

Education Department Bulletin

Published fortnightly by the University of the State of New York

Entered as second-class matter March 3, 1908, at the Post Office at Albany, N. Y., under the act of Congress of July 16, 1894

NO. 429

ALBANY, N. Y.

AUGUST 15, 1908

New York State Museum

JOHN M. CLARKE, Director

CHARLES H. PECK, State Botanist

Museum bulletin 122

REPORT OF THE STATE BOTANIST 1907

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ALBANY

UNIVERSITY OF THE STATE OF NEW YORK

1908

STATE OF NEW YORK

EDUCATION DEPARTMENT

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With years when terms expire

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1915	ALBERT VANDER VEER M.D. M.A. Ph.D. LL.D. -	- Albany
1911	EDWARD LAUTERBACH M.A. LL.D. - - - - -	- New York
1909	EUGENE A. PHILBIN LL.B. LL.D. - - - - -	- New York
1916	LUCIAN L. SHEDDEN LL.B. LL.D. - - - - -	- Plattsburg

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*New York State Education Department
Science Division, February 3, 1908*

*Hon. Andrew S. Draper LL.D.
Commissioner of Education*

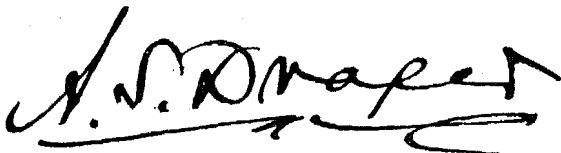
MY DEAR SIR: I communicate herewith, for publication as a bulletin of the State Museum, the annual report of the State Botanist for the fiscal year ending September 30, 1907.

Very respectfully

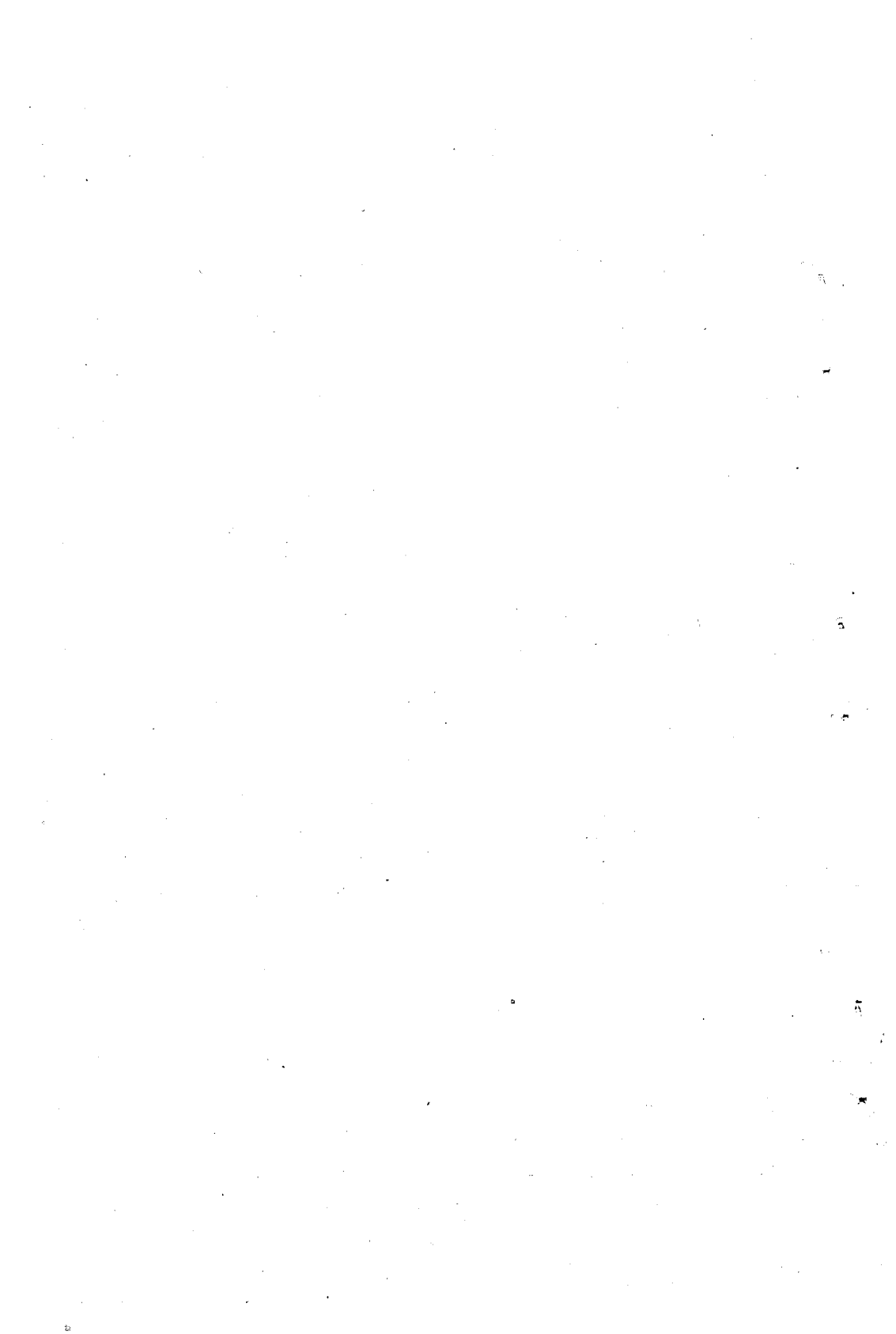
JOHN M. CLARKE
Director

*State of New York
Education Department
COMMISSIONER'S ROOM*

Approved for publication this 3d day of February 1908

A large, stylized handwritten signature in black ink, appearing to read 'A. S. Draper'. The signature is written in a cursive style with a prominent horizontal stroke at the bottom.

Commissioner of Education



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NO. 429

ALBANY, N. Y.

AUGUST 15, 1908

New York State Museum

JOHN M. CLARKE, Director

Museum bulletin 122

REPORT OF THE STATE BOTANIST 1907

Dr John M. Clarke, Director of the State Museum:

I have the honor of submitting to you my report of work done in the botanical department of the State Museum during the year 1907.

Specimens of plants have been collected in the counties of Albany, Greene, Herkimer, Jefferson, Oneida, Onondaga, Putnam, Rensselaer, Saratoga and Steuben.

Specimens of plants have been contributed by correspondents and others which were collected in the counties of Albany, Essex, Franklin, Herkimer, Monroe, New York, Onondaga, Ontario, Orleans, Richmond, Seneca, Steuben, Tompkins, Ulster, Warren and Washington.

The number of species of which specimens have been added to the herbarium is 203. Of these, 82 are new to the herbarium, 121 are not. Of those new to the herbarium, 45 are new species, 38 being species of Crataegus, 7 of fungi. A list of the names of the added species is given under the caption, "Species added to the herbarium."

The number of those who have contributed specimens is 72. This includes those who have contributed specimens of extralimital species and also those who have sent specimens for identification merely, if the specimens were rare or if for any other reason they were considered desirable or worthy of preservation. A list of the names of contributors and of their respective contributions is given under the heading "Contributors and their contributions." Under the heading, "Species not before reported" may be found the

names of species added to our flora, with localities, remarks and descriptions of new species, except in species of the genus *Crataegus*. Localities and descriptions of new species of these are given in the three papers on this subject in another part of the report. These papers have been prepared and kindly contributed by the eminent and expert dendrologist, Prof. C. S. Sargent. Unfortunately many of these species are not represented in our collection by specimens and can not yet be counted as additions to the herbarium. The whole number of species of this genus added to our flora is 88, making the number of New York species of this genus now known 185. But specimens of nearly all the new species credited to Coopers Plains and vicinity have been collected by the writer, and with the specimens contributed by Mr G. D. Cornell, these species are with one or two exceptions all now represented in the herbarium.

The past season, in its relation to the mushroom crop has been very similar to that of 1906. Early in the season there were sufficient rains but cool weather. These conditions were followed by a long period of dry weather unfavorable to the mushroom growth, and crowding it into a short period late in the season. The number of species whose edible qualities have been tried and approved is 8. These have been illustrated on five plates and described as in the plan followed in the preceding report. The whole number of New York edible species now illustrated is 191. The number of plates illustrating them and the poisonous and unwholesome species is 114.

A revision has been made of the New York species of the somewhat difficult genus *Pholiota*. The number of species now recognized as belonging to it is 32. Revised descriptions of these have been written and a key prepared to facilitate the tracing of the species to their respective descriptions.

The number of those seeking information from the botanical department concerning the identity of plants or their character is 117. The number of identifications made is 891.

My assistant, Mr Stewart H. Burnham, has disinfected the collections of 1906 which needed such treatment, labeled and arranged them in their proper places, assisted in conducting the correspondence of the office, in the identification of specimens of inquirers and in giving them the desired information. He has prepared a typewritten catalogue of the species of fungi described by the State Botanist, and made a typewritten copy of the present report.

Respectfully submitted

CHARLES H. PECK

State Botanist

Albany, December 31, 1907

SPECIES ADDED TO THE HERBARIUM

New to the herbarium

- Ajuga reptans L.
 Biatora prasina Fr.
 Biatorella simplex (Dav.) B. & R.
 Boletus niveus Fr.
 Centaurea solstitialis L.
 Cetraria glauca (L.) Ach.
 Chaetomium sphaerospermum C. & E.
 Cladonia bacillaris (Del.) Nyl.
 Clitocybe subcyathiformis Pk.
 Clitopilus subplanus Pk.
 Crataegus acerba S.
 C. affinis S.
 C. amoena S.
 C. anomala S.
 C. barryana S.
 C. bella S.
 C. claytoniana S.
 C. comans S.
 C. cornellii S.
 C. desueta S.
 C. dewingii S.
 C. dissociabilis S.
 C. diversa S.
 C. floridula S.
 C. frutescens S.
 C. fucata S.
 C. gracilis S.
 C. ignea S.
 C. inopinata S.
 C. insignata S.
 C. inusitata S.
 C. limosa S.
 C. macrocalyx S.
 C. nescia S.
 C. numerosa S.
 C. ovatifolia S.
 C. pellecta S.
 C. plana S.
 C. rosea S.
 C. recta S.
 C. repulsans S.
 Crataegus rubrolutea S.
 C. singularis S.
 C. spatifolia S.
 C. spinifera S.
 C. spissa S.
 C. steubenensis S.
 C. structilis Ashe
 C. suavis S.
 C. suborbiculata S.
 C. uncta S.
 C. verrucalis Pk.
 Cronartium ribicola Dietr.
 Diaporthe parasitica Murr.
 Flammula pulchrifolia Pk.
 Galium erectum Huds.
 Hygrophorus coloratus Pk.
 H. lacmus Fr.
 Hypocrea polyporoidea B. & C.
 Lactarius minusculus Burl.
 Leaia piperata Banker
 Lecidea platycarpa Ach.
 Lophiotrema semiliberum (Desm.)
 Lotus corniculatus L.
 Metzgeria conjuncta Lindb.
 Monilia crataegi Diedicke
 Myxosporium necans Pk.
 Nolanea suaveolens Pk.
 Parmelia cetrata Ach.
 P. perforata (Jacq.) Ach.
 Pholiota duroides Pk.
 Physcia hypoleuca (Muhl.) Tuck.
 Polyporus spraguei B. & C.
 Polystictus montagnei Fr.
 Rinodina oreina (Ach.) Mass.
 Russula aeruginea Fr.
 Sphaeropsis lyndonvillae Sacc.
 S. persicae E. & B.
 Stereocaulon coralloides Fr.
 Stropharia bilamellata Pk.
 Trentepohlia umbrina (Kütz.) Born.
 Tubercularia davisiana Sacc. & Tráv.
 Viola vagula Greene

Not new to the herbarium

- Aecidium clematidis* DC.
 Ae. grossulariae (Gmel.) Schum.
Agaricus arvensis Schaeff.
Alsine longifolia (Muhl.) Britton
Amanita caesarea Scop.
 A. formosa G. & R.
 A. phalloides Fr.
 A. rubescens Fr.
Amanitopsis farinosa (Schw.)
 A. vaginata (Bull.) Roze
Aronia nigra (Willd.) Britton
Aster divaricatus L.
 A. panic. bellidiflorus (Willd.)
Blitum capitatum L.
Boletus albocarneus Pk.
 B. castaneus Bull.
 B. chromapes Frost
 B. clintonianus Pk.
 B. elbensis Pk.
 B. nebulosus Pk.
 B. ravenelii B. & C.
 B. subaureus Pk.
 B. subtomentosus L.
Calvatia elata (Mass.) Morg.
Cantharellus cibarius Fr.
 C. cinnabarinus Schw.
 C. floccosus Schw.
 C. minor Pk.
Carya amara Nutt.
 C. glabra odorata Sarg.
Castanea dentata Borkh.
Chrysanthemum leucanthemum L.
Clitocybe amethystina (Bolt.)
 C. candicans Fr.
 C. laccata (Scop.) Fr.
Clitopilus caespitosus Pk.
Collybia acervata Fr.
 C. dryophila (Bull.) Fr.
 C. lacunosa Pk.
 C. platyphylla Fr.
Conringia orientalis (L.) Dum.
Cortinarius torvus Fr.
Crataegus bissellii S.
 C. uniflora Muench.
Cypripedium arietinum R. Br.
Cystopus amaranthi Berk.
Dasystema virginica (L.) Britton
Deconica bullacea Bull.
Dryopteris goldieana (Hook.) Gray
Eleocharis ovata (Roth) R. & S.
Erysimum cheiranthoides L.
Erysiphe polygoni DC.
Euphorbia polygonifolia L.
Flammula lubrica Fr.
Fraxinus lanceolata Borck.
 F. pennsylvanica Marsh.
Fuligo ovata (Schaeff.) Macb.
Fusisporium destruens Pk.
Galium mollugo L.
Habenaria blephariglottis (Willd.)
 H. ciliaris (L.) R. Br.
Helotium citrinum (Hedw.) Fr.
Helvella infula Schaeff.
Hydnum fennicum Karst.
 H. septentrionale Fr.
Hygrophorus borealis Pk.
 H. ceraceus Fr.
 H. coccineus (Schaeff.)
 H. marginatus Pk.
 H. pratensis (Pers.) Fr.
Hypholoma candolleianum Fr.
 H. capnoides Fr.
 H. incertum Pk.
 H. subaquilum Banning
 H. sublateritium (Schaeff.)
Lactarius camphoratus Fr.
 L. insulsus Fr.
 L. oculatus (Pk.) Burl.
 L. subdulcis Fr.
 L. varius Pk.
Lentinus spretus Pk.
Lenzites sepiaria Fr.
Lepiota acerina Pk.
Lycoperdon gemmatum Batsch
 L. glabellum Pk.
 L. subincarnatum Pk.
Marasmius glabellus Pk.
 M. minutus Pk.
 M. subnudus (Ellis) Pk.
Mycena rosella Fr.
Panus torulosus Fr.
Paxillus involutus Batsch
Phlebia radiata Fr.
Pholiota aggericola Pk.

