public cafeteria will be built on top of the building, six storeys above street level and recessed from the roof-line. It is expected that the wing will be completed about March, 1962.

We wish to make appreciative acknowledgment of the support and assistance of the Government in providing the finance to make the construction of the new wing possible. It was a vital necessity and, with its completion, we can see in the future nothing but continued progress in every sphere of the Museum's activities.

DEVELOPMENTS

Continued progress has been made in the reorganisation and modernisation of exhibits in the public galleries. Several exhibits prepared during the year are the most ambitious and complex displays ever installed at the Museum. Many new techniques in display methods were evolved to overcome difficulties associated with making attractive exhibits of certain animals, and are an indication of the marked progress in this important phase of Museum work.

Two large exhibits were prepared by the staff of the Departments of Art and Design and of Preparation as part of the Museum's commemoration of the centenary of the publication of Charles Darwin's book "The Origin of Species".

One exhibit, "These are Invertebrates", also known as "The Invertebrate Tree", was officially opened on 31st July, 1959, by the President of the Museum's Board of Trustees, Mr. Wallace C. Wurth, C.M.G. This exhibit, 32 feet long and 9 feet high, shows the main groups of invertebrate animals (which constitute 97 per centum of the animal kingdom) and their relationships to each other. These relationships may be traced by a system of fluorescent plastic lines and lights which flash in sequence. Of the total of 215 species of animals displayed, 55 are paintings of animals too small to be seen by the naked eye or otherwise unsuitable for display, and 43 are models.

Another outstanding and unique exhibit is "The Vertebrate Tree", which has been installed at the head of the stairway facing the main public entrance. Constructed of welded mild-steel, it shows the inter-relationships of the main groups of animals with backbones and the geological periods at which particular evolutionary developments took place. The figures of animals are silhouetted against a background of translucent fibreglass, 12 feet by 10 feet, behind which sixty fluorescent tubes provide lighting.

Satisfactory progress was made on the long-range plan of reorganisation of collections in the public galleries. Eleven new exhibits were installed in the new Fish Gallery (originally the Australian Bird Gallery) and a further large section of an identification series of Australian birds has been completed and installed in renovated wall-cases of the original Fish Gallery. Models and specimens necessary for two large exhibits, "Whales and Whaling" and "An Introduction to Mammals", have been prepared and are ready to be displayed in newly constructed show cases.

The "Coral Pool" exhibit, near the top of the main stairway has been removed and is being replaced by an exhibit depicting "Neanderthal Man".

A special case has been built in the Fossil Gallery to display a specimen of pitchblende (weight one ton) from Elsharana, South Alligator River, Northern Territory, which was presented on permanent loan by the Atomic Energy Commission. The radiation of the specimen has been measured by representatives of the Atomic Energy Commission who, together with a representative of the Division of Occupational Health of the State Department of Public Health, have inspected the proposed site and approved of it. As well as precautions being taken in regard to radiation, they are necessary also in respect of radon, which is a radioactive, gaseous, disintegration product of radium. An exhaust fan has yet to be fitted in the back of the wall-case and the final installation of the specimen has been delayed until this work is completed. The installation of a geiger counter is desirable, though this would involve expense.

A large cassiterite specimen from Ardlethan, and an outstanding specimen of cerussite presented several years ago by North Broken Hill Ltd., will also be displayed in the pitchblende case.

Displays on the life of Aboriginal women and on boomerangs in the Australian Aboriginal Gallery have been replanned and work will commence shortly.

The practice of installing temporary exhibits of special interest in the entrance hall has been continued. A "Dangerous Marine Animals" exhibit was installed to coincide with meetings of the Scientific Section of the International Convention of Life Saving Techniques which were held in the Museum Lecture Theatre during March, 1960. Two other temporary exhibits dealt with Charles Darwin and Corroboree Frogs. It was the first occasion that this interesting species of Australian frog had been exhibited in the Museum. The "Charles Darwin" exhibit included brief accounts of his life, work, and visit to New South Wales; one of the Galapagos Islands Giant Land Tortoises, of which he made a particular study; some of his original letters to his colleagues; articles which he used during his voyage on H.M.S. "Beagle", and an 1886 edition of his great book "The Origin of Species".

STAFF MATTERS

The Director, Dr. J. W. Evans, who was awarded a UNESCO Fellowship for overseas study, left Sydney on 29th March, 1960, for six months' leave of absence. After visiting several centres in the United States, the Director travelled to Europe where he visited museums in the United Kingdom, Sweden, Holland, Switzerland and France. He will also attend the International Entomological Congress in Vienna, and a UNESCO-sponsored Museums Conference in Tokyo during his absence.

During the Director's absence overseas, his duties are being carried out by the Deputy Director, Mr. H. O. Fletcher.

Mr. C. N. Smithers, who has been appointed Curator of the Department of Entomology, commenced his duties on 12th February, 1960. Mr. Smithers, who came from Southern Rhodesia, is a graduate of Rhodes University, South Africa, and has had extensive entomological experience.

Miss P. M. McDonald, Education Officer, returned in December, 1959, from twelve months' leave of absence, during which she studied museum educational services in European countries and, particularly, the United Kingdom. This work was made possible by Miss McDonald being granted a British Council Bursary. During her visit to Europe she attended a meeting of the International Council of Museums held in Stockholm during July.

Dr. J. A. Keast left Sydney on 10th May, 1960, to carry out research at the American Museum of Natural History in New York and also at the Edward Grey Institute of Ornithology, Oxford University. His main research project is a comparison of the factors governing bird distribution and speciation as between the Australian and Eurasian land masses. Dr. Keast also proposed to undertake some field investigations in Europe.

The following have resigned during the year: Mrs. W. Manwaring (Museum assistant), Miss L. Chambers (ticket writer), Miss S. McGeachy, Miss J. Jones, Mrs. J. Forbes (clerical officers), Mr. C. Meyer, Mr. J. Pore (artificers). They have been replaced by Miss L. Burness, Miss R. Hauenstein (clerical officers), Mr. A. Carpenter, Mr. T. Wright (artificers), Mrs. E. Brown (ticket writer) and Mr. D. Costello (attendant). A second ticket writer, Mrs. K. Neilsen, was appointed in January, 1960.

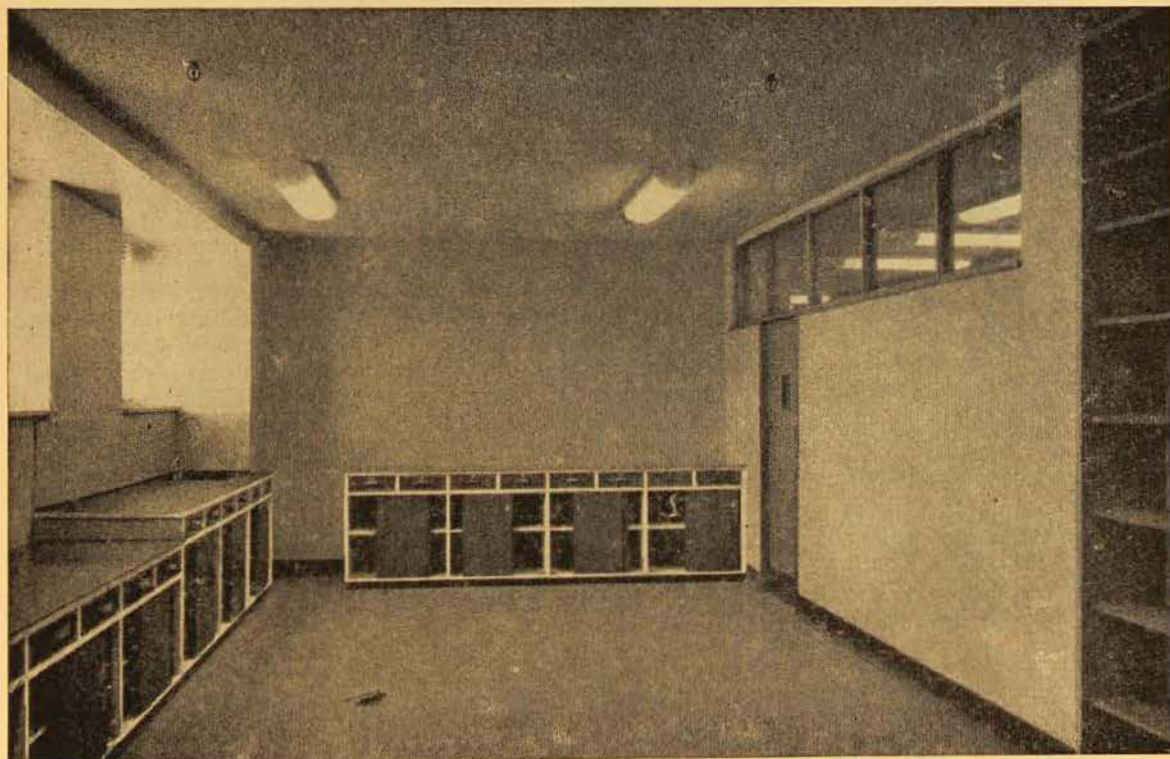
RESEARCH

The Director continued his studies towards the preparation of a monograph on the Australian and New Zealand group of leafhoppers.

The Deputy Director has studied the Devonian fauna of western New South Wales and its stratigraphical relationships.



The completed two floors of the new six-storey wing being built at the Museum. Construction of the remaining four floors and a public cafeteria on the roof has commenced, and will be completed in March, 1962



A curator's office and laboratory in the new two-storey building. The rooms contain ample space for equipment and books and have linoleum-tiled cement floors and vermiculite acoustic ceilings

Mr. McNeill continued his research on the decapoda collected by the British Great Barrier Reef Expedition. This work, which has involved the elaboration of more than 190 species, is almost finalised.