Pholiota caperata <i>Fr.</i>	Russula decolorans <i>Fr.</i>
P. discolor <i>Pk.</i>	R. emetica <i>Fr.</i>
P. praecox <i>Pers.</i>	R. fallax <i>Fr.</i>
Polyporus adustus <i>Willd.</i>	R. obscura <i>Rom.</i>
P. betulinus <i>Fr.</i>	R. ochrophylla <i>Pk.</i>
P. caesius <i>Fr.</i>	R. pectinatoides <i>Pk.</i>
P. cuticularis (<i>Bull.</i>) <i>Fr.</i>	R. squalida <i>Pk.</i>
Polystictus bififormis <i>Klotz.</i>	R. uncialis <i>Pk.</i>
P. pergamenus <i>Fr.</i>	R. variata <i>Banning</i>
Psilocybe conissans <i>Pk.</i>	R. virescens <i>Schaeff.</i>
Puccinia andropogonis <i>Schw.</i>	Salix serissima (<i>Bail.</i>) <i>Fern.</i>
P. coronata <i>Cd.</i>	Thelephora palmata (<i>Scop.</i>) <i>Fr.</i>
Russula crustosa <i>Pk.</i>	Tricholoma personatum <i>Fr.</i>
T.	vaccinum <i>Pers.</i>

CONTRIBUTORS AND THEIR CONTRIBUTIONS

Miss H. C. Anderson, Lambertville, N. J.

Russula vesca <i>Fr.</i>	Sclerotinia tuberosa (<i>Hedw.</i>) <i>Fckl.</i>
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Miss G. S. Burlingham, Mexico

Lactarius aspidioides <i>Burl.</i>	Lactarius circellatus (<i>Batt.</i>) <i>Fr.</i>
L. bensleyae <i>Burl.</i>	Peckiella hymenioides <i>Pk.</i>

Mrs E. B. Blackford, Boston, Mass.

Boletus gracilis laevipes <i>Pk.</i>	Omphalia serotina <i>Pk.</i>
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Miss M. C. Burns, Middleville

Cantharellus floccosus *Schw.*

Mrs G. M. Dallas, Philadelphia, Pa.

Oxydendrum arboreum (*L.*) *DC.*

Mrs H. C. Davis, Falmouth, Me.

Helvella infula *Schaeff.*

Mrs L. L. Goodrich, Syracuse

Chrysanthemum leucanthemum tubuliforme (*Tenney*)

Mrs C. W. Harris, Brooklyn

Biatora chlorantha <i>Tuck.</i>	Cladonia bacillaris (<i>Del.</i>) <i>Nyl.</i>
B. laureri (<i>Hepp.</i>) <i>Tuck.</i>	C. caespiticia (<i>Pers.</i>) <i>Flk.</i>
Cetraria ciliaris (<i>Ach.</i>) <i>Tuck.</i>	C. cristatella <i>Tuck.</i>
C. glauca (<i>L.</i>) <i>Ach.</i>	C. delicata (<i>Ehrh.</i>) <i>Fr.</i>
C. lacunosa <i>Ach.</i>	C. fimb. coniocraea (<i>Flk.</i>)
C. oakesiana <i>Tuck.</i>	C. fimb. tubaeformis <i>Fr.</i>

Cladonia furcata (<i>Huds.</i>) <i>Schrad.</i>	Parmelia perlata (<i>L.</i>) <i>Ach.</i>
C. furc. paradoxa <i>Wainio.</i>	P. physodes (<i>L.</i>) <i>Ach.</i>
C. grac. dilatata (<i>Hoffm.</i>)	P. saxatilis (<i>L.</i>) <i>Fr.</i>
C. pyx. chlorophaea (<i>Spreng.</i>)	P. saxatilis sulcata <i>Nyl.</i>
C. pyx. neglecta (<i>Flk.</i>)	Peltigera horizontalis (<i>L.</i>) <i>Hoffm.</i>
C. rangiferina (<i>L.</i>) <i>Hoffm.</i>	Pertusaria communis <i>DC.</i>
C. turgida (<i>Ehrh.</i>) <i>Hoffm.</i>	P. velata (<i>Turn.</i>) <i>Nyl.</i>
C. verticillata <i>Hoffm.</i>	Physcia aquila detonsa <i>Tuck.</i>
Evernia furfuracea (<i>L.</i>) <i>Mann.</i>	Pyrenula nitida <i>Ach.</i>
E. prunastris (<i>L.</i>) <i>Ach.</i>	Pyxine sorediata <i>Ach.</i>
Graphis scripta <i>Ach.</i>	Ramalina calic. fastigiata <i>Fr.</i>
Lecanora pallida (<i>Schreb.</i>) <i>Schaer.</i>	Stereocaulon coralloides <i>Fr.</i>
L. subfusca (<i>L.</i>) <i>Ach.</i>	Sticta amplissima (<i>Scop.</i>) <i>Mass.</i>
Parmelia borreri rudecta <i>Tuck.</i>	S. pulmonaria (<i>L.</i>) <i>Ach.</i>
P. olivacea (<i>L.</i>) <i>Ach.</i>	Umbilicaria pust. papulosa <i>Tuck.</i>
P. oliv. panniformis <i>Nyl.</i>	Usnea barbata ceratina <i>Schaer.</i>
P. perforata (<i>Jacq.</i>) <i>Ach.</i>	U. barbata florida <i>Fr.</i>

Miss A. Hibbard, West Roxbury, Mass.

Lactarius hibbardae *Pk.*

Miss M. F. Miller, Washington, D. C.

Metzgeria conjugata *Lindl.*

Miss A. M. Patterson, Stanford University, Cal.

Agaricus pattersonae <i>Pk.</i>	Lactarius xanthogalactus <i>Pk.</i>
Amanitopsis velosa <i>Pk.</i>	Pleurotus olearius <i>DC.</i>
Hypholoma appendiculatum (<i>Bull.</i>)	Pluteolus luteus <i>Pk.</i>
H. longipes <i>Pk.</i>	Psathyrella caespitosa <i>Pk.</i>
Lactarius rufulus <i>Pk.</i>	Tricholoma personatum <i>Fr.</i>
	<i>Volvaria speciosa</i> <i>Fr.</i>

Mrs A. M. Smith, Brooklyn

Alsia abietina <i>Sull.</i>	Fontinalis kindbegii <i>R. & C.</i>
Antitrichia californica <i>Sull.</i>	Hylocomium loreum (<i>L.</i>) <i>Schimp.</i>
Aulacomnium androgynum <i>Schwaegr.</i>	H. proliferum (<i>L.</i>) <i>Lindb.</i>
Claopodium crispifolium (<i>Hook.</i>)	H. triquetrum (<i>L.</i>) <i>B. & S.</i>
Dicranoweisia cirrhata <i>Lindl.</i>	Isothecium brewerianum <i>L. & J.</i>
Dicranum bonjeani <i>DeNot.</i>	Neckera douglasii <i>Hook.</i>
D. fuscescens <i>Turn.</i>	N. menziesii <i>Drumm.</i>
D. scoparium <i>Hedw.</i>	Philonotis fontana <i>Brid.</i>
Eurhynchium oreganum (<i>Sull.</i>)	Plagiothecium undulatum <i>B. & S.</i>
E. stokesii <i>B. & S.</i>	Polytrichum juniperinum <i>Willd.</i>
E. stoloniferum (<i>Hook.</i>)	Racomitrium canescens <i>Brid.</i>
Fontinalis antipyretica <i>L.</i>	Scleropodium caespitosum <i>B. & S.</i>
S	colpophyllum (<i>Sull.</i>) <i>Grout.</i>

Miss T. L. Smith, Worcester, Mass.

Coprinus jonesii *Pk.*

Miss J. B. Spruance, Katahdin Iron Works, Me.
Gomphidius flavipes *Pk.*

Miss M. L. Sutliff, Sacramento, Cal.
Omphalia pyxidata (*Bull.*) *Fr.* | Polyporus volvatus *Pk.*

Mrs E. Watrous, Hague
Cypripedium arietinum *R. Br.* | Helvella gracilis *Pk.*
Dryopteris goldieana (*Hook.*) *Gray* | Phegopteris polypodioides *Fee*
Polystichum braunii (*Spenner*) *Fee*

Miss M. T. Wheeler, Keene Valley
Blitum capitatum *L.*

J. C. Arthur, Lafayette, Ind.
Puccinia agropyri *E. & E.* | Puccinia crandallii *P. & H.*

E. Bartholomew, Stockton, Kan.
Calvatia rubroflava (*Crag.*) *Morg.* | Lactarius vellereus *Fr.*
Collybia subsulphurea *Pk.* | Lycoperdon pulcherrimum *B. & C.*
Tylostoma mammosum *Fr.*

M. S. Baxter & V. Dewing, Rochester
Carex tribuloides reducta *Bailey* | Meibomia paniculata (*L.*) *Kuntze*
Cyperus filic. macilentus *Fernald* | Polygonum lapathifolium *L.*
Eleocharis ovata (*Roth.*) *R. & S.* | Senecio obovatus *Muhl.*
Euphorbia polygonifolia *L.* | Sisymbrium altissimum *L.*

H. C. Beardslee, Ashville, N. C.
Amanita russuloides *Pk.*

H. Blauvelt, Coeymans
Fusicladium pirinum (*Lib.*) *Fckl.*

F. S. Boughton, Pittsford
Lentinus lepideus *Fr.*

C. W. Boyd, Tupper Lake
Clavaria fistulosa *Fr.*

F. J. Braendle, Washington, D. C.
Amanita coccola *Scop.* | Pholiota confragosa *Fr.*
Amanitopsis volvata (*Pk.*) *Sacc.* | Pleurotus lignatilis *Fr.*
Armillaria mucida (*Schrad.*) *Pers.* | P. ostreatus (*Jacq.*) *Fr.*
Polyporus brumalis (*Pers.*) *Fr.*

S. H. Burnham, Sandy Hill

Biatorella simplex (Dav.) B. & R.	Hygrophorus lacmus Fr.
Clitocybe laccata Scop.	Lecidea platycarpa Ach.
Clitopilus caespitosus Ph.	Polyporus admirabilis Ph.
Cortinarius croceus Fr.	P. hispidus (Bull.) Fr.
Crepidotus croceitinctus Ph.	Rinodina oreina (Ach.) Mass.
Geoglossum nigratum (Fr.) Che.	Salix candida Fluegge
	Viola vagula Greene

G. H. Chadwick, Albany

Calyptospora goeppertiana Kühn	Geaster hygrometricus Pers.
Morchella esculenta (Pers.) Fr.	

T. T. Clohessy, Utica

Russula aeruginea Fr.

G. D. Cornell, Coopers Plains

Crataegus acerba S.	Crataegus numerosa S.
C. amoena S.	C. pellecta S.
C. dissociabilis S.	C. plana S.
C. diversa S.	C. ramosa S.
C. frutescens S.	C. repulsans S.
C. fucata S.	C. rubrolutea S.
C. gracilis S.	C. suavis S.
C. inopinata S.	C. uncta S.

J. J. Davis, Racine, Wis.

Aecidium laricis Kleb.	Phytophthora thalictri Wils. & Dav.
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S. Davis, Boston, Mass.

Clavaria amethystinoides Ph.	Inocybe fuscodisca (Ph.) Mass.
C. ornatipes Ph.	I. hirtellum Bres.
Cortinarius nigrellus Ph.	I. infelix Ph.
Deconica bryophila Ph.	I. praetervisa Quel.
Eccilia cinericola Ph.	I. proximella Karst.
E. subacus Ph.	I. rimosa (Bull.) Fr.
Entoloma diminutivum Ph.	Leotia punctipes Ph.
E. murinum Ph.	Naucoria sororia Ph.
Flammula betulina Ph.	Omphalia gerardiana Ph.
Galera hypnorum (Batsch) Fr.	Panaeolus papilionaceus Fr.
Helvella macropus brevis Ph.	Pholiota marginella Ph.
Hygrophorus peckii Atk.	Psathyrella betulina Ph.
Hypholoma candolleianum Fr.	Russula pusilla Ph.
Inocybe agglutinata Ph.	Tricholoma personatum Fr.
I. decipiens Bres.	Tubaria furfuracea Pers.