Miss Pope, as well as studying the distribution of barnacles in Western Australia, has also carried out work on the noxious marine invertebrates of Australia. With Miss Isobel Bennett, she completed a paper on the "Intertidal Zonation of the Exposed Rocky Shores of Tasmania and Adjacent Islands".

Mr. Whitley described two new species of fish from New Caledonia.

Dr. McMichael continued research on the New Guinea land mollusca. He has also studied the Australian Avavoid land snails and, with Dr. J. Boray, has prepared a paper for publication on the Australian Lymnaeid snail, the host of the sheep liver-fluke. Further research was carried out on the Australian volute shells.

Mr. McCarthy, with Professor N. W. G. Macintosh, continued his archaeological survey of the rock engravings and paintings, stone cairns and Aboriginal implements at Mootwingee and Sturt's Meadows in western New South Wales. Mr. McCarthy is studying the results of excavations at several sites at Glen Davis, New South Wales, which have revealed important archaeological evidence in regard to a new prehistoric aboriginal culture. He is also preparing a paper on the rock engravings at Port Hedland.

Dr. Keast continued his research projects on the modification of the annual behaviour cycle in Australian desert birds and also on the speciation and systematics of birds.

Mr. Smithers is carrying out research on the Australian Psocoptera and Mecoptera.

Mr. McAlpine continued his studies on the Australian Diptera Acalyptrata, including flies of the families Helomyzidae, Anthomyzidae and Lauxaniidae.

Mr. Cogger completed research on the lizard genus *Egernia*, and completed a paper, with Mr. A. Holmes, on mechanisms of heat conservation in a python (*Morelia spilotes variegata*). He is also studying the pulmonary system of sea snakes and is investigating the phylogeny and general biology of the lizard family Agamidae.

FIELD WORK

The Director visited Melbourne in December at the invitation of the President of the Council of the Royal Society of Victoria, and attended their Centenary Symposium as a representative of the Museum. He was accompanied by Dr. Keast and both he and Dr. Keast read papers at the Symposium.

Other travelling on Museum business, which also was not strictly in the category of field work, included the attendance of the Director, Miss Pope, Dr. Keast, Mr. Chalmers and Mr. Whitley at the meeting of the Australian and New Zealand Association for the Advancement of Science, held in Perth during August, 1959.

During October and early November, Mr. Fletcher, in company with an officer of the Geological Survey, spent three weeks investigating Devonian fossils at various localities in the Cobar area, western New South Wales. A further collection of important fish remains was made at Wuttagoona, between Louth and Cobar.

Miss Pope, at the conclusion of the ANZAAS meeting in Perth, visited the south-western coast of Western Australia, between Perth and Albany, and made extensive collections of barnacles and echinoderms.

Mr. McCarthy, accompanied by Professor N. W. G. Macintosh, spent two weeks during November, 1959, at Mootwingee and Sturt's Meadows, western New South Wales, to complete archaeological studies of those areas. Mr. McCarthy also made two further visits to Glen Davis, including a week in December, 1959, and a week in May, 1960, to continue cave excavations. A new prehistoric Aboriginal culture, the Capertian, was discovered underlying the Bondaiian culture, and is the earliest known in eastern New South Wales. Several short excursions were made to the Woronora Dam and the Cordeaux Dam to record three sites of Aboriginal charcoal drawings.

During November, 1959, Dr. Keast, accompanied by Mr. Mackay, officer-in-charge of the Preparation section, visited the Bourke district to note the effects of rainfall on the breeding of birds. In August, at the conclusion of the ANZAAS meeting in Perth, Dr. Keast spent three weeks in the Hamersley Range with a party from the Western Australian Museum. He also spent a week in January with Dr. Ernst Mayr, of the Museum of Comparative Zoology (Harvard University), studying the bird life of the Macpherson Range.

During March, 1960, Mr. Cogger, accompanied by Mr. Mackay, spent ten days in the Nymagee-Bourke districts, where important collections of birds, reptiles and frogs were made. Mr. Cogger, with Mr. J. Clark, also made short visits to the Warrumbungle Mountains, Point Lookout and the Barrington Tops.

Messrs. Marlow, Smithers and Cogger left Sydney on 28th May, 1960, for two months field work on the Cape York Peninsula.

During January, Mr. Marlow, accompanied by Messrs. Mackay and Van Deusen, made a short trip to the Barrington Tops, where specimens needed for mounts in the new Mammal Gallery displays were collected.

Mr. McAlpine spent three weeks in Tasmania during January, 1960, and made extensive collections of insects at a number of localities. The collection made of Diptera Acalyptrata is possibly one of the two or three largest yet made in Tasmania, and includes many unrecorded species from that State. Comprehensive series of specimens representing the Coleoptera, Hymenoptera and other orders were also collected. Mr. McAlpine also made several short excursions to the Blue Mountains and to Coff's Harbour.

Mr. Chalmers, after attending the ANZAAS meeting in Perth, made collections of minerals and rocks in the Kalgoorlie, Norseman and Perth areas.

A new four-wheel drive Willy's Jeep truck was acquired during the year for use in field work. The Museum's second vehicle, a Standard utility, was replaced by a new Holden Station Waggon.

PUBLICATIONS

During the year a new Museum booklet, "The Frogs of New South Wales", was prepared by Mr. H. G. Cogger, Assistant Curator of Reptiles, and it will be ready for distribution within a few weeks. The booklet has 38 pages, 30 illustrations and a two-colour cover. The second edition of the booklet "Exploring Between Tidemarks" is being printed.

Volume XIII of "The Australian Museum Magazine" was continued with Nos. 3, 4, 5 and 6. Number 4 was a special "Charles Darwin" issue to commemorate the centenary of the publication of his book "The Origin of Species". The Trustees again express their appreciation to outside contributors who have supplied articles to the Magazine.

Efforts were continued to increase the Magazine circulation, and, following a fairly widespread distribution of circulars and subscription forms, many new subscribers were obtained, particularly from schools and libraries.

Four parts of the "Records of the Australian Museum", Nos. 2, 3, 4 and 5 of Volume XXV, and the Index to Volume XXIV were published.

Four new leaflets on natural history subjects were published, and twenty-six existing leaflets were revised and reprinted. Ten other revised leaflets are at the press.

Nine thousand folders giving information about the Museum's publications and containing subscription forms for the Magazine were printed for distribution to likely subscribers and purchasers.

A coloured poster, 3 feet x 2 feet 2 inches, entitled "Life Through the Ages" was prepared during the year and 1,500 copies are being printed and will shortly be ready for distribution. The poster is simple and self explanatory and shows the progress of life through geological time.

As well as the articles they have contributed to the Magazine, the following scientific papers by members of the staff were published during the year:

Evans, J. W., Fauna Australiensis, *Aust. Journ. Sci.* 22 (ii): 433, 1960; McCarthy, F. D., with Miss M. McArthur, The Food Quest and the Time Factor in Aboriginal Economic Life, *Rec. Amer. Aust. Sci. Exped. Arnhem Land* 1948, (2): 145, 1960; with F. M. Setzler, The Archaeology of Arnhem Land, *Rec. Amer. Aust. Sci. Exped. Arnhem Land* 1948, (2), 215, 1960; The Cave Paintings of Groote Eylandt and Chasm Islands, *Rec. Amer. Aust. Sci. Exped. Arnhem Land* 1948, (2); 297, 1960. The String Figures of Yirrkalla, *Rec. Amer. Aust. Sci. Exped. Arnhem Land* 1948, (2); 415, 1960; Methods and Scope of Australian Archaeology, *Mankind*, (5), 297, 1959. Whitley, G. P., The Freshwater Fishes of Australia, *Biogr. Ecol. Austr. in Monogr. Biol.* (Junk Den Haag) (8), 136, 1959; More Ichthyological Snippets, *Proc. Roy. Zool. Soc. N.S.W.* (ii): 1957-58 (1959); The Mud-Skipper, *Educ. Gazette* 54 (4): 142, 1960; Two New Generic Names, *Proc. Roy. Zool. Soc. N.S.W.* (ii), 59, 1957-58 (1959). Keast, J. A., The Australian Environment, The Reptiles of Australia, The Birds of Australia and their Adaption to an Arid Continent, *Biogr. Ecol. Austr. in Monogr. Biol.* 8 (Junk Den Haag) 1959. McMichael, D. F., with T. Iredale, The Land and Freshwater Mollusca of Australia, *Biogr. Ecol. Austr.*, in *Monogr. Biol.* 8 (Junk Den Haag) 1959; The Re-discovery of *Ternivoluta studeri* Martens (Mollusca Volutidae), *Proc. Roy. Zool. Soc. N.S.W.* (ii): 60, 1957-58 (1959); Notes on Littorinid Nomenclature and a New Genus and Species of Land Snail from North Queensland, *J. Mal. Soc. Aust.* (3): 25 and 31. Cogger, H. G., The Ecology, Morphology, Distribution and Speciation of a New Species and Subspecies of the Genus *Egernia*, *Rec. Aust. Mus.* 25 (5).

LECTURES

A series of six Popular Science Lectures was given during the year. Dr. J. A. Keast gave a lecture in July, 1959, on "The Australian Continent and its Importance in Evolutionary Studies"; Mr. A. Strom, A.S.T.C., Chairman of the Fauna Protection Panel, lectured in August on "National Parks and Faunal Reserves in New South Wales"; Mr. B. J. Marlow, B.Sc., lectured in September on "The Evolution and Adaptive Radiation of Marsupials" and in October Mr. Harley Wood, M.Sc., F.R.A.S., Government Astronomer, gave a talk on "Man's Expanding Universe". Two lectures of the 1960 Syllabus were delivered, by Dr. J. M. Thomson, who in May lectured on "The Migration of Fishes", and Dr. D. Anderson, Lecturer in Zoology at the University of Sydney, who gave a talk in June on "Some Surprising Animal Relationships". The total attendance at the six lectures was 552.

As usual, many lectures to outside organisations were given during the year by several members of the staff.

INQUIRIES

Inquiries from the public and from scientific workers are steadily increasing. During the year approximately 800 inquiries covering a wide range of natural history subjects were received by the Public Relations Officer and submitted to the Curators for attention. More than 1,000 inquiries were received direct by Curators and dealt with. It is possible that the increase in inquiries is due to the recent publicity on the work of the Museum and the scope of its activities.

Requests for information on building stones continued during the year from architects, builders and industrial designers; advice was given on the deterioration of sandstone used for monumental purposes; assistance was given to many inquirers concerning gemstones and also on an opal ornament for the Tengku Abdul Rahman, Prime Minister of Malaya.

The usual large number of requests for information on spiders, insects and centipedes were dealt with. Funnel-web spiders continue to be the main topic of inquiry, although the Mouse Spider was the one most frequently submitted for identification.

Heavy storms off the coast of New South Wales late in 1959 caused many sea snakes to be washed ashore on Sydney's beaches. As a result, there have been many inquiries for information about them from the public, the press, radio and television stations.

The Parramatta City Council was advised on the identification of worms from compost heaps. The identifications for the State Department of Agriculture included worms found infesting mushroom beds. Information was given to hospitals and pathologists concerning the introduced giant toad (*Bufo marinus*) and other native frogs used in laboratory work. Identification of a number of tropical Palinuridae (Marine Crayfish) was made for the Department of Agriculture, Stock and Fisheries, in Papua. Information was given to the Broken Hill Pty. Co. Ltd. regarding the distribution of coralline sands in the Great Barrier Reef area.

Numerous other inquiries included the identification of stinging Jelly-fish and other marine stinging organisms; information on leech repellants and the eradication of leeches from a swimming pool; the possibility of farming *Onuphis* worms, and the naming of parasitic worms.

Information on the natural history of Lord Howe Island was given to the Atlantic Union Oil Co. Pty. Ltd. for use in a film.

CO-OPERATION

The Trustees again have much pleasure in expressing their appreciation of the assistance given to the Museum in many ways, both by scientific workers and members of the general public.

Thanks are due to Miss Joyce Allan and Mr. T. Iredale, both of whom are former members of the staff and now Honorary Zoologists and who continue to assist actively in the Shell Department. Mr. K. A. Hindwood, Honorary Ornithologist, has willingly assisted in the answering of bird inquiries during the absence overseas of Dr. Keast. Mr. S. Copland, Honorary Zoologist, has continued with research on the Museum collection of amphibians. Dr. A. A. Racek, Honorary Zoologist, has been responsible for the Museum acquiring interesting and important collections of marine animals, including important deepwater echinoderms, barnacles and fishes.

Mr. L. Thomas, Honorary Associate, has been actively engaged with his studies on Bryozoa and has spent considerable time in rearranging, checking and naming the collection of corals. Assistance has also been given by amateur naturalists on the systematic revision of the shell, frog, lizard and snake study collections.

Thanks are due to officers of the Maritime Services Board in assisting the Museum to secure live specimens, for preservation, of Scyphomedusae and Ctenophora (jelly-fish) from Sydney Harbour.

Mrs. K. Sherrard has again been of great assistance with identification of graptolites and in describing and naming Silurian bivalves in the Museum Collection.

Co-operation of another kind is also acknowledged. During the year a sub-committee of the Trustees, comprising the President, Professor Elkin and Mr. Hyde, met with the Acting Director to consider means of publicising the Museum with a view to obtaining financial support for large Museum projects. Committees of members of the Museum staff have continued in their investigation on library needs and fire precautions.

Many gifts to the Museum are mentioned in the various departmental reports, but several in particular merit special notice. Mr. D. Francois, a Fulbright Scholar, who was attached to the Museum for twelve months, presented a substantial collection of freshwater crayfish gathered from widely separate localities in New South Wales; an interesting collection of skipper butterflies from New South Wales, including rare species, was presented by Mr. L. C. Haines. Mr. Perry, Bureau of Mineral Resources, made available colour slides of building stones used in Sydney buildings at the Gosford and Wombeyan quarries, copies of which were made and added to the Museum official collection.

MUSEUM BUILDINGS AND GROUNDS

Work continued during the year on the renewal of copper sheeting on the Museum roof and considerable progress has been made. The roof on the south wing was completed and the main gable facing College Street is nearing completion. The glass roof over the Invertebrate Gallery has been removed and replaced with corrugated copper sheeting, thus eliminating natural light and ensuring a watertight roof. The Public Works Department is to be commended on the excellence of its work and the care taken that the building was kept watertight during work on the roof. During heavy rainstorms minor leaks developed in the roof, but these were traced and attended to and no further trouble is expected.

Two roof areas have yet to receive attention. These are a corrugated-iron roof covering the office block and a flat section of roof covering the Fossil Gallery. Both are in the north wing, and it is hoped that they will be attended to in the near future.

No major painting work has been done during the year, but a request made to the Public Works Department that the Mammal Gallery and entrance and exit lobbies be renovated and painted has received favourable consideration, and it is expected that work will commence shortly.

Lino tiles were laid in the Invertebrate Gallery and the Mineral Gallery and the appearance of the floors has been considerably enhanced.

The lighting programme of the Museum has continued and lighting has been installed in the Vertebrate Tree exhibit, on the main stairway, the coin cabinets and the wall-cases of the Upper Bird Gallery.

Further lighting has been requested for the wall-cases in the Mammal Gallery, the Invertebrate Gallery and a new exhibit in the Fossil Gallery.

The elimination of natural light from the galleries is continuing and all windows in the Fish and Bird Galleries have been covered. As previously reported, the appearance of all gallery exhibits is considerably improved by artificial lighting.

The first portion of the new wing was completed during the year and the Curators concerned are already moving into their new quarters. The major work remaining is the construction of a retaining wall at the rear of the new wing, the demolition of an old iron shed and the construction of a parking area. Plans have been prepared for a parking area and work will start almost immediately on its construction.

An amount of £15,000 was made available for the purchase of steel storage cabinets for the new building and a tender from Duff Steel Industries, of Port Kembla, was accepted. More than half of the steel cabinets were received and installed.

The rooms vacated by Curators in the south wing are now used solely as storage for collections. To take full advantage of the high ceilings, the Public Works Department was asked to erect mezzanine floors in the rooms of the Department of Mineralogy and the Department of Invertebrates. The mezzanine floor in the Mineralogist's room was completed and the Invertebrate Department's mezzanine floor will be completed shortly. A half mezzanine floor was erected in the Artificers' workshop.

Two rooms in the basement were renovated during the year and the coin collection is now stored in one of them. The rooms adjacent to the Hallstrom Lecture Theatre, formerly housing the coin collection and anthropological material, are being renovated and a wall is being broken through to provide an entrance into the main gallery. These rooms will be used by the Education Officers as an office, a work-room, and storage for natural history specimens used in the classes for school children.

VISITORS AND ATTENDANCES

During the year 318,394 people visited the Museum. Many scientific visitors spent varying periods studying the collections and consulting with Curators on scientific problems of mutual interest. The completion of the new wing has provided much-needed office and laboratory accommodation for visiting scientists, and with these added facilities visitors will be able to work with greater advantage and spend longer periods of study at the Museum.

Extended periods of study have been spent at the Museum by Mr. U. Soe Hlaing, a Colombo Plan Fellow and Curator in charge of the Museum Department of the International Institute for Advanced Buddhistic Studies at Rangoon. He studied Museum administration, including the acquisition of material and preparation of displays. Professor Kuang C. Chow, Professor of Mechanical Engineering, National Taiwan University, Formosa, spent two weeks studying the various aspects of Museum work prior to establishing a natural history section in the National Taiwan University Science Hall. Both these visits were arranged through the Commonwealth Office of Education.

Dr. I. Vigeland, of the Oslo Museum, Norway, has continued his studies on Bryozoa for the greater part of the year.

Mr. D. Francois, an American Fulbright Scholar, left the Museum in August, 1959, after a year's study, to continue his research at the Cornell University, U.S.A.

Captain Minami and Professor Isao Matsui, with interpreters and seventy-two young cadets from the M.V. "Koyo Maru", visited the Museum in December and were shown the collections. The M.V. "Koyo Maru" is a training and research vessel of 1,215 tons from the Shimonoseki College of Fisheries, Japan.

A Symposium on Dangerous Marine Animals was held in the Hallstrom Lecture Theatre in March by the Scientific Group of the International Convention of Life Saving Techniques. Participants included Surgeon Rear-Admiral L. Lockwood, R.A.N.; Commander Batterham, R.A.N.; Drs. V. M. Coppleson, P. K. L. Phleps, R. Endean, S. Weiner, J. R. Pacy, R. V. Southcott, J. H. Barnes, T. J. Hansen and C. W. Kingston; Messrs. J. R. Kinghorn, W. Ewers and N. Gorshenin. Members of the Museum staff also took part in the Symposium and lectured on their particular subjects.

In July, 1959, sixty members of the Royal Australian Historical Society visited the Museum and, after being officially welcomed, were shown around the Museum by members of the staff.

Members of the Naturalists' Society of New South Wales also visited the Museum and spent an afternoon in the galleries.