W. T. Davis, New Brighton,

Crataegus uniflora Muench.

J. Dearness, London, Ont.

Dermatea crataegicola <i>Durand</i>		Didymosphaeria thalictri <i>E. & D.</i>
Diaporthe microstroma <i>E. & E.</i>		Puccinia caricis-asteris <i>Arth.</i>
D. ulmicola <i>E. & E.</i>		Pucciniastrum potentillae <i>Kom.</i>

F. Dobbin, Shushan

Biatora prasina <i>Fr.</i>		Physcia hypoleuca (<i>Muhl.</i>) <i>Tuck.</i>
Cladonia digit. ceruchoides <i>Wain.</i>		Rinodina constans (<i>Nyl.</i>) <i>Tuck.</i>
Parmelia cetrata <i>Ach.</i>		Trentepohlia umbrina (<i>Kütz.</i>) <i>Born.</i>

E. J. Durand, Ithaca

Microglossum viride (<i>Pers.</i>) <i>Boud.</i>		Sclerotinia fructigena (<i>Pers.</i>)
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S. C. Edwards, New Brighton

Armillaria mellea <i>Vahl</i>		Fomes annosus <i>Fr.</i>
		Lenzites sepiaria <i>Fr.</i>

C. E. Fairman, Lyndonville

Eutypella angulosa (<i>Nke.</i>) <i>Sacc.</i>		Ophiochaete herpotricha (<i>Fr.</i>) <i>Sacc.</i>
Lophiotrema semiliberum (<i>Desm.</i>)		Sphaeropsis lyndonvillae <i>Sacc.</i>
		Sphaeropsis persicae <i>E. & B.</i>

G. B. Fessenden, Boston, Mass.

Clitocybe subnigricans Pk.

O. E. Fischer, Detroit, Mich.

Clitocybe pulcherrima <i>Pk.</i>		Fistulina pallida <i>B. & R.</i>
C. morbifera <i>Pk.</i>		Pleurotus elongatipes <i>Pk.</i>

N. M. Glatfelter, St Louis, Mo.

Boletus pachypus <i>Fr.</i>		Boletus subglabripes <i>Pk.</i>
		Pluteus leoninus coccineus <i>Cke.</i>

F. O. Grover, Oberlin, O.

Dothiorella aberrans Pk.

C. Guillet, Toronto, Ont.

Claudopus nidulans (<i>Pers.</i>) <i>Pk.</i>		Geaster limbatus <i>Fr.</i>
Clitocybe nobilis <i>Pk.</i>		Omphalia curvipes <i>Pk.</i>
Collybia hirticeps <i>Pk.</i>		O. vestita <i>Pk.</i>
		<i>Sarcoscypha coccinea (Jacq.) Fr.</i>

C. C. Hanmer, East Hartford, Conn.
Leptoglossum microsporum (C. & P.) Sacc.

W. E. Harding, Linden
Centaurea solstitialis L.

G. G. Hedgcock, St Louis, Mo.
Ceratostromella moniliformis Hedgcock

G. T. Howell, Rockville, Ind.

Daedalea confragosa (Bolt.) Pers.		Lentinus microspermus Pk.
Hypholoma rugocephalum Atk.		L. vulpinus Fr.
Lentinus cochleatus Fr.		Mycena leaiana Berk.

C. E. Jones, Selkirk
Conringia orientalis (L.) Dum. | Lotus corniculatus L.

C. H. Kauffman, Ann Arbor, Mich.

Boletus atkinsoni Pk.		Hydnum kauffmani Pk.
Collybia campanella Pk.		Pleurotus porrigens Pers.
Clitopilus conissans Pk.		Polyporus aurantiacus Pk.
Cortinarius rubripes Pk.		P. osseus Kalchb.
Entoloma peckianum Burt		Polystictus velutinus Fr.
		Poria fuscocarnea Pers.

R. H. Lane, Jolon, Cal.
Mycena acicula (Schaeff.) Fr.

G. G. Lansing, Romulus
Laestadia bidwellii Ellis

W. H. Leibelsperger, Fleetwood, Pa.
Cordyceps herculea (Schw.) Sacc.

C. G. Lloyd, Cincinnati, O.
Phycomyces nitens (Ag.) Kze.

J. McPherson, Trenton, N. J.
Phoenix dactylifera L. (undeveloped fruit)

A. P. Morgan, Harrison, O.
Marasmius siccus Schw.

G. E. Morris, Waltham, Mass.

Amanita porphyria <i>Fr.</i>	Hygrophorus caprinus (<i>Scop.</i>) <i>Fr.</i>
Badhamia lilacina (<i>Fr.</i>) <i>Rost.</i>	H. lacmus <i>Fr.</i>
Balansia hypoxylon (<i>Pk.</i>) <i>Atk.</i>	Leotia chlorocephala <i>Schw.</i>
Clavaria platyclada <i>Pk.</i>	Leptonia abnormis <i>Pk.</i>
Clitocybe adirondackensis <i>Pk.</i>	Marasmius siccus <i>Schw.</i>
Cortinarius multififormis <i>Fr.</i>	Mycena epipterygia <i>Scop.</i>
C. rigidus (<i>Scop.</i>) <i>Fr.</i>	M. galopoda <i>Fr.</i>
Entoloma variabile <i>Pk.</i>	Nolanea conica <i>Pk.</i>
Fuligo ovata (<i>Schaeff.</i>) <i>Macbr.</i>	Panus strigosus <i>B. & C.</i>
Geoglossum americanum <i>Che.</i>	Pholiota duroides <i>Pk.</i>
Guepinia aurea <i>Mont.</i>	Polyporus volvatus <i>Pk.</i>
Helvella gracilis <i>Pk.</i>	Tricholoma grammopodium (<i>Bull.</i>)
Hygrophorus borealis <i>Pk.</i>	<i>Fr.</i>
	Tylostoma americanum <i>Lloyd</i>

G. E. Morris & S. Davis, Mass.

Entoloma modestum <i>Pk.</i>	Mycena alcalina <i>Fr.</i>
	Naucoria tabacina bicolor <i>Pk.</i>

W. A. Murrill, New York

By exchange

Diaporthe parasitica *Murrill*

J. J. Neuman, Horicon, Wis.

Hydnum sulcatipes <i>Pk.</i>	Poria medulla-panis (<i>Pers.</i>) <i>Fr.</i>
Irpex nodulosus <i>Pk.</i>	P. obducens <i>Pers.</i>
Myriadoporus induratus <i>Pk.</i>	Steccherinum adustulum <i>Banker</i>

R. S. Phifer, Danville, Va.

Lycoperdon pulcherrimum *B. & C.*

R. R. Riddell, Albany

Lepiota naucinoides *Pk.*

F. J. Seaver, New York

Cordyceps militaris (<i>L.</i>) <i>Link</i>	Hypomyces aurantius (<i>Pers.</i>) <i>Fchl.</i>
Gloniopsis smilacis (<i>Schum.</i>)	Hypoxylon sassafras <i>Schw.</i>
Hypocrea gelatinosa (<i>Tode</i>) <i>Fr.</i>	Nectria aureofulva <i>C. & E.</i>
H. patella <i>C. & P.</i>	N. cinnabarina (<i>Tode</i>) <i>Fr.</i>
Hypoderma commune (<i>Fr.</i>) <i>Duby</i>	Rosellinia aquila (<i>Fr.</i>) <i>DeNot.</i>

E. B. Sterling, Trenton, N. J.

Hygrophorus psittacinus (<i>Schaeff.</i>)	Russula pusilla <i>Pk.</i>
Lycoperdon gemmatum <i>Batsch</i>	Tricholoma fumidellum <i>Pk.</i>
	Volvaria speciosa <i>Fr.</i>

F. C. Stewart, Geneva

Cronartium ribicola *Dietr.*

D. R. Sumstine, Wilkesburg, Pa.

<i>Collybia hirticeps</i> <i>Pk.</i>		<i>Rhinotrichum sumstinei</i> <i>Pk.</i>
<i>Flammula eccentrica</i> <i>Pk.</i>		<i>Thelephora caryophyllea</i> (<i>Schaeff.</i>)
<i>Monilia aureofulva</i> <i>C. & E.</i>		<i>Zygodesmus pannosus</i> <i>B. & C.</i>
		<i>Zygodesmus rubiginosus</i> <i>Pk.</i>

H. von Schrenk, St. Louis, Mo.

Lepiota xylophila *Pk.*

J. M. Van Hook, Wooster, O.

<i>Flammula betulina</i> <i>Pk.</i>		<i>Russula compacta</i> <i>Frost</i>
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H. L. Wells, New Haven, Conn.

<i>Lepiota americana</i> <i>Pk.</i>		<i>Tricholoma alboflavidum</i> <i>Pk.</i>
		<i>Tricholoma columbetta</i> <i>Fr.</i>

F. B. Wheeler, Syracuse

<i>Cortinarius lilacinus</i> <i>Pk.</i>		<i>Sporodina aspergillus</i> (<i>Scop.</i>)
<i>Lactarius turpis</i> <i>Fr.</i>		<i>Schroet.</i>

T. E. Wilcox, Washington, D. C.

<i>Boletus bicolor</i> <i>Pk.</i>		<i>Phylloporus rhodoxanthus</i> (<i>Schw.</i>)
B. <i>caespitosus</i> <i>Pk.</i>		<i>Polystictus sanguineus</i> (<i>L.</i>) <i>Mey.</i>
B. <i>chrysenteron</i> <i>Fr.</i>		<i>Russula chamaeleontina</i> <i>Fr.</i>
B. <i>retipes</i> <i>B. & C.</i>		R. <i>crustosa</i> <i>Pk.</i>
B. <i>subsanguineus</i> <i>Pk.</i>		R. <i>rugulosa</i> <i>Pk.</i>
<i>Hydnum fennicum</i> <i>Karst.</i>		<i>Tricholoma personatum</i> <i>Fr.</i>

B. C. Williams, Newark

Stropharia bilamellata *Pk.*

H. C. Wilson, Peabody, Mass.

Russula pectinatoides *Pk.*

D. B. Young, Albany

Marasmius minutus *Pk.*

SPECIES NOT BEFORE REPORTED

Ajuga reptans L.

In waste grassy places. Remsen, Oneida co. June. Introduced from Europe and sparingly naturalized.

Biatora prasina Fr.

Bark of sugar maple, *Acer saccharum* L. Shushan, Washington co. March. Frank Dobbin.

Biatorella simplex (Dav.) B. & R.

Rocks. Helderberg mountains. July. S. H. Burnham. This is *Lecanora privigna* (Ach.) Nyl.

Boletus niveus Fr.

Sandy soil. Karner, Albany co. August. This has by some been considered a white variety of *Boletus scaber* Fr. It appears to us to be worthy of specific distinction, for it differs from that species not only in the color of the pileus but also in its smaller tubes and in the character of the stem, which is adorned with mere scurfy or appressed squamules instead of the conspicuous dotlike fibrous scales of the stem of *B. scaber*.

Centaurea solstitialis L.

Linden, Genesee co. August. W. E. Harding. This plant was introduced from Europe into California many years ago. Whether the plant has come here from the west or is the result of a more recent introduction from Europe is uncertain.

Cetraria glauca (L.) Ach.

On dead hemlock, *Tsuga canadensis* Carr. Panther mountain, Essex co. June. Mrs C. W. Harris.

Chaetomium sphaerospermum C. & E.

Bottom of a barrel standing in a damp cellar. Menands, Albany co. September. The spores in our specimens vary from globose to broadly elliptic and from .0003-.0004 of an inch in diameter.

Cladonia bacillaris (Del.) Nyl.

Decaying wood. Adirondacks. July. Mrs C. W. Harris.

Cladonia delicata (Ehrh.) Fl.

Decaying wood. Near Chilson lake, Essex co. August. Mrs C. W. Harris. Sand Lake, Rensselaer co. C. H. Peck. This was formerly reported as a variety of *Cladonia squamosa*, but it is now deemed worthy of specific distinction.

Clavaria ornatipes n. sp.

Clubs 1-2 inches tall, gregarious, sparingly branched; stem slender hairy, fuscous or brown, the branches irregular, terete, whitish, grayish or cinereous, the tips acute or obtuse; spores broadly elliptic or subglobose, .0003-.00045 of an inch long, .00024-.0003 broad.¹

In low swampy woods, usually among mosses. Sand Lake.

In New York State Museum Report 24, page 82 this was referred to *Clavaria trichopus* Pers. After seeing specimens of it from other localities and finding it constantly differing from the descriptions of that species, which is called "snowy white" and is much branched, it has seemed to us to be distinct.

Clitocybe subcyathiformis Pk.

In damp places under shrubs. Karner. October. For the description of this species see article on "Edible Fungi."

Clitopilus subplanus n. sp.

Pileus thin, broadly convex or nearly plane, slightly depressed in the center or distinctly umbilicate, glabrous, whitish or grayish white, flesh white; lamellae thin, close, adnate or slightly decurrent, dingy flesh colored; stem slender, glabrous, terete or compressed, stuffed or hollow, colored like the pileus; spores flesh colored, angular, uninucleate, .0004-.0005 of an inch long, .00024-.0003 broad.

Pileus 1-1.5 inches broad; stem 1-1.5 inches long, 1-2 lines thick.