Other scientific visitors have included the following: Professor Kort (Director of the Russian Institute of Oceanography of the Soviet Academy of Science); Dr. Paul Fischer (École des Mines, Paris); Dr. H. Nininger and Mr. Huss (Arizona Meteorite Museum); Dr. J. Lovering and Dr. Ringwood (Australian National University); Dr. Edwards and Mr. Vernon (C.S.I.R.O., Mineragraphic Section, Melbourne); Dr. Ernst Mayr (Museum of Comparative Zoology, Harvard University); Mr. B. Monroe (Louisiana); Dr. J. Micha (Germany); Dr. Hans Fischer (Germany); Dr. R. Bulmer (Auckland University); Professor Kirk (Russia); Dr. D. L. Oliver (Harvard University); Messrs. L. Brass and H. M. Van Deusen (American Museum of Natural History); Dr. D. Squires (American Museum of Natural History); Dr. D. Thomas (Department of Mines, Victoria); Dr. A. A. Opik, Mr. S. Skwarko and Mr. M. Dickins (Bureau of Mineral Resources); Dr. M. I. Glaessner (University of Adelaide); Professor Westoll (Durham University, England); Professor A. H. Voisey (New England University); Professor E. S. Hills (University of Melbourne); Dr. B. P. Uvarov (formerly Director of the Anti-Locust Research Centre in London); Dr. Burgess, Dr. Richard, Mr. C. Weaver and Mrs. King (members of the Hawaiian-West Australian Dredging Expedition). Mrs. J. Vaughan-Morgan (wife of the Minister of State, United Kingdom Board of Trade) made an official visit to the Museum.

FINANCE

Expenditure from Consolidated Revenue for the year (excluding Statutory Endowment of £1,000) was £85,538. 0s. 3d., compared with £69,331. 3s. 9d. last year. Net expenditure from Trustees' Account Funds (including Statutory Endowment) was £6,256. 7s. 5d., compared with £7,869. 7s. 4d. for 1958-59.

The cash balance in the Trustees' Account at 30th June, 1960, was £2,316. 2s. 9d. Trustees' Invested Funds at 30th June, 1960, were: Commonwealth Inscribed Stock £1,550; Commonwealth Special Bonds £5,500; Metropolitan Water, Sewerage and Drainage Board Inscribed Stock £2,500.

A Statements of Receipts and Expenditure for the year is contained in Appendix A.

DEPARTMENTAL REPORTS

Fossils (H. O. Fletcher, M.Sc., Curator; Miss Freda Sachs, Assistant).

Acquisitions during the year comprised 483, making a total of 49,380 registered specimens.

Donations of interest included graptolites from Silurian rocks at Canberra (Mr. L. Hall) and from Yass (Mrs. K. Sherrard); a well-preserved series of brachiopods, *Syringothyris exsuperans*, from Permian rocks at Rylstone (Mr. W. Nicholls); Triassic plant remains from Long Reef (Miss E. Foster); fish remains from diatomaceous earth deposits at Bugaldie (Mr. D. Parry); a series of Jurassic fish from Talbragar (Mr. Wall); vertebrate remains, including skull fragments of *Thylacinus*, from cave breccia at Belubula Caves (Mr. J. Kirkpatrick); type specimens of Silurian bivalves from Yass (Mrs. K. Sherrard).

A large series of important fish remains were collected by the Curator and Mr. E. O. Rayner (Geological Survey of New South Wales) from Upper Devonian rocks at Wuttagoona Station, between Louth and Cobar. The material represents a fish fauna new to Australia, and will be described and named by Professor E. S. Hills, University of Melbourne.

The pieces of a complete carapace and plastron of an extinct horned turtle (*Meiolania*) from a Pleistocene sand deposit at Ned's Beach, Lord Howe Island, were presented by Mr. R. Missen. The specimen, which was complete, was broken while being excavated.

Three specimens of a rare fossil crustacean, *Phreatoicus wianamattensis* Chilton, from Triassic rocks at St. Peters, were incorporated in the collection.

The Curator took over the duties of the Director on his departure on 29th March for six months' leave of absence overseas.

The rearrangement and cataloguing of the invertebrate collection of fossils has continued. The Tertiary pelecypods have been completed and, for the first time, specimens are now stored together, catalogued and indexed. The collection of ammonites and belemnites has also been sorted and rearranged, and cataloguing is almost completed.

A start has been made on transferring the vertebrate collection of fossils from large wooden storage cupboards into new steel storage cabinets. Considerable storage space will be saved by the transfer.

A list of type specimens of Tertiary gastropods was compiled. It consisted of 63 specimens, the identity of which was checked in various scientific papers.

Specimens were forwarded on loan to Mr. M. Dickins, Bureau of Mineral Resources.

Mr. G. R. Stevens, Sedgwick Museum, Cambridge, returned a collection of belemnites, specimens of which are mentioned in a paper he has prepared as a Bulletin of the New Zealand Geological Survey.

A comparative series of Devonian brachiopods and pelecypods has been received, on exchange, from the American Museum of Natural History. A named collection of Permian gastropods from New South Wales was forwarded in exchange to Dr. E. Yochelson, American Museum of Natural History. It will assist in a compilation of Permian gastropod genera.

Assistance given to scientific workers included photographs of type specimens of graptolites for comparison with similar American species, for Dr. Reuben Ross, United States Geological Survey; specimens of Triassic and Jurassic fish were presented to the Cleveland Museum of Natural History, Ohio; a series of "Gondwanaland" fossils has been presented to The University, Leicester; a large series of Upper Devonian fish remains from Wuttagoona Station, near Cobar, was photographed for Professor E. S. Hills, University of Melbourne.

Approximately 85 inquiries were dealt with during the year, and numerous fossils were identified for the public and various institutions.

Pelecypods of Upper Silurian age were described and named by Mrs. K. Sherrard, and the material, including many type specimens, has been incorporated in the study collection. Mrs. Sherrard has also identified graptolites from various localities in New South Wales and her reports have been forwarded to the Government Geologist.

The Curator continues to act as Honorary Palaeontologist to the Geological Survey of New South Wales, and his advice was sought at various times by officers of that department.

Crustacea, Coelenterata and Other Groups (F. A. McNeill, Curator).

During the year a total of 2,556 specimens of Crustacea has been registered and incorporated in the reference study collection.

Acquisitions included three extensive collections which have made an important and interesting addition to the Museum collections. They consist of freshwater crayfish from various localities in New South Wales, collected by Mr. D. Francois during twelve months' research as a Fulbright Scholar at the Museum; authentically named species of freshwater crayfish, not previously represented in the Museum collection, received on exchange from the National Museum, Melbourne; a representative set of species of the family Portunidae (swimming crabs), presented by Professor W. Stephenson. These species formed the basis of his recently published paper on the Portunidae.

The study collection of Crustacea has been reorganised in order to facilitate the storage of additional material, and a thorough check was made of all preserved and dry-stored reference study collections.

Specimens of the family Portunidae on loan have been returned by Professor W. Stephenson, University of Queensland, and this important recorded material, together with donated specimens, has been re-incorporated in the reference study collection.

Type specimens of two new species of the first known troglitic shrimps from Australia were returned by Dr. L. B. Holthuis, Leiden Museum, Holland, who recently described and named Museum specimens from North-west Cape, Western Australia.

Specimens have been forwarded on loan as follows: Dr. L. B. Holthuis, United States National Museum (examples of *Pagurus hedleyi* and *Scyllarides sculptus*); Mr. E. F. Riek, C.S.I.R.O., Division of Entomology, Canberra, (type material of a parasitic isopod, *Austroargathona caridiphaga*); Mr. D. Francois, Cornell University, U.S.A. (selected collection of freshwater crayfish Parastacidae); Dr. M. J. Mackerras, Queensland Institute of Medical Research (microslide preparations of blood parasites of Haemogregarina); Dr. D. Squires, American Museum of Natural History (Lord Howe Island and Port Jackson corals); Dr. R. George, Western Australian Museum (a series of shore-crabs, *Brachynotus octodentatus*).

Considerable time was spent on editing a large report on Australian Copepoda by Dr. P. Heegaard, of Denmark. His report is being submitted for publication in the Records of the Australian Museum.

A total of 176 inquiries from members of the public and from scientific institutions have been answered during the year.

Mr. L. Thomas, Hon. Associate of the Museum, has given invaluable assistance in the Department and has spent considerable time in rearranging, checking and naming the reference study material of Bryozoa and corals.

Worms and Echinoderms (Elizabeth C. Pope, M.Sc., Curator).

The following notable specimens have been added to the collection: a juvenile sea-urchin, *Diadema setosum*, from Sydney Harbour (Mr. A. Sinclair); important deep-water echinoderms trawled off the coast of New South Wales by the M.V. "Challenge" (Dr. A. Racek and Miss Isobel Bennett); rare sea-stars and ophiuroids from Heron Island (Mr. K. Gillett); a collection of barnacles from Norfolk Island (Mr. C. Bowden); deep-water barnacles from trawling operations off the Sydney coast (Dr. Racek); specimens of a barnacle, *Ibla idiotica*, from the type locality of the species in New Zealand (Dr. Elizabeth Batham). The Curator collected sea-stars, sea-urchins and an extensive collection of barnacles during field-work in Western Australia.

Previously unnamed Echiuroid worms in the Museum collection were described and named by Dr. S. J. Edmonds; two new types are included and two additional type specimens were presented. The Curator continued collecting and recording local turbellarian worms with the object of them being described and named by Dr. L. Hyman. A series of invertebrates from Lake Macquarie, collected during a C.S.I.R.O. ecological survey, was presented by Mr. J. MacIntyre.

The entire spirit collections of the Department were respired and the collection of dry echinoderms has been fumigated. The crinoid collection has been rearranged in phylogenetic order and recatalogued. The storage of the Ascidian collection was rearranged and, when catalogued, all collections in the department will be catalogued.

A collection of type specimens of Bryozoa from the late Professor T. H. Johnston's collection has been registered and the allotted numbers sent to Miss Angel, South Australia. Microscope slides of Bryozoa, damaged during a heavy rain-storm, were attended to and replaced in the collection.

Approximately 120 inquiries were dealt with during the year and, in addition, many routine identifications were made for members of the public.

Specimens were named for Mrs. M. Hooworth, Queenwood School (collection of marine animals); Riverside School, Gladesville (identification of salps); Mr. Maitland, of Artransa (marine animals identified from films); Mr. A. Sinclair (compound ascidian); Mr. Kearnes (occurrence of a sea-weed, *Pterocladia*, and the local krill season).

Assistance was also given to an Asian student who required an extensive bibliography on local freshwater ecology.

Mr. Mosman, of Zurich, Switzerland, examined specimens and colour slides of marine invertebrates for use in textile designing.

Specimens of *Balanoglossus* worms from Long Bay were collected, measured in life, preserved and supplied to Professor J. Morton, of New Zealand.

Large barnacles, *Balanus nigrescens*, were presented to Mr. I. E. Cornwall, of Camden.

Fishes (G. P. Whitley, Curator).

Six hundred and sixty-seven specimens were acquired and registered from every State of the Commonwealth (except South Australia), from Lord Howe Island, New Zealand, New Caledonia, New Guinea, the Philippines and South Africa. Noteworthy accessions were: deep-sea fishes from the M.V. "Challenge" (Dr. A. A. Racek); two blind gudgeons (Western Australian Museum); leptocephalus larvae (Mr. P. Colman); Queensland fresh-water fishes (Mr. D. Wilhoft and Mr. E. Worrell); stingrays and cat-fishes (Dr. J. R. Pacy). Specimens from New Guinea were presented by Mr. N. Blood and Captain W. Wilding, and from New Caledonia by Dr. R. Catala.

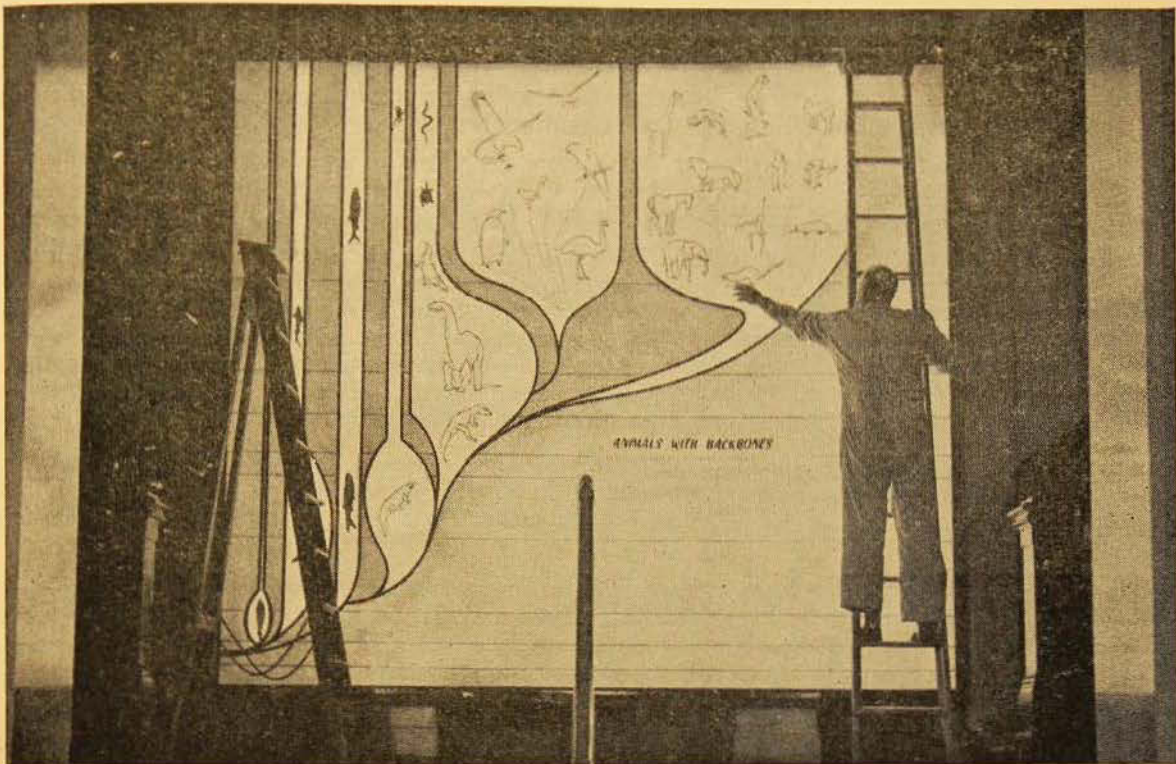
Considerable progress has been made in the new Fish Gallery and eleven new exhibits which were planned have been completed, installed and labelled. Recent record dives by the Bathyscaphe and latest theories on the reproduction of eels have made it necessary to modify several of the gallery displays. Successful arrangements have been made to acquire several Piranha, carnivorous fishes of the Amazon River, from South America.

The fish collections are in good order, and work was continued in distributing the arrears of accumulated specimens in the spirit house.

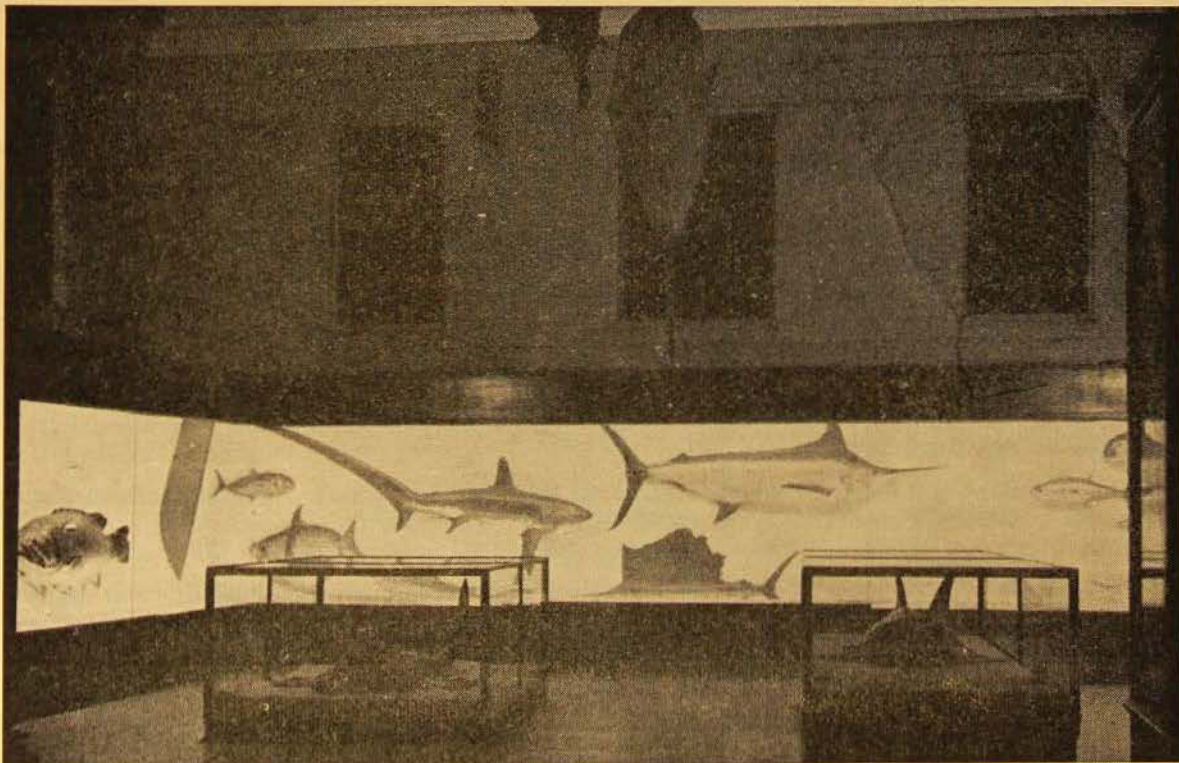
Current scientific literature was card-indexed and check-lists of fishes were kept up-to-date.

Many hundreds of inquiries have been dealt with for members of the public and for local and overseas institutions. Details concerning shark attacks in Australia were supplied to the Smithsonian Institution, Washington, U.S.A., to be included in a comprehensive world survey which is being compiled. Information was supplied to Dr. V. Coppleson and Messrs. I. Munro and T. C. Marshall to assist them in the compilation of books on sharks and fishes.

Loans of material were made to the Zoological Museum, Copenhagen, the Smithsonian Institution, Washington, and the Western Australian Museum. Sharks and fishes on loan to scientific workers in New Zealand, Western Australia and the Smithsonian Institution were returned.



This striking new exhibit, "Animals With Backbones", also known as "The Vertebrate Tree", shows the inter-relationships of the main groups of backboned animals and the geological periods at which particular evolutionary developments occurred



Part of the modernised section of the newly-arranged Fish Gallery

Fishes from Arnhem Land, Northern Territory, were received from the Smithsonian Institution, Washington, in exchange for a series of Australian fishes.

Information concerning the history of the Museum has been obtained by the Curator as time permits by checking and indexing books, newspapers, pictures and documents at the Public and Mitchell Libraries. Historical inquiries, which were dealt with, included the routes of Cook's Pacific voyages, early Museum photographs, selection of old files for retention as archives, identification of an old book and information on the A. C. English collection.

Birds and Reptiles (J. A. Keast, M.A., Ph.D., Curator; H. G. Cogger, B.Sc., Assistant Curator).

Seventy-one specimens of birds and 1,014 reptiles and amphibians were added to the collections during the year. Noteworthy acquisitions were specimens of eggs, larvae and adults of *Kyarranus sphagnicolus*, a genus of frogs not previously represented in the Museum collection. A large series of reptiles from Victoria was presented by Mr. F. Parker, and Dr. R. N. H. Bulmer donated reptiles from the Schrader Mountains, New Guinea. Mr. Eric Worrell presented a series of reptiles, which were cast for future gallery exhibits and added to the research collection. The Assistant Curator collected reptiles and amphibians from various localities in New South Wales.

The Curator left Sydney in May, on leave of absence, to carry out research at the American Museum of Natural History, New York, and the Edward Grey Institute of Ornithology, Oxford University. Since his departure the work of the Department has been carried on by the Assistant Curator.