Among fallen leaves and decaying vegetable matter in woods. Sand Lake, Rensselaer co. and Gansevoort, Saratoga co. July and August.

This is closely related to *Clitopilus carneoalbus* With. from which I have separated it because of the more umbilicate

¹ Latin descriptions of this and other new species may be found in the last chapter of this report.

pileus, the absence of any reddish tints in the pileus, its stuffed or hollow stem and specially of its larger spores which are longer than broad.

Crataegus anomala Sarg.

Crown Point, Essex co. and Fort Ann, Washington co. Flowers in May, fruit ripens in September. The plants now referred to this species were formerly credited to *C. exclusiva* Sarg. from which they may be separated by the fruit which is distinctly narrowed toward the base. The species was founded on specimens collected in Canada.

Crataegus suborbiculata Sarg.

Letchworth park, Wyoming co. Flowers in May, fruit ripens the last week in September. This species also was founded on specimens collected in Canada. It is placed in the group *Punctatae*.

The following species of *Crataegus* are here reported by name only as additions to our flora. The names are arranged under their respective groups. Nearly all are new species of which descriptions, localities and remarks are contained in the three chapters on *Crataegus*, immediately following the present one.

	CRUS-GALLI		<i>Crataegus dissociabilis</i> S.
<i>Crataegus arduennae</i> S.		C.	<i>foliata</i> S.
C. <i>cerasina</i> S.		C.	<i>gracilis</i> S.
C. <i>geneseensis</i> S.		C.	<i>implicata</i> S.
C. <i>robusta</i> S.		C.	<i>inutila</i> S.
		C.	<i>livingstoniana</i> S.
		C.	<i>macera</i> S.
	PUNCTATAE	C.	<i>macrocalyx</i> S.
<i>Crataegus barbara</i> S.		C.	<i>numerosa</i> S.
C. <i>celsa</i> S.		C.	<i>oblita</i> S.
C. <i>desueta</i> S.		C.	<i>ovatifolia</i> S.
C. <i>dewingii</i> S.		C.	<i>pellecta</i> S.
C. <i>notabilis</i> S.		C.	<i>placiva</i> S.
		C.	<i>plana</i> S.
	PRUINOSAE	C.	<i>promissa</i> S.
<i>Crataegus acerba</i> S.		C.	<i>pulchra</i> S.
C. <i>amoena</i> S.		C.	<i>radiata</i> S.
C. <i>aridula</i> S.		C.	<i>ramosa</i> S.
C. <i>barryana</i> S.		C.	<i>rubrolutea</i> S.
C. <i>bronxensis</i> S.		C.	<i>strigosa</i> S.
C. <i>clintoniana</i> S.		C.	<i>tortuosa</i> S.
C. <i>congestiflora</i> S.		C.	<i>uncta</i> S.
C. <i>cruda</i> S.		C.	<i>xanthophylla</i> S.

TENUIFOLIAE
Crataegus bella S.
C. boothiana S.
C. claytoniana S.
C. conferta S.
C. fucata S.
C. gracilipes S.
C. ignea S.
C. insignata S.
C. leptopoda S.
C. luminosa S.
C. nescia S.
C. recta S.
C. slavini S.
C. spatifolia S.
C. suavis S.

MOLLES

Crataegus radians S.

FLABELLATAE

Crataegus dayana S.
C. gloriosa S.
C. letchworthiana S.
C. limosa S.
C. steubenensis S.

COCCINEAE

Crataegus chateaugayensis S.
C. harryi S.

Crataegus neobaxteri S.
C. puberis S.
C. spissa S.
C. verrucalis Pk.

INTRICATAE

Crataegus cornellii S.

ANOMALAE

Crataegus affinis S.
C. brachyloba S.
C. floridula S.
C. inopinata S.
C. repulsans S.
C. simulans S.
C. singularis S.

TOMENTOSAE

Crataegus admiranda S.
C. calvini S.
C. comans S.
C. efferata S.
C. finitima S.
C. frutescens S.
C. honeoensis S.
C. spinifera S.
C. structilis Ashe
C. venustula S.

Cronartium ribicola Dietr.

On living leaves of black currant, *Ribes nigrum* L. Agricultural Experiment station grounds. Geneva. September 26, 1906. F. C. Stewart. This is an injurious parasitic fungus which has probably been recently introduced into this country. Its aecidial form, *Peridermium strobi*, occurs on the trunk and branches of white pine to which it is more injurious than the *Cronartium* is to currant bushes. Fortunately this form has not yet been detected in this country and it is possible that we may yet be free from it.

Diaporthe parasitica Murr.

Parasitic on the branches of chestnut trees to which it is injurious and eventually destructive. Various places in the vicinity of New

York. Our specimens are from Bronx park. There are two forms of the plant, a summer or conidial form which was collected in July, and a winter or perfect form bearing ascospores, which was collected in December. Received from W. A. Murrill in exchange. Specimens have also been communicated by G. G. Atwood which were collected in Westchester co.

Flammula pulchrifolia n. sp.

Pileus fleshy but thin, hemispheric becoming convex, slightly viscid when moist, hygrophanous, fibrillose or, in large specimens, squamulose in the center and fibrillose on the margin, pale pink or pallid on the margin and pink in the center, flesh white, taste bitter and unpleasant; lamellae thin, close, adnate, sometimes slightly sinuate, whitish, soon bright tawny or Indian yellow becoming bright tawny ochraceous with age; stem equal or nearly so, stuffed or hollow, pallid, sometimes yellowish at the base, fibrillose at the top from the remains of the veil; spores bright tawny ochraceous in a thick layer, ochraceous buff in a thin one, .0003 of an inch long, .0002-.00024 broad.

Pileus 1-2 inches broad; stem 1-1.5 inches long, 1.5-2 lines thick.

Decaying wood of hemlock, *Tsuga canadensis* Carr. Menands, Albany co. July and August.

This beautiful species is easily recognized by the pink tint of the pileus, the bitter flavor of its flesh and the peculiar bright colors of its lamellae and spores. The fibrils at the top of the stem when stained by the falling spores might be mistaken for a slight annulus.

Galium erectum Huds.

Abundant along a stream in an upland field 3 miles southeast of Utica. June. J. V. Haberer. The upright bedstraw is a recently introduced plant and is related to wild madder, *Galium mollugo* L.

Hygrophorus coloratus n. sp.

Pileus fleshy, convex or nearly plane, often umbonate, even, very viscid or glutinous, yellowish red-orange or bright red, flesh white, yellow under the cuticle; lamellae unequal, distant, arcuate, adnate or decurrent, white, sometimes tinged with yellow, interspaces venose; stem equal or tapering upward, glutinous, stuffed or hollow, white or slightly tinged with yellow, sometimes when young showing a slight floccose veil near the top; spores .0003-.0004 of an inch long, .0002-.00024 broad.

Pileus 1-2.5 inches broad; stem 2-3 inches long, 2-4 lines thick.

Under tamarack and balsam fir trees. Fulton Chain, Herkimer co. October.

This is a beautiful species of *Hygrophorus* closely related to *H. speciosus* Pk. and *H. aureus* Arrh. From the last I have separated it because of its different habitat, its frequently umbonate pileus, its white or whitish stem and its partial floccose white veil. By this last character and its persistently red or orange colored pileus it is separable from *H. speciosus* Pk. and *H. bresadolae* Quel. It is possible that further observation may prove that all these are forms of one variable species.

Hygrophorus lacmus Fr.

Ground in woods of deciduous trees. Wilburs Basin, Saratoga co. November. S. H. Burnham. A single specimen.

Hypocrea polyporoidea B. & C.

Bark and decorticated wood of beech, *Fagus americana* Sweet. Adirondack mountains. Lake Pleasant, Hamilton co. and Star lake, St Lawrence co. August.

Lactarius minusculus Burl.

Among fallen leaves and mosses under white birches. Menands, Albany co. July. This species has hitherto been confused with *L. subdulcis* Fr. and has been separated because of its smaller size and acrid or tardily acrid taste.

Leaia piperata Banker

Decaying wood. East Schaghticoke, Rensselaer co. H. J. Banker. Meadowdale, Albany co. September. Remarkable for its dissected pileus and its hot peppery flavor.

Lecidea platycarpa Ach.

Rocks. Vaughns, Washington co. August. S. H. Burnham.

Lophiotrema semiliberum (Desm.) Sacc.

Dead grass stems. Lyndonville, Orleans co. May. C. E. Fairman.

Lotus corniculatus L.

Selkirk, Albany co. C. E. Jones. An introduced plant sparingly naturalized.

Metzgeria conjugata Lindb.

Perpendicular surface of rocks. Shandaken, Ulster co. June. Miss M. F. Miller.

Monilia crataegi Diedicke

Parasitic on living leaves of various species of thorn bushes. It causes the leaves to turn brown and die and is therefore more or less injurious to the plant it attacks, according to the severity of the attack. The fungus is at first whitish, but soon becomes cinereous. When fresh it emits a strong odor. In the typical form of the fungus the spores are said to be $13\ \mu$ long, $11\ \mu$ broad. In our specimens they vary from $12-20\ \mu$ long, and $11-12\ \mu$ broad. Painted Post, Steuben co. Also Clayton, Jefferson co. and near Albany. May and June.

Myxosporium necans n. sp.

Acervuli in longitudinal series, erumpent, whitish within, spores oozing out in whitish or yellowish white tendrils or masses; spores oblong or elliptic, .00024-.0004 of an inch long, .00008-.000012 broad, often binucleate, supported on slender sporophores.

Bark of living chokecherry, *Prunus virginiana* L. North Greenbush, Rensselaer co. June. The fungus attacks the trunk near the base and soon kills the shrub.

Nolanea suaveolens n. sp.

Pileus submembranous, convex, umbilicate, obscurely fibrillose or unpolished, indistinctly striate on the margin, smoky brown; lamellae thin, unequal, close, adnate, whitish becoming dingy pink; stem slender, glabrous, hollow, brown; spores angular, uninucleate, .0004-.0005 of an inch long, .00024-.0003 broad.

Pileus 6-10 lines broad; stem 1.5-2 inches long, .5 of a line thick. Woods. Sand Lake, Rensselaer co. August.

The dried specimens emit an agreeable odor similar to that of *Lactarius camphoratus* or *L. glyciosmus*. This character is suggestive of the specific name.

Parmelia perforata (Jacq.) Ach.

Trees. Near Chilson lake, Essex co. June. Mrs C. W. Harris.

Parmelia cetrata Ach.

Trunks of trees in swamps. Shushan, Washington co. May.
Frank Dobbin.

Physcia hypoleuca (Muhl.) Tuckerm.

Trunks of trees. Shushan. April. Frank Dobbin.

Pholiota duroides Pk.

Ground in woods near Syracuse. August. G. E. Morris and
C. H. Peck. For description of this species see article on "New
York Species of Pholiota."

Polyporus alboluteus E. & E.

Decaying prostrate trunk of spruce, between Long lake and Mud
pond, Hamilton co. Imperfect specimens of this rare species were
formerly referred to *Lenzites sepiaria dentifera*, in
New York State Museum Report 40, page 75. It has been found
but once in our State. The type specimens were collected in Colo-
rado, the only other locality at present known for the species. A
new genus, *Aurantiporellus*, has recently been founded by Dr
Murrill on this species.

Polyporus spraguei B. & C.

On old stumps of oak and chestnut. Sand Lake, Rensselaer co.
and Wading River, Suffolk co. July and August.

Polystictus montagnei Fr.

Ground. Sand Lake, Rensselaer co. and Piseco, Hamilton co.
This is a rare species with us. A single specimen was found in
each locality. It is distinguished from allied species by the large
size of its pores. The pileus is often very irregular.

Rinodina oreina (Ach.) Mass.

Peaked rock near Shushan, Washington co. July. S. H. Burn-
ham.

Russula aeruginea Fr.

Near Utica. August. T. T. Clohessy. Near Gansevoort, Sara-
toga co. C. H. Peck.

Sphaeropsis lyndonvillae Sacc.

Dead branches of a cultivated species of *Althaea*. Lyndonville, Orleans co. C. E. Fairman.

Sphaeropsis persicae E. & B.

Dead branches of flowering almond, *Prunus japonica* Thunb. Lyndonville. May. C. E. Fairman.

Stereocaulon coralloides Fr.

Rocks. Mt Marcy. July. C. H. Peck. Near Chilson lake, Essex co. June. Mrs C. W. Harris.

Stropharia bilamellata Pk.

In a plowed field near Newark, Wayne co. September. B. C. Williams. See article on "Edible Fungi."

Trentepohlia umbrina (Kütz.) Born.

Bark of canoe birch, *Betula papyrifera* Marsh. Shushan, Washington co. May. Frank Dobbin.

Tubercularia davisiana Sacc. & Trav.

Parasitic on *Rhytisma salicinum* (Pers.) Fr. Catskill mountains.

Viola vagula Greene

Low damp ground near Vaughns, Washington co. May. S. H. Burnham.

SOME ADDITIONS TO THE CRATAEGUS FLORA OF
WESTERN NEW YORK

BY C. S. SARGENT

The following paper is based chiefly on collections and observations made by Mr John Dunbar of Rochester in Buffalo and Niagara Falls between 1901 and 1906. In it are also included a few species distinguished at Rochester since the publication in the fourth volume of the Proceedings of the Rochester Academy of Science in 1903 of my paper on *Crataegus in Rochester*, and a few others discovered in the valley of the Genesee river south of Rochester by Messrs Baxter and Dewing of Rochester, and in Canandaigua and Chapinville, Ontario co. by the Rochester botanists.