The research collections have been maintained in good order. A complete reorganisation of the spirit collection of reptiles and amphibians has been undertaken owing to a critical lack of space in the spirit house. Work has continued, with the assistance of a group of amateur herpetologists, on the systematic revision of the spirit collections of reptiles and amphibians.

The transfer of the bird collections from various parts of the building into new specially-constructed steel storage cabinets, to be installed in the new bird store in the new wing, will commence shortly.

The general correspondence for the year consisted of numerous inquiries from the public and scientific institutions. Inquiries included the identification of reptiles and birds and advice in keeping many of these animals in captivity.

A list of the type specimens of birds in the collection has been completed and a start has been made on a list of specimens of reptiles and amphibians.

Several essential pieces of new equipment were added to the Department during the year, including a Watson binocular dissecting microscope, a Qualtex incubator and a chemical balance.

The Assistant Curator is co-operating with the Educational Officer and Photographer in the production of two educational films, one on frogs and the other on lizards.

Work has begun on building up a representative collection of alizarin skeletal transparencies in all groups of reptiles and amphibians.

Mammals (B. J. Marlow, B.Sc., Curator).

One hundred and fifty specimens were added to the collection and registered during the year. These included a large series of rats from New Guinea, presented by Dr. Willis, School of Hygiene and Tropical Medicine, University of Sydney, and a small collection of marsupials and rodents from New Guinea, presented by Dr. Bulmer, University of Auckland.

Continued progress has been made in the reorganisation of the collection of mammal skins and skulls. The card index for this material has been completely reorganised according to modern taxonomy of this group. It is anticipated that the complete reorganisation of the mammal collection will take at least two years.

Final plans and designs have been made, in co-operation with the Exhibitions Department, for displays in the Mammal Gallery, and work is well advanced on the exhibits which will be used in displays featuring an introduction to mammals, monotremes, marsupials and on whales and whaling.

A course of lectures on the anatomy of domestic animals was delivered to fourth-year students in Animal Husbandry, Department of Agriculture, University of Sydney.

Assistance was given to the Department of Visual Education in the preparation of a film strip for use in secondary schools on the "Characteristics of Mammals".

An Australian Mammal Society was founded to promote the study of mammals in the country, and the Curator was elected as a foundation member.

Skulls of common species of marsupials were exchanged with the Department of Zoology, University of British Columbia, for study skins of small Canadian mammals. These included a pika (*Ochotoma princeps*), related to the hares and rabbits, a genus not previously represented in the collection. An exchange of material was also made with the Zoology Department of the University of Malaya and some large Oriental shrews (*Suncus murinus*), which were needed for gallery display, were obtained.

Facilities were given to Mr. J. Mahoney, Department of Geology, University of Sydney, to study type material of the rodent genus *Pseudomys*; skulls of bandicoots (*Isoodon*) were examined for Dr. I. Mackerras, Queensland Institute for Medical Research. About 150 rats were identified for Dr. Willis, and a series of measurements of fruit bat skulls were made for Dr. Felton, of Germany.

About 280 inquiries from the public were answered during the year.

Molluscs (D. F. McMichael, B.Sc., M.A., Ph.D., Curator; Helen Anderson, Assistant).

Numerous molluscs were added to the collection during the year. They included a fine series of land snails from Peru, purchased from Dr. W. Weyrauch. Series of Australian and New Guinea species were collected and presented by Messrs. Horton and Bulmer, staff members Dr. Keast and Messrs. Cogger, Mackay and McAlpine and by members of the Department of Molluscs. A good series of land snails, including preserved material of considerable interest, was obtained by the Curator during a visit to Tasmania in January. Acquisitions of marine shells consisted of a series of trawled shells from the "Challenge" survey, obtained through Dr. Racek, and further material will be received shortly. Other specimens have been presented by many collectors, including Mesdames Kerslake, McKeon and Seymour, and Messrs. Garrard, Nielsen, Weaver, Coleman and Dr. Clench. Mr. Healey continued to collect nudibranchs, which he presented to the Museum, together with colour slides of them alive.

Curatorial activity has been emphasised again during the year. Revision of the land snails has continued, and the collection of foreign land shells has been transferred from a basement store to the main store, thus bringing all the land shells together for the first time. These are now being reboxed, sorted and rearranged, the completed groups being the Acavidae, Chloritidae, Trochomorphidae, Ariophantidae and some helicoid groups. At the same time the maintenance of the Australasian collection of marine shells has continued, and much assistance was given during the year by Mrs. Kerslake. The foreign marine gastropods and the land snails have been transferred from the basement to the main shell store. The sorting of shell material in the spirit house has continued.

Miss Joyce Allan, Honorary Zoologist, has completed the cataloguing of the available type specimens of marine gastropods and cephalopods. Additional types, however, are continually being located and the lists will not be completely finalised for some time.

Much time has been spent during the year on inquiries and identification of shells for the public, and on requests for information from other Australian zoologists and overseas institutions. This has resulted in the addition of useful and interesting material to the collections. Assistance with identifications has been given by Mr. Iredale and Mrs. Kerslake.

The Curator, as a member of the Museum Library Committee, assisted in making a survey of the current literature with a view to the Museum's present accessions and possible future requirements.

The Marine Shell Study Group continued to meet monthly in the Museum until the end of 1959 when it was temporarily discontinued.

A University student, Mr. D. Nichols, spent some time with the Curator working on land snails both in the Museum and in the field.

Insects and Arachnids (C. N. Smithers, M.Sc., Curator; D. K. McAlpine, M.Sc., Assistant Curator; Romola Wilkinson, Assistant).

The Curator, Mr. C. N. Smithers, commenced duty on the 12th February, 1960.

Approximately 4,000 specimens have been added to the collections during the year. These included a fine collection of skipper butterflies from New South Wales, including some rare species, presented by Mr. L. C. Haines. Other donations of insect specimens were from Mr. G. H. Hardy, of Katoomba; Mr. R. A. Harrison, of the Department of Scientific and Industrial Research, Auckland; Mr. C. V. Nathan, of Vacluse, and Mr. S. Sekhon of the University of Queensland.

The collections have been increased by the field work of the Curator and Assistant Curator.

The Curator has commenced to build up the collection of psocids (Order Psocoptera), which was previously of negligible proportions, and is studying that group and the Mecoptera.

The collections have been maintained in a satisfactory state, and every opportunity has been taken of expanding and improving them. Acquisitions have been mounted or otherwise preserved, labelled and placed in the collections. Identifications of these specimens were made, wherever practicable.

A collection of interesting Australian insects was sent to Dr. J. C. M. Carvalho, of Rio de Janeiro, Brazil, to be included in a display of insects.

Mr. R. T. Simon Thomas, of Hollandia, completed his research on a loan collection of New Guinea Cassidinae (Coleoptera, Chrysomelidae), and the material was returned. Specimens of Sciomyzidae (Diptera), on loan to Mr. S. Sekhon, University of Queensland, were also returned with type designations.

Specimens were forwarded on loan to Mr. R. W. Crosskey, of the Commonwealth Institute of Entomology, London, genus *Pygophora* (Diptera, Muscidae); Mr. J. C. Schaffner, Iowa State University, U.S.A. (Hemiptera), and Dr. M. A. Lieftinck, genus *Thyreus* (Hymenoptera, Apoidea).

Anthropology and Numismatics (F. D. McCarthy, Dip. Anthrop., Curator).

A total of 2,300 specimens in 61 acquisitions has been received.

Gifts of Australian material comprised 41 spears from the Katherine and Daly Rivers (Mrs. Moore); a sacred board (N. Blunden); a ritual spindle from the Northern Territory (O. E. Edwards); six cockle-shell ornaments from the south coast of New South Wales (Dr. H. Pacy); a fine example of pecked rock engraving from Depuch Island, Western Australia (A. Day).

Donations of stone implements included 609 from Andamooka and the Lake Torrens district, South Australia (Mr. O. Le M. Knight); 266 biface points from the Burrundi district, Northern Territory (J. Stratton); 45 axes, percussion and grindstones, and cylcons from the Bourke district (I. Sim); 58 flake implements from cave floors in the Lithgow district (Coast and Mountain Bushwalkers' Club), and 130 from the same sites (Messrs. D. Mackenzie, B. Shanahan and T. Walker).

Gifts of stone axes from New South Wales included three from H. J. Clift; six from Marulan (R. Brewer), Burragorang Valley (M. Boyd), Bogan Gate (K. Rawson), Curlewis (J. W. Scott), Narrandera (S. Peterson), Mt. Hope (R. Kilpatrick); three axes and a knife from Newcastle (L. G. Thompson).

Other implements donated included a cylcon from Lightning Ridge (D. Walker); five uniface pebble implements from Coff's Harbour (H. J. Cann); two hammerstones from Berrigan (L. McKenzie); two grindstones from Sturt's Meadows (P. Bevan); two mullers from Cox's Creek (N. Blunden and members of the Coast and Mountain Bushwalkers' Club); a hammerstone from Saratoga (A. J. Strudwick); millstone and core from Jerilderie (G. Elliot); twelve flake implements from Narromine and Lake Narran (R. Mackay); an axe from the south-western Kimberleys, Western Australia (Miss Julitha Walsh). The Curator collected sixteen flake implements at Woronora Dam and Topar Station, New South Wales.

Among gifts of Pacific Islands material there were 108 implements, weapons, utensils and ornaments from the Asaro district, Central New Guinea; a finely carved canoe prow from the Sepik River (Southern International Films); 128 implements, mortars, ornaments, utensil and other material from the Tari district (R. Glasse); 17 weapons and ornaments from various islands (Mrs. Knobbs); a set of personal ornaments worn by one man, New Britain (D. J. Langdale); a club from New Hebrides (A. Ruggeri); a wood carving from Buka Island (W. Reid), and an adze blade from Central New Guinea (C. Dunk).

Other material received as gifts included a steel dagger and comb from Indonesia (K. Gregg); two Celebes daggers (R. C. Cole) and a collection of 21 specimens from Samoa, New Hebrides, Madagascar and South Africa (J. Martin).

Fifteen bark paintings and four other specimens of Aboriginal art were selected from the collection to form part of a travelling exhibition of Australian Aboriginal Art, arranged by the State Art Galleries of Australia and to be shown in the various Art Galleries of Australia, beginning in Sydney.

Photographs of specimens have been supplied to a number of research workers abroad.

The Museum is building up a valuable collection of recordings of rock engravings and paintings in the Sydney-Hawkesbury district, and in this regard thanks is due to a number of private individuals. Mr. I. Sim, in particular, has contributed 40 scale charts of sites in the Blue Mountains and elsewhere. The object is to record all known sites and complete the scientific corpus of the art. Records of sites will thus be in existence should any of them be threatened with destruction by expansion of settlement.

The protection of Aboriginal relics in New South Wales has for the past twenty-five years been a matter of keen interest. The Government of New South Wales has now delegated to the National Trust of Australia (New South Wales) the protection and preservation of Aboriginal relics in this State. The Cumberland County Council also has jurisdiction in this field.

A report submitted on the urgent need for the collecting by Australian museums of anthropological specimens in New Guinea and other Melanesian Islands is being considered by the UNESCO Museums Committee in Australia.

Minerals and Rocks (R. O. Chalmers, A.S.T.C., Curator; Judith Harvey, Technical Assistant).

The number of minerals at 30th June was 40,705, an increase of 237. Donations included excellent uranium minerals from Rum Jungle (Barry Neill); a large cassiterite specimen weighing 175 lb. from Ardlethan (Cadwallader, Garretty and Mason); crocoite and pyromorphite from Tasmania (G. H. Thomas) and a fine gold specimen from Norseman, Western Australia (Central Norseman Gold Corporation).

Many minerals not previously represented in the collection were obtained by exchange, particularly from the École des Mines, Paris. These included uranium minerals from France, Morocco, Algeria, Tunisia and Senegal. Borate minerals, including a fine large crystal of the rare mineral inderite, from California and the new mineral hellyerite, recently described from Tasmania, were also received in exchange.

A collection of Western Australian minerals was made by the Curator at Norseman, Coolgardie, Londonderry, Spargoville and Bulong.

A set of polished sections made from material supplied by the Museum has been received from the Department of Applied Geology, University of New South Wales.

The number of rocks is 8,101, an increase of 81, and 42 thin sections were registered. These include bore cores from the Joint Coal Board, rocks collected by the Curator from Western Australia, and small portions of meteorites from the Department of Geophysics, Australian National University.

Towards the end of the year the combined office and work-room of the Department was vacated and the contents removed to permit the construction of a mezzanine floor, thus converting the room into a complete mineral and rock store. The Curator and his assistant are now occupying new rooms in the new wing.

A series of new steel storage cabinets was installed in the mineral and rock stores and the work of transferring collections to the new store is proceeding.

Two teaching collections were presented to the Balmain Teachers' College and two to schools, and several small collections were given to interested children. A comprehensive collection of specimens was given to Professor D. Brown, who is establishing a new Department of Geology at Canberra University College.

The supply of rare opaque minerals to the University of New South Wales was continued for making polished sections. Specimens of sulphide minerals, carbonate minerals and gem material for heat-treatment work was also lent to the University of New South Wales. Small portions of common ore minerals were given to the Newcastle University College for making polished specimens. A selection of specimens was lent to Professor L. J. Lawrence, University of New South Wales, for study purposes. A comprehensive suite of minerals from all mines in the Broken Hill district, excluding the main lode, was given on loan to Dr. A. B. Edwards, C.S.I.R.O., Mineragraphic Investigations Section, Melbourne. Small portions of meteorites and fluorescent calcite were given to the Department of Geophysics, Australian National University, Canberra. A selection of graphite samples was given to the C.S.I.R.O., Division of Coal Research.

A collection of 25 large mineral specimens, together with information for labels, was lent to the Department of Trade for display at the Lausanne (Switzerland) World Fair, at which Australia is the Guest Nation.

Exchanges were negotiated with Dr. A. E. Gardner, the City Museum, Vancouver.

Advice was given to the Canberra University College and the Bureau of Mineral Resources on the purchase of two large mineral collections in Sydney.

Approximately 152 inquiries were dealt with during the year, and were mainly concerned with the identification of rocks and minerals.

Assistance was given to the Joint Coal Board in examining and reporting on three different collections of borecores. Mr. J. Perry, Mineral Resources Bureau, and Professor D. Brown, Department of Geology, Canberra University College, were shown over Sydney stone-yards and visits were made to quarries, to familiarise them with the Sydney building-stone industry. Advice was given to Dr. Kalix, Bureau of Mineral Resources, and Mr. T. Rose, Geological Survey of New South Wales, on gemstones, in connection with publications these departments are printing. Moulds of two meteorites from Western Australia have been made for the Western Australian Museum.

The Curator assisted in assessing the respective merits of candidates for the Walter Burfitt Prize awarded by the Royal Society of New South Wales, and also for an award made by the New South Wales Branch of the Australian Astronomical Society.

School Service (Patricia M. McDonald, B.Sc., Dip. Ed., Education Officer; J. Kirkpatrick, B.A., Dip. Ed., Assistant Education Officer).

Miss McDonald returned to the Museum in December, 1959, from twelve months' leave of absence, during which she studied museum educational services in European countries and, particularly, the United Kingdom.

The total number of children who attended organised natural history classes given during the year in the Museum by the Education Officers was 10,540. These represented 290 class visits. In addition, many individual teachers conducted their own classes in the galleries. There are now 25 classes coming regularly once a month to the Museum, each of which is following an individual course of natural science or social studies.

During the September, January and May school vacations 7,750 people attended the screenings of children's films. At the tertiary level of education lectures were given to students from the Sydney and Balmain Teachers' Colleges on museum educational services. The usual visits were made by students from the New South Wales Kindergarten Training College and by art students from the Sydney Technical College. Zoology students from the University of Sydney visited the Museum, at the request of their lecturer, to study and prepare a thesis on our new exhibit "These Are Invertebrates".

The loan of specimens and photographs to school classes continued and 54 loans were made to schools. Specimens available for this service were increased by the transfer of duplicate material from scientific departments of the Museum. Mr. Justice Myers generously presented a further series of colour slides, and some have been incorporated in the loan collection.

Letters answered during the year totalled 908, and they included inquiries on all natural history subjects. An attempt was made to control this ever-increasing correspondence by supplying pamphlets on a variety of animals direct to schools.

An article on museum educational services was written for the "Education News" and one for the "Education Gazette". The latter journal continues to provide space for the republication of Museum leaflets, and three were published.

Two additional 16 mm. sound-films, "Camouflage in Nature through Form and Colour" and "How Animals Defend Themselves", have been added to the film library and were useful in teaching visiting school classes.

The production of two teaching films on Australian frogs and Australian lizards was commenced in co-operation with Mr. Cogger and Mr. Hughes. Several hundred feet of film have already been obtained and work is progressing.

Editorial Assistant and Public Relations Officer (P. F. Collis).

Publications sub-edited and inquiries from the public have been mentioned elsewhere in this Report.

The Museum received greatly increased publicity during the year in the press, on television and radio and through other media. Thirteen talks on new exhibits and natural history subjects were given on various radio stations by members of the staff. The Premier's Department's Publicity Office prepared talks on the Museum's activities for broadcasting. The Australian Museum Magazine was favourably reviewed by teachers' organisations' journals in New South Wales and other States and by other journals, including "Current Affairs Bulletin". Extracts from the Magazine were published in "The Sydney Morning Herald" and the "Daily Telegraph", and copies were included in a display of educational publications held by the Education Department's School Library Service. It was also publicised at the University of Sydney by the Students' Representative Council and the University Union.

Newspaper publicity has been given to the Museum on many occasions. The new wing received much publicity, and articles describing it and its future use appeared, with illustrations, in three newspapers. The new wing was also featured in an A.B.C. television item on educational buildings in New South Wales.

The official opening of the exhibit "The Invertebrate Tree", mentioned elsewhere in this Report, was televised and reported in the daily newspapers. New gallery exhibits were given publicity and two feature articles on the modernisation and reorganisation of the Museum have been published in "The Sydney Morning Herald". The A.B.C. televised a feature on the service the Museum gives the public in identifying natural history specimens and supplying information.

Following the finding of several sea snakes on Sydney beaches during the summer, the Museum appealed through the press and radio to members of the public to present any they found for research. Several specimens were received.

Publicity generally was particularly good, and many other Museum items of interest, apart from those mentioned, were published in the press.

The "shop", just inside the main entrance of the Museum, continued to sell Museum publications, folders of natural history pictures, prints of Aboriginal Bark paintings and pictures of Birds of Paradise.

Library (Mary G. E. Davies, B.Sc., L.A.A., Librarian).

During the year 307 bound volumes were added to the library, of which 229 were presented or received on exchange. One hundred and twenty-five were books or parts of series and 182 were bound volumes of periodicals. Two hundred and twenty-nine volumes have been bound for the Library by the Government Printer, 199 of which were new bindings and the rest repairs and rebinds. All these figures are a considerable advance on those of last year.

In October there were discussions with the Government Printing Office about the backlog of binding, and that Office agreed to take an extra 200 volumes of binding and 60 volumes of repairs or rebinding each year, over and above the usual binding quotas. The extra volumes are dispatched in lots of 65 every three months.

Approximately 500 loans were made to the libraries of the C.S.I.R.O. Divisions, Museums, Universities, Government Departments, commercial firms and other bodies throughout Australia and New Zealand. The Museum borrowed approximately 40 volumes from other libraries. Visiting scientists and research workers, both from Australia and overseas, made use of the Library and there were many requests for information and for microfilms and photocopies of material in the Library.