I NUTLETS WITHOUT VENTRAL CAVITIES

I CRUS-GALLI

Leaves obovate, cuneate, coriaceous, dark green and shining above, mostly glabrous, usually serrate only above the middle, their veins thin except on vigorous shoots and often within the parenchyma; calyx glabrous; fruit oblong to subglobose; nutlets 1-3, obtuse and rounded at the ends, prominently ridged on the back.

Veins within the parenchyma

Stamens 10 or less

Anthers rose color..1 *C. crus-galli* var. *pyracanthifolia*Anthers white2 *C. arduennae*

Veins prominent

Anthers pale pink

Stamens 9-103 *C. geneseeensis*

Stamens 10-20

Flowers at least 1.8 cm in diameter, in broad many-flowered corymbs; leaves broadly ovate; fruit crimson; spines stout..4 *C. robusta*Flowers not more than 1.2 cm in diameter, in few-flowered corymbs; leaves narrowly obovate; fruit bright cherry-red; spines slender5 *C. cerasina**Crataegus crus-galli* var. *pyracanthifolia* Aiton

Hort. Kew. II. 170 (1788). Sargent, Silva N. Am. XIII. 39, t. 637;
Bot. Gazette XXXV. 100; Man. 369.

Niagara Falls, J. Dunbar and C. S. Sargent (* 17), September 16, 1904, J. Dunbar, September 27, 1905 and June 1906; Rochester, Baxter and Dewing (* 314), June 10 and October 15, 1905; also at Niagara on the Lake, Ontario and in Delaware.

Crataegus arduennae Sargent

Bot. Gazette XXXV. 377 (1903); Man. 373, f. 291; Acad. Sci. Phila. Proc. 582 (1905).

South Buffalo, B. H. Slavin (№ 14), June 6 and October 1906; also southern Ontario, through southern Michigan to northeastern Illinois, and in eastern Pennsylvania.

Crataegus arduennae was first described as entirely glabrous but there are often a few hairs on the upper side of the midribs of the young leaves; and a few minute hairs can be found occasionally on the young pedicels of the Buffalo plant.

Crataegus geneseensis n. sp.

Glabrous with the exception of a few hairs on the young leaves. Leaves obovate-oblong, short pointed at the rounded or acute apex, gradually narrowed from near the middle to the concave-cuneate entire base, and finely serrate above, with usually incurved teeth; nearly fully grown when the flowers open about the 1st of June and then thin, slightly hairy along the upper side of the midribs, dark yellow-green and lustrous above and pale below, and at maturity subcoriaceous, dark green and very lustrous on the upper surface, pale yellow-green on the lower surface, 4.5-5 cm long and 2-2.5 cm wide, with thin prominent midribs, and conspicuous primary veins extending obliquely to above the middle of the leaf; petioles slender, narrowly wing-margined sometimes nearly to the base, slightly hairy on the upper side while young, soon glabrous, 5-8 mm long; leaves on vigorous shoots oval and acuminate to obovate and rounded at the apex, concave-cuneate at the base, coarsely serrate, often deeply lobed, 6-7 cm long and 3.5-4 cm wide, with thick midribs, and stout broadly winged rose colored petioles. Flowers 1-1.2 cm in diameter, on slender pedicels, in wide lax many-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes slender, elongated, acuminate, minutely glandular serrate near the base, reflexed after anthesis; stamens 9-11, filaments persistent on the fruit; anthers pink; styles 1, 2 or rarely 3. Fruit ripening in the middle of October, on slender drooping reddish pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, scarlet, lustrous, marked by large dark dots, 1.2-1.5 cm long and 1-1.2 cm wide; calyx little enlarged, with a deep narrow cavity, and spreading lobes, their tips often deciduous from the ripe fruit; flesh thin, yellow, dry and mealy; nutlets 1-3, obtuse at the ends, rounded and slightly grooved on the back, about 8 mm long, and 6 mm in diameter.

A tree 3-4 m high, with a trunk sometimes 3 dm in diameter, widespreading branches forming a broad flat topped open head, and slender slightly zigzag branchlets light orange-green and marked by many pale lenticels when they first appear, pale orange colored in their first season and dull gray-brown the following year, and armed with slender nearly straight, light brown ultimately gray spines 4-4.5 cm long and persistent and become branched on old stems.

Banks of the Genesee river above Rochester, J. Dunbar (* I type), June 1 and October 23, 1903; Tuscarora, Baxter and Dewing (* 295, a much older tree with smaller leaves), September 14, 1904, and May 30, 1905.

Crataegus robusta n. sp.

Leaves glabrous, oblong-obovate, gradually narrowed or rounded and usually short pointed at the apex, narrowed from above the middle to the cuneate entire base, and finely doubly serrate above, with straight glandular teeth; nearly fully grown when the flowers open about the 10th of June and then thin and lustrous above, and at maturity subcoriaceous, dark green and very lustrous on the upper surface, pale yellow-green on the lower surface, 5-6 cm long and 3.5-4 cm wide; leaves on vigorous shoots often 8-9 cm long and 5-6 cm wide, with prominent pale yellow midribs and 6 or 7 pairs of prominent primary veins; petioles stout, wing-margined often to below the middle, glandular early in the season toward the apex, often tinged with red in the autumn, 7-12 mm in length. Flowers 1.8 cm in diameter, on elongated slender glabrous pedicels, in broad lax many-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, glandular serrate; stamens 10-20; anthers pale pink; styles usually 2 or 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the end of September, on long slender drooping pedicels, in few-fruited clusters, short-oblong to obovate, crimson, lustrous, marked by occasional large pale dots, about 2 cm long and 7-8 mm wide; calyx prominent, with a broad shallow cavity, and spreading and reflexed or appressed narrow lobes, dark red on the upper side below the middle and often deciduous from the ripe fruit; flesh thin, yellow-green, dry and mealy; nutlets 2 or 3, gradually narrowed at the ends, rounded at the base, ridged on the back, with a low grooved ridge, about 1 cm. long, and 5 mm wide.

A tree 5-6 m high, with a trunk covered with dark scaly bark

and sometimes 3 dm in diameter, thick widespreading branches forming a symmetrical round-topped head often 6-7 m in diameter, and stout nearly straight pale orange-brown lustrous branchlets marked while young with oblong pale lenticels, light gray and shining in their second season, and armed with straight red-brown shining spines 5-7 cm in length, persistent and becoming branched on the old trunk and branches.

Banks of the Niagara river above the falls, J. Dunbar and C. S. Sargent (№ 16 type), September 16, 1904, J. Dunbar, June 12, 1905; Buffalo, J. Dunbar (№ 26), September 30, 1904, May 28, June 12 and September 26, 1905.

Crataegus cerasina n. sp.

Leaves oblong-obovate, acute or rounded at the apex, gradually narrowed and concave-cuneate at the entire base and sharply doubly serrate above, with straight glandular teeth; nearly half grown when the flowers open about the 10th of June and then glabrous with the exception of a few caducous pale hairs on the upper side of the midribs, thin, dark green and lustrous above and pale below, and at maturity subcoriaceous, dark yellow-green and shining on the upper surface, light yellow-green on the lower surface, 5-6.5 cm long and 2.6-3.5 cm wide, with slender yellow midribs, and 5 or 6 pairs of thin, prominent primary veins; petioles slender, wing-margined to below the middle, 1.2-1.5 cm in length; leaves on vigorous shoots coriaceous, often slightly lobed toward the apex, more coarsely serrate and sometimes 7 cm long and 5 cm wide, with stout midribs, more prominent veins, and thick broadly winged reddish petioles about 1 cm in length. Flowers 1.2 cm in diameter, on long slender glabrous pedicels, in few usually 7-10-flowered compact corymbs; calyx-tube narrowly obconic, glabrous, the lobes slender, elongated, acuminate, glandular serrate, slightly hairy on the inner surface toward the base, reflexed after anthesis; stamens 10-20; anthers pale pink; styles usually 2. Fruit ripening from the middle to the end of September, on slender reddish pedicels, in 1-5-fruited drooping clusters, short-oblong, full and rounded at the ends, bright cherry-red, very lustrous, marked by occasional large pale dots, 1-1.2 cm long and 8-10 mm wide; calyx little enlarged, with a deep narrow cavity, and slender spreading, persistent lobes dark red on the inner surface toward the base and slightly serrate near the middle; flesh thin, yellow, dry and mealy; nutlets 2, full and rounded at the ends, ridged on the back, with a high broad ridge, 7-8 mm long, and 4-5 mm wide.

A tree 5-7 m high, with a tall trunk 2-3 dm in diameter, covered with ashy gray scaly bark, spreading and ascending branches forming a wide open round-topped head, and slender nearly straight branchlets light olive-green and glabrous when they first appear, becoming light orange color and lustrous during their first season and dark gray-brown the following year, and armed with many slender nearly straight bright chestnut-brown shining ultimately dark gray-brown spines 3-5 cm in length.

Niagara Falls, J. Dunbar and C. S. Sargent (№22, type), September 16, 1904, J. Dunbar, June 12, 1905; also (№ 22A and 22B), J. Dunbar and C. S. Sargent, September 16, 1904, and J. Dunbar, June 12, 1906.

II PUNCTATAE

Leaves usually thin, mostly acute or occasionally rounded at the apex, their veins prominent; stamens 20; fruit short-oblong or rarely subglobose or obovate, often conspicuously punctate; flesh usually dry and mealy.

Anthers rose color or yellow; leaves obovate, often acutely lobed above the middle, especially on vigorous shoots, more or less villose below; fruit flattened at the ends, marked by large dots, dark red or bright yellow1 *C. punctata*

Anthers dark rose color; leaves rhombic, glabrous at maturity
Leaves subcoriaceous; flowers on stout villose pedicels; calyx thickly coated with matted white hairs; fruit subglobose, crimson, very lustrous2 *C. celsa*

Leaves thin; flowers on slender glabrous pedicels; calyx glabrous; fruit short-oblong or sometimes slightly obovate, orange-red slightly lustrous3 *C. notabilis*

Anthers pink; corymbs and leaves glabrous
Leaves oblong-obovate, acuminate at the base; fruit obovate.....

.....4 *C. barbara*

Leaves ovate to oval or orbicular, abruptly narrowed at the base; fruit short-oblong5 *C. dewingii*

Crataegus punctata Jacquin

Hort. Vind. r. 10, t. 28 (1770). Sargent, Silva N. Am. IV. 103, t. 184; Man. 389, f. 308; Acad. Sci. Phila. Proc. 583 (1905).

Buffalo, J. Dunbar (№5), May 21 and September 25, 1903; also from Canada to Illinois and to the mountains of western North Carolina.

Crataegus celsa n. sp.

Leaves rhombic to oblong-obovate, acute or acuminate at the apex, gradually narrowed and concave-cuneate at the entire base, finely doubly serrate above, with incurved glandular teeth, and slightly divided above the middle into 4 or 5 pairs of small acute lobes; about half grown when the flowers open during the last week of May and then membranaceous, light yellow-green and sparingly villose especially on the midribs and veins, and at maturity subcoriaceous, glabrous, dark green and lustrous on the upper surface, pale on the lower surface, 5-7 cm long and 3.5-5 cm wide, with slender prominent midribs and 5-7 pairs of primary veins extending obliquely toward the apex of the leaf and deeply impressed on its upper side; petioles slender, narrowly wing-margined often nearly to the middle, slightly villose while young, soon becoming glabrous, often rose color in the autumn, 1.5-2 cm in length; stipules linear, minutely glandular, fading brown, caducous; leaves on vigorous shoots thicker, more coarsely serrate and sometimes 9-10 cm long and 8-9 cm wide, with thick rose colored midribs and stout broadly winged petioles. Flowers 1.5 cm in diameter, on stout villose pedicels, in compact many-flowered hairy corymbs, with linear to linear-obovate slightly glandular caducous bracts and bractlets; calyx-tube narrowly obconic, thickly coated with long matted white hairs, the lobes wide, acuminate, glandular serrate, glabrous on the outer, villose on the inner surface below the middle; stamens 20; anthers small, dark rose color; styles usually 3. Fruit ripening early in October, on stout reddish drooping pedicels, in wide many-fruited clusters, subglobose, full and rounded at the ends, crimson, very lustrous, marked by large pale dots, about 1 cm long and 8 or 9 mm wide; calyx prominent, with a deep narrow cavity, and large spreading, closely appressed, light green persistent lobes; flesh thin, yellow, dry and mealy; nutlets 3, full and rounded at the ends, or narrow and acuminate at the apex, rounded and slightly ridged on the back, with a broad low ridge 7-8 mm long, and 5 mm wide.

An arborescent shrub sometimes 7 m high, with numerous stems covered with dark gray scaly bark, spreading and ascending branches, and stout slightly zigzag branchlets dark olive-green and sparingly hairy when they first appear, becoming light orange-brown, very lustrous and marked by large oblong lenticels in their first season and pale gray-brown the following year, and armed with numerous stout nearly straight purple shining spines 5-6 cm long, often pointing toward the base of the branch, and generally persistent on old stems.

Niagara Falls, J. Dunbar (* 32, type), September 28, 1905, and May 28, 1906.

Similar to *Crataegus pausiaca* Ashe, in habit, in the color of the branchlets and in the shape and venation of the leaves, this species differs from it in its larger flowers on much shorter pedicels, in the more villose calyx-tube and much broader, more foliaceous calyx-lobes, and in the smaller subglobose crimson fruit on shorter stalks.

Crataegus notabilis n. sp.

Leaves rhombic, acuminate, gradually narrowed and acute at the entire base, coarsely doubly serrate above, with incurved or straight glandular teeth, and divided above the middle into 2 or 3 pairs of small acuminate spreading lobes; when they unfold slightly tinged with red and glabrous with the exception of a few scattered pale hairs along the upper side of the midribs, membranaceous and about half grown when the flowers open at the end of May, and at maturity thick and firm, glabrous, smooth and dark yellow-green on the upper surface, pale blue-green on the lower surface, 6-7 cm long and 4-4.5 cm wide, with prominent yellow midribs, and thin primary veins extending very obliquely to the points of the lobes; petioles slender, broadly wing-margined often to below the middle, occasionally furnished early in the season with minute deciduous glands, glabrous, 2-3 cm in length; stipules linear, glandular, fading brown, caducous. Flowers 1.2 cm in diameter, on long slender glabrous pedicels, in usually 6-8-flowered lax thin-branched corymbs, with linear bracts and bractlets, the lower peduncles from the axils of the upper leaves; calyx-tube broadly obconic, glabrous, the lobes slender, acuminate, entire or slightly dentate above the middle, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 20; filaments persistent on the ripe fruit; anthers large, red-purple; styles 3-5. Fruit ripening early in October, on long drooping pedicels, in few-fruited clusters, short-oblong or slightly obovate, full and rounded at the ends, orange-red, marked by occasional large dark dots, 8-10 mm long, 7-8 mm in diameter; calyx prominent, with a short tube, a deep narrow cavity, and slender spreading persistent lobes; flesh thin, yellow, hard and dry; nutlets 3-5, rounded at the ends, ridged on the back, with a broad, low grooved ridge, light colored, 5-6 mm long, and about 4 mm wide.

An arborescent shrub 5-7 m high, with stout ascending and spreading stems covered with dark gray scaly bark, small spreading

branches forming a narrow open head, and slender slightly zigzag glabrous branchlets dull orange-green and marked by many small pale lenticels when they first appear, becoming light orange-brown or chestnut-brown and lustrous in their first season and dull gray-brown, the following year, and armed with numerous very slender nearly straight dark chestnut-brown or purplish shining ultimately ashy gray spines 3.5-5 cm in length, persistent and becoming branched on old stems.

Buffalo, J. Dunbar (\times 14, type), June 1 and September 24 and 30, 1904.

Crataegus barbara n. sp.

Glabrous with the exception of the hairs on the inner surface of the calyx-lobes. Leaves oblong-obovate, acuminate, gradually narrowed to the long slender acuminate entire base, finely serrate above, with minute incurved teeth, and only slightly lobed near the apex; nearly fully grown when the flowers open during the first week of June and then thin, dark green, smooth and lustrous above and pale below, and at maturity subcoriaceous, dark green and very lustrous on the upper surface, pale on the lower surface, 5.5-7 cm long and 2.5-3 cm wide, with stout yellow midribs, and thin very prominent primary veins extending obliquely toward the apex of the leaf; petioles slender, narrowly wing-margined nearly to the middle, 1.5-2.5 cm in length; leaves on vigorous shoots oblong to obovate, narrowed to the ends, more coarsely serrate, often deeply divided into 1 or 2 narrow acuminate lateral lobes, frequently 9-10 cm long and 4.5-6 cm wide, with stout broadly winged petioles. Flowers 1.3-1.5 cm in diameter, on long slender pedicels, in wide lax many-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, finely glandular serrate, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 20; anthers pale pink; styles 2-4. Fruit ripening the middle of October, on long slender reddish pedicels, in drooping few-fruited clusters, oblong-obovate, rounded at the apex, gradually narrowed from below the middle, abruptly compressed at the often oblique base and decurrent on the pedicels; calyx little enlarged, with a very narrow deep cavity, and spreading closely appressed persistent lobes, flesh thin, juicy, pale yellow; nutlets 3-5, acute at the ends or narrowed and rounded at the base, ridged on the back, with a low grooved ridge, 7-8 mm long, and 4-5 mm wide.

A tree sometimes 7 m high, with a short trunk 2-2.5 dm in diameter, erect branches forming a broad open head, and stout zigzag glabrous branchlets, light orange-yellow and marked by large pale lenticels when they first appear, becoming light orange color and lustrous in their first season, and armed with numerous nearly straight or curved spines 2.5-6 cm long and becoming dark gray or purple in their second or third seasons.

Brighton, near Rochester, B. H. Slavin (№ 2, type), October 14, 1903, and June 4, 1905.

Crataegus dewingii n. sp.

Leaves ovate to oval or rarely orbicular, acuminate, abruptly concave-cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and very slightly divided above the middle into 4 or 5 pairs of small acuminate lobes; deeply tinged with red when they unfold, about half grown when the flowers open at the end of May and then thin, yellow-green and glabrous with the exception of a few caducous hairs along the upper side of the midribs, and at maturity thin but firm in texture, dark green and lustrous on the upper surface, pale bluish green on the lower surface, 5-7 cm long and 4-5 cm wide, with stout yellow midribs, and thin primary veins arching obliquely to the points of the lobes; petioles slender, wing-margined at the apex, villose on the upper side while young, slightly glandular, 2.5-3 cm in length; leaves on vigorous shoots often oblong-ovate, more coarsely serrate, deeply divided into broad lateral lobes and 5-6 cm long. Flowers 1.8-2 cm in diameter, on slender glabrous pedicels, in 4-13-flowered lax corymbs, with broadly obovate to linear-obovate caducous bracts and bractlets fading brown; calyx-tube broadly obconic, glabrous, the lobes abruptly narrowed from the base, broad, acuminate, entire or slightly serrate near the middle, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 20; anthers pink; styles 4 or 5, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening from the middle to the end of September, on stout red pedicels, in few-fruited drooping clusters, short-oblong, full and rounded at the ends, crimson, pruinose, becoming lustrous, marked by many small pale dots, 1-1.2 cm in diameter; calyx little enlarged, with a broad deep cavity, and spreading often incurved persistent lobes villose on the upper side; flesh thin, hard, dry and mealy; nutlets 4 or 5, gradually narrowed and rounded at the ends, ridged on the back, with a high narrow ridge, 7-8 mm long, and 4-5 mm wide.

A tree sometimes 8 m high, with a trunk 2 m long and 1.5 dm in diameter, covered with ridged and scaly gray bark, drooping and widespreading branches, and slender nearly straight glabrous branchlets dull red and marked by pale lenticels when they first appear, becoming bright chestnut-brown and lustrous in their first season and pale gray-brown the following year, and armed with few slender nearly straight chestnut-brown shining spines 3-3.5 cm long.

Open thickets in clay soil, Belfast, Allegany co., Baxter and Dewing (№ 285, type), September 14, 1904, May 29 and September 14, 1905; (№ 212X), May 30, 1903, September 14, 1904, September 19, 1905.

This interesting species, which is doubtfully referred to this group, is named for Mr Vincent Dewing who with Mr Baxter has carefully studied and industriously collected the large number of species of *Crataegus* growing in several of the towns of the upper Genesee valley in New York.

III PRUINOSAE

Fruit subglobose to short-oblong or obovate, red or green, often slightly 5-angled, generally pruinose especially during the summer; flesh hard and dry; leaves thin to subcoriaceous.

Stamens 20

Anthers rose color, pink or red

Leaves glabrous

Corymbs glabrous

Corymbs many-flowered.....1 *C. pruinosa*

Corymbs few-flowered

Leaves cuneate at the base; fruit conspicuously 5 angle and mammillate below the middle.....2 *C. arcana*

Leaves often rounded at the broad base; fruit not mammillate

Leaves subcoriaceous; flowers not less than 1.8 cm in diameter, on long pedicels.....3 *C. gracilis*

Leaves thin; flowers 1.2-1.4 cm in diameter, on short pedicels.....4 *C. amoena*

Corymbs villose.....5 *C. clintoniana*

Young leaves roughened above by short white hairs.....6 *C. oblita*

Anthers yellow

Leaves glabrous7 *C. cognata*

Leaves slightly hairy above while young

Leaves oblong-ovate; corymbs many-flowered; spines short and stout8 *C. formosa*

Leaves broadly ovate; corymbs few-flowered; spines long and slender9 *C. leiophylla*

Stamens 10 or less

Anthers rose color, purple or pink

Leaves glabrous

Fruit short-oblong

Leaves slightly lobed; fruit cherry-red, pruinose, 1-1.2 cm in diameter.....10 *C. pulchra*Leaves deeply lobed; fruit crimson, not pruinose, 1.5-1.7 cm in diameter.....11 *C. radiata*Fruit obovate12 *C. aridula*

Leaves villose above while young

Fruit obovate

Flowers not more than 1.6 cm in diameter, in very compact 4-6-flowered corymbs; stamens usually 5; anthers dark rose color13 *C. congestiflora*Fruit subglobose15 *C. maineana*Flowers at least 2cm in diameter, in broad loose corymbs; stamens 10; anthers pink.....14 *C. plana*Fruit subglobose.....15 *C. maineana*

Leaves scabrate above while young

Leaves thick

Leaves blue-green

Stamens 10; fruit short-oblong to obovate..16 *C. placiva*Stamens 5; fruit obovate.....17 *C. tortuosa*Leaves yellow-green18 *C. xanthophylla*

Leaves thin

Leaves blue-green

Flowers in 2-8-flowered compact corymbs; fruit subglobose, pruinose.....19 *C. implicata*Flowers in wide lax many-flowered corymbs; fruit oblong-obovate, not pruinose.....20 *C. promissa*

Leaves yellow-green

Leaves scabrate at maturity

Flowers not more than 1.5 cm in diameter; calyx-lobes glabrous; fruit short-oblong, on drooping pedicels.....

.....21 *C. strigosa*

Flowers at least 2 cm in diameter; calyx-lobes villose on the inner surface; fruit obovate, on erect pedicels.....

.....22 *C. barryana*

Leaves glabrous at maturity

Anthers dark rose color; calyx-lobes short and broad; fruit on long drooping pedicels23 *C. foliata*Anthers pale pink; calyx-lobes long and slender; fruit on shorter pedicels24 *C. cruda*

Anthers yellow; flowers on villose pedicels, in compact 5-7-flowered corymbs; styles hirsute to the middle; young leaves scabrate.....

.....25 *C. inusitula*

Crataegus pruinosa K. Koch

Verhandl. Preuss. Gart. Verein, neue Reihe I. 246 (1854). Sargent, Silva N. Am. XIII. 61, t. 648; Man. 411, f. 331; Acad. Sci. Phila. Proc. 585 (1905).

Buffalo, J. Dunbar (* 2, 6 and 45), 1902-5.

Crataegus arcana Beadle

Bilt Bot. Studies I. 122 (1902). Sargent, Bot. Gazette XXXV. 101; Acad. Sci. Phila. Proc. 588 (1905).

Niagara Falls, J. Dunbar and C. S. Sargent (* 24), September 16, 1904; J. Dunbar, May 28, 1905; also eastern Pennsylvania to western North Carolina.

Crataegus gracilis n. sp.

Leaves ovate, acuminate, rounded or abruptly cuneate at the broad entire base, sharply doubly serrate above, with straight glandular teeth, and divided into 3 or 4 pairs of short acuminate lateral lobes; when they unfold deeply tinged with red and glabrous with the exception of occasional caducous hairs along the upper side of the midribs, nearly fully grown when the flowers open at the end of May and then membranaceous and dull yellow-green, and at maturity subcoriaceous, dark blue-green, smooth and lustrous on the upper surface, paler on the lower surface, 5-6 cm long and 3.5-4 cm wide, with slender yellow midribs and 4 or 5 pairs of thin primary veins; petioles slender, slightly wing-margined at the apex, glandular, with occasional scattered dark glands, 8-10 mm long; stipules linear or linear-falcate, glandular, fading rose color, deciduous; leaves on vigorous shoots coriaceous, nearly triangular, mostly truncate at the base, coarsely serrate, deeply lobed, often 8-9 cm long and 9-10 cm wide, with stout reddish midribs, broadly margined conspicuously glandular petioles 2-2.5 cm in length, and foliaceous lunate coarsely serrate stipules. Flowers about 1.8 cm in diameter, on long slender glabrous pedicels, in compact 6-10-flowered corymbs, with linear glandular red bracts and bractlets; calyx-tube broadly obconic, glabrous, the lobes abruptly narrowed from broad bases, slender, acuminate, glabrous, entire or occasionally minutely glandular toward the base; stamens 20; anthers pale pink, filaments persistent on the fruit; styles 3-5, surrounded at the base by tufts of long pale hairs. Fruit ripening late in September, on slender drooping pedicels, in few-fruited clusters, depressed-globose, green tinged with red or orange color, pruinose, about 1 cm in diameter; calyx

prominent, with a short tube, a broad shallow cavity, and wide-spreading and slightly incurved lobes, dark red on the upper side toward the base; flesh thin, dry, greenish yellow; nutlets 3-5, full and rounded at the base, narrowed and rounded at the apex, ridged on the back, with a high rounded ridge, dark colored, 8-9 mm long, and about 5 mm wide.

A shrub 2-3 m high, with numerous ascending stems spreading into broad thickets, and covered below with ashy gray bark, and stout slightly zigzag glabrous branchlets green tinged with red when they first appear, soon becoming bright chestnut-brown and lustrous and marked by large pale lenticels, and armed with many stout nearly straight chestnut-brown shining spines 4-6 cm long and usually pointing toward the base of the branch.