The recataloguing of the Library continued through the year, but work was interrupted by a change of staff, the transfer of books to the new wing, and a partly-completed stocktake; work on the latter two processes is still continuing. During the year 382 books and periodicals were classified and catalogued, 434 old cards were withdrawn from the catalogue and 1625 new cards were inserted. Cards made for the Union Catalogue of Books in Australian libraries totalled 466 and were despatched to the National Library, Canberra.

In April, 1960, Mrs. Anderson (Miss E. McElhone) was transferred to the library of the Premier's Department; she was replaced by Mrs. Schey.

Since May, 1960, the books in the Departments of Mineralogy, Lower Invertebrates, and Art have been transferred to the new wing, and those of the Department of Anthropology are in the process of transfer. The books of five departments still have to be transferred—Mammals, Birds and Reptiles, Fish, Entomology and Education. The Library is to take over the rooms vacated by the Department of Birds and Reptiles for use as an office and a reading room.

The Library Committee of the Museum has reviewed the periodicals listed in "Scientific Serials in Australian Libraries", and a list is being compiled of periodicals not held by the Museum, and not available in Sydney.

Exhibition Department (J. Beeman, Officer-in-charge).

Preparators' Section: R. D. Mackay (Officer-in-charge), R. Witchard and K. Gregg, Assistant Preparators, S. Ross, Cadet Preparator.

Art and Design Section: J. Beeman (Officer-in-charge), B. Bertram and D. Rae, Assistant Artists; Mrs. E. Brown and Mrs. K. Neilsen, Ticket writers.

The changes made last year in the organisation of the Departments of Preparation and of Design, outlined as above, have resulted in a greater co-ordination and efficiency in work, particularly in the preparation of gallery displays.

Two large gallery exhibits, the "Invertebrate Tree" and the "Vertebrate Tree", commenced last year, were completed. These outstanding displays are mentioned in detail earlier in this report. The "Invertebrate Tree" was officially opened by the President of the Museum's Board of Trustees, Mr. Wallace C. Wurth, C.M.G., on 31st July, 1959.

Designs have been completed for the Australian section of the Mammal Gallery and two new cases have been built for the installation of an introductory mammal exhibit and a "Whale and Whaling" exhibit. Thirty-four mammals have been modelled for these exhibits, which are now in an advanced stage of preparation.

A design for the Foreign Mammals (Zoogeography Exhibit) has been completed, and a large relief globe of the world to be used in the exhibit is nearing completion. This exhibit will occupy the full length of one side of the present Skeleton Gallery.

Two life-size human figures for the Neanderthal Man exhibit have been modelled and are ready for moulding.

Designs have been completed for a number of snake and lizard exhibits and specimens have been moulded and are ready for casting. In this work a new process of fibreglass casting is being used.

Miscellaneous items completed by the Art and Design section include 76 paintings, 5 plans, 36 construction drawings, 44 colour notes and the colouring of 34 casts.

Progress has been made with the Fish Gallery, although difficulties were experienced in obtaining suitable specimens to complete planned displays. Two additional exhibits were finalised and four others are nearing completion. The large "Classification of Fishes" exhibit is complete, with the exception of several rare species. When obtained, these fishes will be moulded and cast and added to the exhibit. A new technique for painting fishes has been developed and is most successful in that it does not obscure details of scaling in the cast.

A systematic collection of birds is being installed in the Upper Bird Gallery and will enable the public to identify all Australian species. The work of installation is almost complete.

Repeated mechanical failure of the turntable in the Bird Flight exhibit necessitated its removal, and it will be replaced by four new models of birds in flight.

A new process for the preparation of skulls and small skeletons was introduced in the department. All bulky meat is cut from the specimen and the remainder is left to dry on the bones. It is then placed in a breeding colony of the *Dermestes* beetle, kept in a specially constructed box. The beetles remove every vestige of flesh, and the bones are thoroughly clean and ready for articulation.

Three members of the staff attended a course of welding at the Sydney Technical College and their training has been useful for maintenance and construction work in the Galleries.

New equipment acquired during the year included a drying cabinet for prepared skins of birds and mammals. An arrangement was made with the Police Department for the use of three pistols for reptile and small bird collecting in the field. Dust ammunition is used and the specimens are undamaged when shot.

Museum Photographer and Visual Aids Officer (H. D. Hughes, A.R.P.S.).

Last year the position of Museum Photographer and Visual Aids Officer was created and filled by Mr. H. D. Hughes, formerly in charge of the Department of Preparation. Mr. Hughes is now devoting the whole of his time to photography and visual aid and, as a result, considerable progress in this important phase of Museum work has been achieved.

During the year 481 negatives were made and 1,820 prints prepared. Nineteen slides (3¼ x 3¼) and 590 slides (35 mm.), colour and black and white, were added to the collection. Registrations consisted of 226 negatives, 335 (35 mm.) slides and 19 (3¼ x 3¼) slides.

Television rights of the 16 mm. colour film "The Black Swan", produced by the Museum, were sold to the Australian Broadcasting Commission, and the film has been screened frequently on Channel 2 in various programmes. A total of 27 copies of the film was sold to other organisations.

In conjunction with Miss P. McDonald and Mr. H. G. Cogger, work has commenced on the preparation of two films, one dealing with frogs and one with lizards. Shooting scripts have been written, and about 800 feet of colour film has been exposed as opportunities occur and live specimens are available.

The modernisation of the Lecture Theatre made it necessary to modify existing projection facilities, and during the year the cinesound system was improved. Twin speakers were fitted in specially designed cases built by the Museum artificers and installed by the Government Stores Radio and Motion Picture Division, who advised us on the design of the speaker cases and their construction. The sound system now gives excellent sound reproduction and can be used for microphone as well as film sound.

A start has been made on cataloguing and card-indexing the collection of slides, and the work is well advanced.

New equipment acquired during the year consisted of one 10-inch Kodak Ektar Commercial camera lens and one Braun Hobby "Special" portable electronic flash-light unit with an extension head.

The Common Seal of the Trustees of the Australian Museum was hereunto affixed by Order of the Board this Thirtieth day of September, 1960.

FRANK B. SPENCER, President,
H. O. FLETCHER, Acting Director.

ADDENDUM

This Annual Report had been compiled prior to the death of Mr. Wallace C. Wurth, which occurred on 16th September, 1960. In its draft form, the Report had received his approval at a meeting of the Standing Committee held on 13th September, 1960, at which he was present.

At its meeting on 30th September, 1960, the Trust adopted a resolution in the following terms:

"The Trustees of the Australian Museum express the great sense of loss which they and the Museum have suffered through the death of Mr. Wallace C. Wurth, who, for a considerable period of years, played an outstandingly distinguished part in public affairs, not only in New South Wales, but also in the Commonwealth as a whole.

"Mr. Wurth was a Trustee of the Museum for 14 years, Chairman of the Finance Committee for 12 years, and, in December, 1958, became President of the Board.

"He took a keen interest in all the affairs and activities of the Museum, seized every opportunity to advance its work, and by his watchful care ensured the completion of the magnificent new wing.

"The Trustees assure Mrs. Wurth of the esteem in which they held her husband and express their sincere sympathy with her and her family."

Appendix A

**THE AUSTRALIAN MUSEUM—SUMMARISED STATEMENT OF RECEIPTS AND
PAYMENTS FOR THE YEAR ENDED 30th JUNE, 1960**

RECEIPTS		£	s. d.	£	s. d.
Appropriation Account—					
Treasury Appropriations				85,538	0 3
Trustees' Account—					
Statutory Endowment		1,000	0 0		
Grant towards Museum Requirements		2,000	0 0		
Museum Publications—Sales and Subscriptions		2,603	12 9		
Museum Shop Sales		127	1 4		
Legacy		100	0 0		
Donations		273	8 9		
Interest		398	5 3		
Advertising		60	6 0		
Postage Receipts		232	3 5		
Sale of Films—"Black Swan"		180	10 0		
Refund of Customs Charges		74	15 3		
Proceeds, Sale of Stamp Collection		4	17 9		
Miscellaneous Receipts		15	9 2		
				7,070	9 8
Balance as at 1st July, 1959—					
Cash at Bank and in hand		1,941	12 2		
Investments		9,110	8 0		
				11,052	0 2
				103,660	10 1
PAYMENTS					
Appropriation Account—					
Salaries, etc.		62,796	17 7		
Insurance of Buildings		42	7 8		
Travelling and Subsistence Expenses		1,441	8 2		
Freight, Cartage and Packing		76	12 6		
Books, Periodicals and Papers		681	10 5		
Fees, Commissions, etc.		47	10 0		
Laundry Expenses		74	4 10		
Postal and Telegraphic		309	19 7		
Other Insurances		505	16 4		
Stores, Plant and Equipment		2,749	13 7		
Grant towards Museum requirements		2,000	0 0		
Storage Equipment		14,811	19 7		
				85,538	0 3
Trustees' Account—					
Museum Publications—Cost		2,297	2 9		
Stock for Museum Shop		76	15 11		
Stores, Plant and Equipment		2,668	9 10		
Production of Film "Black Swan"		336	14 0		
Purchase of Films		43	10 0		
Publication Sales Receipts paid to Treasury		273	0 6		
Postage Receipts paid to Treasury		239	7 2		
Purchase of Specimens		72	2 5		
Travelling Expenses		150	12 1		
Customs Charges		37	10 0		
Entertainment		45	6 1		
Miscellaneous Expenditure		15	16 8		
				6,256	7 5
Balance as at 30th June, 1960—					
Cash at Bank and in hand		2,316	2 5		
Investments		9,550	0 0		
				11,866	2 5
				£103,660	10 1

H. O. FLETCHER, Acting Director.