Niagara Falls, J. Dunbar and C. S. Sargent (№ 26, type), September 16, 1904, J. Dunbar, May 28, 1905.

Crataegus amoena n. sp.

Leaves ovate, acute or acuminate, concave-cuneate or rounded at the entire base, finely doubly serrate above, with straight or incurved glandular teeth, and divided above the middle into 2 or 3 pairs of broad acute lobes; slightly tinged with red when they unfold, about half grown when the flowers open at the end of May and then thin, smooth and light yellow-green above and pale below, and at maturity thin but firm in texture, dark bluish green on the upper surface, pale on the lower surface, 4-6 cm long, 3.5-5 cm wide, with slender midribs often tinged with rose in the autumn, and 3 or 4 pairs of obscure primary veins; petioles slender, slightly wing-margined at the apex, deeply grooved, sparingly glandular while young, 1.5-2.5 cm in length; stipules linear, glandular, fading brown, caducous; leaves on vigorous shoots rounded or cuneate at the broad base, 6-7 cm long and 5-6 cm wide. Flowers 1.2-1.4 cm in diameter, on short slender pedicels, in compact most 4-6 flowered corymbs; calyx-tube broadly obconic, the lobes gradually narrowed from wide bases, short, acuminate, generally entire; stamens 20; anthers creamy white suffused with pink; styles 3-5. Fruit ripening from the middle to the end of October, on stout erect pedicels, in few-fruited clusters, subglobose to short-oblong, dark red, pruinose, 1-1.2 cm in diameter; calyx prominent, with a broad deep cavity, and spreading lobes dark red on the upper side toward the base; flesh thin, hard, greenish yellow; nutlets 3-5, gradually narrowed and rounded at the ends, ridged on the back, with a high narrow rounded ridge, dark colored, about 7 mm long, and 5 mm wide.

A shrub 3-4 m high, with ascending and spreading stems covered below with dark red bark, and slender slightly zigzag branchlets olive-green deeply tinged with red when they first appear, becoming bright chestnut-brown and very lustrous and marked by occasional large dark lenticels in their first season and dull gray the following year, and armed with numerous slender nearly straight purple spines 4-6 cm long, and persistent and branched on old stems.

Niagara Falls, J. Dunbar and C. S. Sargent (\times 21, type), September 16, 1904, J. Dunbar, May 28, 1905.

Crataegus clintoniana n. sp.

Leaves ovate, acuminate, cuneate or rounded at the entire base, finely and often doubly serrate above, with straight glandular teeth, and divided into 4 or 5 pairs of narrow acuminate lateral lobes; when they unfold tinged with red, sparingly villose on the upper surface and villose below along the midribs and veins and furnished with axillary tufts of matted pale hairs, nearly half grown when the flowers open about the 20th of May and then thin, light yellow-green, still sparingly hairy principally along the under side of the midribs and veins and pale bluish green below, and at maturity thin, yellow-green, smooth and glabrous on the upper surface and nearly glabrous on the lower surface, 4-5 cm long and 3.5-4 cm wide, with slender midribs, and usually 4 pairs of thin primary veins; petioles slender, slightly wing-margined at the apex, glabrous, sparingly glandular while young, 1-1.5 cm in length; leaves on vigorous shoots abruptly cuneate or rounded at the broad base, coarsely serrate, deeply lobed, often 6-7 cm long and broad, with stout broadly winged glandular petioles 2.5-3 cm in length. Flowers 2 cm in diameter, on slender villose pedicels, in compact mostly 5- or 6-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, nearly entire, glabrous, reflexed after anthesis; stamens 20; anthers bright red; styles 3-5, generally 5, surrounded at the base by a broad ring of pale hairs. Fruit ripening early in October, on stout reddish pedicels, in few-fruited erect clusters, subglobose but often rather broader than high, distinctly angled, orange-red, lustrous, marked by numerous small pale dots, 1.2-1.4 cm in diameter; calyx prominent, with a short tube, a broad deep cavity, and small spreading or reflexed lobes persistent on the ripe fruit; flesh thick, yellowish green, dry and mealy; nutlets usually 5, narrowed and rounded at the ends, slightly grooved on the back, 6-7 mm long, and 4-5 mm wide.

A narrow shrub thin in habit, 5-6 m high, with many small stems covered with dark gray scaly bark, spreading and ascending branches, and slender nearly straight branchlets glabrous and orange-green slightly tinged with red when they first appear, becoming red-brown and lustrous during their first season and dull gray-brown the following year, and armed with numerous, thin, straight, light chestnut-brown shining, ultimately dull gray spines 4-5 cm in length, persistent, very numerous and becoming branched on the old stems.

Low wet woods, Buffalo; J. Dunbar (No. 8, type), May 21 and September 29, 1903, September 26, 1905. Not common.

This handsome and distinct species is named in memory of George W. Clinton (1807-85), a distinguished judge of the Supreme Court of the city of Buffalo and a critical student of the plants growing in the neighborhood of that city.

Crataegus oblita n. sp.

Leaves oblong-ovate to nearly triangular, acuminate, rounded, subcordate or abruptly concave-cuneate at the broad entire or glandular base, finely doubly serrate above, with straight glandular teeth, and divided often only above the middle into 4 or 5 pairs of wide acuminate spreading lobes; about one third grown when the flowers open the 25th of May and then membranaceous, yellow-green, roughened above by short white hairs and pale and glabrous below, and at maturity thin but firm in texture, dull blue-green, smooth and lustrous on the upper surface, pale bluish green on the lower surface, 5-6.5 cm long and 4.5-5 cm wide, with thin yellow midribs, and slender primary veins extending obliquely to the points of the lobes; petioles very slender, slightly wing-margined at the apex, sparingly villose while young on the upper side, soon glabrous, 3-4 cm in length; leaves on vigorous shoots subcoriaceous, truncate or rounded at the base, more coarsely serrate and more deeply lobed, often 5.5-6 cm long and wide. Flowers 1.5-1.6 cm in diameter, on long slender glabrous pedicels, in lax mostly 4-6-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from broad bases, wide, acuminate, entire or occasionally slightly toothed near the middle, glabrous, reflexed after anthesis; stamens 20; anthers rose color; styles 4 or 5, surrounded at the base by a narrow ring of pale hairs. Fruit ripening the end of September, on slender drooping pedicels, in few-fruited clusters, obovate, full and rounded at the apex, slightly narrowed to the rounded base, crimson, pruinose, finally becoming lustrous, marked by large pale

dots, 9-11 mm long and 9-10 mm in diameter; calyx enlarged and prominent, with a broad deep cavity, and spreading and appressed usually persistent slightly serrate lobes dark red on the upper side below the middle; flesh thin, yellow-green, dry and mealy; nutlets 4 or 5, thin and compressed at the rounded ends, rounded and slightly grooved or irregularly ridged on the back, 6-7 mm long, and 4-5 mm wide.

A shrub 4-5 m high, with small ascending stems covered with pale gray bark, spreading branches and slender slightly zigzag glabrous branchlets, dark reddish brown and marked by pale lentils when they first appear, becoming dark chestnut-brown and very lustrous in their first season and dull red-brown the following year, and armed with slender straight slightly curved dull chestnut-brown spines 3-5 cm long.

Borders of thickets in low moist soil, Buffalo, J. Dunbar (№ 16, type), June 1, 1904, May 28, 1906, J. Dunbar and C. S. Sargent, September 24, 1904.

Crataegus cognata Sargent

Rhodora V. 58 (1903).

Buffalo, J. Dunbar (№ G), October 1901, May 26 and October 6, 1902, May 21 and September 29, 1903; (№ 23), September 30, 1904, June 12, 1905; (№ 38), June 12 and September 26, 1905; Niagara Falls, J. Dunbar and C. S. Sargent (№ 8), September 16, 1904, J. Dunbar, June 12, 1905; (№ 15), J. Dunbar and C. S. Sargent, September 16, 1904, J. Dunbar, May 26, 1905; near Hemlock lake, Livingston co., Henry T. Brown (№ 15 and 26), May and October 1906; also southern and western New England and eastern New York.

Crataegus formosa Sargent.

Rochester Acad. Sci. Proc. IV. 101 (1903).

Buffalo, J. Dunbar, October 6, 1902, September 26, 1905, May 28, 1906, Niagara Falls, J. Dunbar (№ 1), October 7, 1902, May 22, 1903; also at Rochester, New York.

Crataegus leiophylla Sargent

Rochester Acad. Sci. Proc. IV. 99 (1903).

Buffalo, J. Dunbar, September 26, 1905, May 25, 1906; also at Rochester, New York.

The anthers in this species were first described as pale yellow; further observations show that they are slightly tinged with pink.

Crataegus pulchra n. sp.

Glabrous. Leaves ovate to oval, acuminate, rounded or occasionally cuneate at the entire base, finely often doubly serrate above, with straight glandular teeth, and divided very slightly above the middle into 3 or 4 pairs of short broad acuminate lobes; deeply tinged with red when they unfold, more than half grown when the flowers open at the end of May and then thin, yellow-green above and paler below, and at maturity thin, yellow-green, 4.5-5.5 cm long and broad, with slender yellow midribs, and obscure primary veins; petioles slender, slightly wing-margined sometimes nearly to the middle, glandular with minute dark glands, 2-2.5 cm in length. Flowers about 1.8 cm in diameter, on slender pedicels, in compact mostly 6-8-flowered corymbs, with linear acuminate glandular bracts and bractlets fading rose color; calyx-tube broadly obconic, the lobes slender, acuminate, entire or sparingly glandular toward the apex, reflexed after anthesis; stamens 10; anthers maroon; styles 2-4. Fruit ripening the middle of September, on short stout pedicels, in drooping 2-3-fruited clusters, short-oblong, full and rounded at the ends, cherry-red, pruinose, marked by small pale dots, 1-1.2 cm in diameter; calyx prominent, with a broad shallow cavity, and widespreading or closely appressed usually persistent lobes dark red on the upper side; flesh thin, yellow, dry or mealy; nutlets 2-4, narrowed and acute at the ends or rounded at the base, ridged on the back, with a narrow rounded ridge, light colored, about 8 mm long, and 5 mm wide.

A shrub 1-2.5 m high, with small stems spreading into thickets, and slender nearly straight branchlets orange-green tinged with red when they first appear, becoming chestnut-brown, lustrous and marked by small pale lenticels in their first season, and dark red-brown the following year, and armed with thin nearly straight purple ultimately gray-brown spines 3-5 cm long.

Niagara Falls, J. Dunbar and C. S. Sargent (* 25, type), September 16, 1904, J. Dunbar, May 28, 1905; Buffalo, (* 11) J. Dunbar, September 30, 1904, and May 28, 1905; (* 23), J. Dunbar and C. S. Sargent, September 16, 1904, J. Dunbar, May 28, 1905.

Crataegus radiata n. sp.

Glabrous. Leaves ovate, acuminate, cuneate or rounded at the entire base, coarsely doubly serrate above, with straight gland-tipped teeth, and divided into 3 or 4 pairs of narrow acuminate spreading lateral lobes; nearly half grown when the flowers open about the

20th of May and then thin, smooth and yellow-green above and pale blue-green below, and at maturity thin but firm, dark dull blue-green on the upper surface and pale on the lower surface, 5-7 cm long and 4-5 cm wide, with prominent yellow midribs, and slender primary veins arching obliquely to the points of the lobes; petioles slender, wing-margined to below the middle, glandular, with persistent glands, often rose color in the autumn, 1.5-2 cm in length; leaves on vigorous shoots subcoriaceous, rounded at the broad base, more coarsely serrate and more deeply lobed and sometimes 8-9 cm long and broad, with stout broadly winged conspicuously glandular petioles. Flowers 1.8-2 cm in diameter, on slender elongated pedicels, in loose usually 5- or 6-flowered long-branched corymbs; calyx-tube narrowly obconic, the lobes slender, acuminate, entire; stamens 9 or 10; anthers dark red; styles usually 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening about the 1st of October, on stout reddish pedicels, in few-fruited drooping clusters, short-oblong, full and rounded at the ends, crimson, lustrous, marked by many small dark dots, 1.5-1.7 cm in diameter; calyx little enlarged, with a narrow deep cavity, and closely appressed lobes persistent on the ripe fruit; flesh thick, yellow, dry and mealy; nutlets usually 4, narrowed at the ends, rounded at the base, ridged on the back, with a broad grooved ridge, light colored, 6-7 mm long, and 4-5 mm wide.

A shrub 4-6 m high, with numerous small stems covered with dark gray scaly bark, small spreading branches, and slender zigzag branchlets dark orange-green when they first appear, becoming bright chestnut-brown and very lustrous in their first season and dull red-brown the following year, and armed with many slender slightly curved purple shining spines 3.5-4 cm long, persistent and very numerous on old stems.

Buffalo, J. Dunbar (♯ 3, type), October 6, 1902, May 21 and September 29, 1903, J. Dunbar and C. S. Sargent, September 24, 1904.

Crataegus aridula n. sp.

Glabrous. Leaves ovate, acuminate, cuneate or concave-cuneate at the entire base, sharply doubly serrate above, with straight glandular teeth, and divided into 5 or 6 pairs of narrow acuminate spreading lobes; nearly full grown when the flowers open during the first week of June and then thin, dark yellow-green, smooth above and pale below, and at maturity thin, dark bluish green on the upper surface, pale on the lower surface, 4-5 cm long and

3.5-4.5 wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular, with minute scattered glands, 2-3 cm in length; leaves on vigorous shoots deltoid to rhombic, thin, coarsely serrate, often 6-7 cm long and broad, with slender wing-margined conspicuously glandular petioles. Flowers on long slender pedicels, in 5-7-flowered compact corymbs, with linear to linear-obovate glandular bracts and bractlets fading rose color; calyx-tube broadly obconic, the lobes gradually narrowed from the base, slender, acuminate, entire or occasionally sparingly dentate below the middle; stamens 10; anthers red; styles 2 or 3. Fruit remaining hard and dry in the autumn, obovate, dark red, marked by many large pale dots, pruinose, about 1 cm long and 8-9 mm wide; calyx prominent, with a long tube, a deep narrow cavity, and spreading persistent lobes; flesh thin, yellowish green; nutlets 2 or 3, rounded at the base, acute at the apex, ridged on the back, with a low rounded ridge, light colored, 7-8 mm long, and 4-5 mm wide.

A shrub, with slender nearly straight branchlets, olive-green tinged with red when they first appear, becoming light chestnut-brown and lustrous in their first season and ultimately dark gray-brown, and armed with straight slender dark purplish spines 2.5-3 cm in length.

Niagara Falls, J. Dunbar (* 3, type), October 7, 1902, and June 1, 1904.

Crataegus congestiflora n. sp.

Leaves ovate, acuminate, rounded or abruptly cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided into 5 or 6 pairs of broad spreading acuminate lateral lobes; more than half grown when the flowers open during the last week of May and then membranaceous, light yellow-green and covered above by short white hairs and pale bluish green and glabrous below, and at maturity thin, dark blue-green, dull and glabrous on the upper surface and paler blue-green on the lower surface, 4-6 cm long and 3-4.5 cm wide, with thin yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly glandular, 1.5-2.5 cm in length; leaves on vigorous shoots short-pointed at the apex, rounded at the broad base, more coarsely serrate and more deeply lobed, about 6-7 cm long and 5-6 cm wide. Flowers 1.4-1.5 cm in diameter, on slender glabrous pedicels, in very compact mostly 4-6-flowered corymbs;

calyx-tube narrowly obconic, glabrous, the lobes wide, acuminate, entire or occasionally irregularly toothed toward the apex, glabrous, bright red above the middle, reflexed after anthesis; stamens 5-8, usually 5; anthers dark rose color; styles 3 or 4, surrounded at the base by a wide ring of pale tomentum. Fruit ripening the end of October, on slender reddish pedicels, in 4- or 5-fruited spreading clusters, somewhat obovate, full and rounded at the apex, slightly narrowed and sometimes decurrent on the pedicel at the base, marked by many pale dots, crimson, pruinose, 1-1.2 cm long and 9-11 mm wide; calyx little enlarged, without a tube, with a narrow shallow cavity, and spreading persistent lobes often serrate toward the apex and dark red on the upper side; flesh thin, yellow, dry and mealy; nutlets 2 or 3, narrowed and rounded at the ends or acute at the apex, ridged on the back, with a broad grooved ridge, 6-7 mm long, and 4-5 mm wide

A shrub 3-4 m high, with small stems covered with dark gray bark, ascending and spreading branches, and very slender zigzag glabrous branchlets light green, slightly tinged with red when they first appear, becoming bright chestnut-brown and very lustrous in their first season and dull reddish brown the following year, and armed with numerous thin slightly curved light brown shining spines, becoming purple and ultimately gray, and 2.5-3 cm long.

Buffalo, J. Dunbar (* 19, type), September 30, 1904, May 27, 1905; (* 31), September 30, 1904; (* 44), September 26, 1905.

Crataegus plana n. sp.

Leaves oblong-obovate, acuminate, rounded or rarely cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided above the middle into 3 or 4 pairs of small spreading acuminate lobes; tinged with red and sparingly villose on the upper surface and in the axils of the veins below when they unfold, almost fully grown and nearly glabrous when the flowers open about the 20th of May and then thin, light yellow-green and smooth above and bluish green below, and at maturity thin, glabrous, dark green and somewhat lustrous on the upper surface and pale blue-green on the lower surface, 4-5 cm long and 3-4 cm wide, with slender yellow midribs, and thin primary veins extending obliquely to the points of the lobes; petioles slender, wing-margined often to the middle, slightly glandular while young, 1.5-2 cm in length; leaves on vigorous shoots subcoriaceous, broadly ovate to suborbicular, rounded or cordate at the base, more

coarsely serrate and more deeply lobed, and sometimes 6-7 cm wide, with stout broadly winged petioles glandular throughout the season. Flowers 2 cm in diameter, on slender glabrous pedicels, in usually 5-7-flowered corymbs, with linear glandular bracts and bractlets fading rose color; stamens 10, filaments persistent on the ripe fruit; anthers pale pink; styles 3-5, surrounded at the base by a broad ring of pale hairs. Fruit ripening from the first to the middle of October, on slender pedicels, in few-fruited erect clusters, short-oblong, somewhat rounded at the base, bright green when fully grown, crimson at maturity, pruinose, marked by many small pale dots; calyx prominent, without a tube, with a broad deep cavity, and widespreading persistent lobes dark red on the upper side below the middle; flesh thin, yellow-green, hard, dry and mealy; nutlets 3-5, rounded at the ends, rounded and slightly grooved on the back, light colored, 5-6 mm long, and about 4 mm wide.

A shrub 3-4 m high and broad, with several stout erect stems covered with dark scaly bark, small spreading and ascending branches, and very slender glabrous branchlets, light chestnut-brown and lustrous in their first season, dark dull reddish brown the following year, and armed with numerous slender nearly straight chestnut-brown and shining, ultimately dark gray spines 3-4 cm long.

Buffalo, J. Dunbar (* 4, type), October 6, 1902, May 21, 1903; near Hemlock lake, Livingston co., H. T. Brown (* 3), May and October 1906.

Crataegus maineana Sargent

Rochester Acad. Sci. Proc. IV. 106 (1903).

Buffalo, J. Dunbar (* D), September 25, 1901, May 28, 1906; Niagara Falls, J. Dunbar, September 28, 1905, May 28, 1906; also near Rochester, New York.

Crataegus placiva n. sp.

Leaves ovate, acuminate, rounded, truncate or abruptly concave-cuneate at the broad entire or glandular base, finely doubly serrate above, with straight glandular teeth, and divided into 2 or 3 pairs of short broad acuminate lateral lobes; deeply tinged with red when they unfold, nearly fully grown when the flowers open at the end of May, and then thin, yellow-green and roughened above by short white hairs and pale and slightly hairy in the axils of the veins below, and at maturity thick, glabrous, smooth, dark blue-

green on the upper surface, pale on the lower surface, and 4-5 cm long and broad, with slender midribs and 3 or 4 pairs of thin primary veins; petioles slender, slightly wing-margined at the apex, glandular throughout the season, often tinged with red in the autumn, 2-3 cm in length; stipules linear, glandular, fading brown, caducous; leaves on vigorous shoots subcoriaceous, truncate at the base, coarsely serrate, more deeply lobed and often 7-8 cm long and wide. Flowers 2 cm in diameter, on elongated slender glabrous pedicels, in compact usually 5- or 6-flowered corymbs, with linear to linear-obovate glandular bracts and bractlets; calyx-tube broadly obconic, glabrous, the lobes short, slender, acuminate, glabrous, entire; stamens 10; filaments persistent on the ripe fruit; anthers purplish red; styles 3 or 4, surrounded at the base by a broad ring of long matted white hairs. Fruit ripening from the first to the middle of October, short-oblong, full and rounded at the ends or obovate and slightly narrowed at the base, bright orange-red, pruinose, marked by small pale dots, 1-1.2 cm in diameter; calyx prominent, without a tube, with a broad shallow cavity, and widespreading persistent lobes dark red on the upper side below the middle; flesh thin, yellow, dry and mealy; nutlets 3 or 4, narrow and rounded at the ends, slightly ridged on the back, with a low rounded ridge, about 7 mm long, and 4-5 mm wide.

A shrub sometimes 5 m high, with ascending stems covered with dark gray scaly bark, spreading branches, and slender zigzag glabrous branchlets dark orange-green more or less deeply tinged with red when they first appear, becoming dull chestnut-brown and marked by small pale lenticels in their first season and dull reddish brown the following year, and armed with slender slightly curved shining spines 5-6 cm long, persistent and very numerous on old stems and branches.

Buffalo, J. Dunbar (* 22, type), September 30, 1904, May 28, 1905; (* 27), September 30, 1904, May 28, 1906.

Crataegus tortuosa n. sp.

Leaves oblong-ovate, abruptly cuneate or rarely rounded at the entire base, finely doubly serrate above, with straight or incurved glandular teeth, and slightly divided into 4 or 5 pairs of broad acuminate spreading lobes, about half grown when the flowers open at the end of May and then membranaceous, yellow-green, slightly roughened above by short white hairs and glabrous below, and at maturity thick, blue-green, smooth and glabrous on the upper sur-

face, 5-6.5 cm long and 4.5-5 cm wide, with stout yellow midribs sometimes tinged with rose color in the autumn, and thin remote primary veins extending to the points of the lobes; petioles stout, wing-margined at the apex, sparingly glandular early in the season, tinged with rose color in the autumn, 2-4 cm in length; leaves on vigorous shoots usually broader and rounded or cordate at the base, more deeply lobed and sometimes 6-7 cm long and wide. Flowers on short slender glabrous pedicels, in compact 3-8, usually 5-flowered corymbs, with small linear rose colored bracts and bractlets; calyx-tube narrowly obconic, the lobes short and broad, minutely serrate near the middle, glabrous, red and glandular at the acuminate apex, reflexed after anthesis; stamens usually 5; anthers purplish red; styles 2-4, surrounded at the base by a broad ring of long pale hairs. Fruit ripening the end of September, on stout drooping reddish pedicels, in few-fruited clusters, obovate, full and rounded at the apex, abruptly narrowed at the base, bright orange-red, pruinose, marked by numerous pale dots, lustrous, 1-1.2 cm long, and 8-10 mm wide; calyx-tube little enlarged, with a broad shallow cavity, and narrow spreading lobes dark red on the upper side below the middle, their tips incurved or more often deciduous from the ripe fruit; nutlets 2 or 3, narrow and rounded at the ends, prominently ridged on the back, with a broad deeply grooved ridge, light colored, 7-8 mm long, and 4-5 mm wide.

A shrub sometimes 5-6 m high, with stout stems, very tortuous horizontal or ascending branches, and slender slightly zigzag glabrous branchlets, dark orange-green when they first appear, becoming bright chestnut-brown and marked by dark lenticels in their first season and dull reddish brown the following year, and armed with numerous stout nearly straight bright chestnut-brown shining ultimately dull gray spines 2-3 cm long.

Buffalo, J. Dunbar, (♯ 25, type), September 30, 1904, May 28 and September 26, 1905; J. Dunbar and C. S. Sargent (♯ 29), September 30, 1904; (♯ 17), September 24, 1904, J. Dunbar, May 28, 1905.

Crataegus xanthophylla n. sp.

Leaves broadly ovate, acuminate, rounded or cuneate at the entire or glandular base, sharply doubly serrate, with straight glandular teeth, and divided above the middle into 3 or 4 small acuminate lobes; nearly half grown when the flowers open at the end of May and then thin, light yellow-green and roughened above by short

white hairs and pale blue-green and glabrous below, and at maturity thick and firm to subcoriaceous, glabrous, smooth and dark yellow-green on the upper surface, pale yellow-green on the lower surface, 6-8 cm long and 5-7 cm wide, with stout yellow midribs and 4 or 5 pairs of slender primary veins; petioles stout, slightly wing-margined at the apex, glandular, with minute persistent glands, often rose color in the autumn, 2-3.5 cm in length. Flowers 1.5 cm in diameter, on slender glabrous pedicels, in compact usually 5-7-flowered corymbs; calyx-tube broadly obconic, glabrous, the lobes short and broad, acuminate, glabrous, coarsely glandular serrate above the middle, reflexed after anthesis; stamens 10; anthers red; styles 3 or 4, surrounded at the base by a broad ring of pale tomentum. Fruit ripening early in October, on stout drooping dark red glabrous pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, orange-red, slightly pruinose, marked by small pale dots, 1-1.2 cm long; calyx little enlarged, with a broad shallow cavity, and spreading persistent glabrous lobes dark red on the upper side below the middle; nutlets 3 or 4, acute at the ends, ridged on the back, with a narrow ridge, dark colored, 7-8 mm long, and about 4 mm wide.

A shrub 5-6 m high, with numerous slender spreading stems covered with pale gray bark, small ascending branches, and slender slightly zigzag glabrous branchlets, dark orange-green and marked by small pale lenticels when they first appear, becoming bright red-brown the following year, and armed with a few slender shining spines 2.5-3 cm long.

Buffalo, J. Dunbar (♯ 1, type), October 6, 1902, May 26, 1906.

Crataegus implicata n. sp.

Leaves ovate to oval, acuminate and short-pointed at the apex, rounded and cuneate at the entire base, finely often doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of small acuminate spreading lobes; nearly fully grown when the flowers open at the end of May and then yellow-green and slightly roughened above by scattered white hairs, and at maturity membranaceous, dark bluish green and smooth on the upper surface, pale blue-green on the lower surface, 3.5-4.5 cm long and 3-4 cm wide, with thin midribs, and slender primary veins; petioles very slender, sparingly glandular through the season, 1-2.5 cm in length; stipules linear to linear-falcate, glandular-serrate, fading brown, persistent; leaves on vigorous shoots subcoriaceous, broadly ovate,

more deeply lobed, often 5 cm long and wide, with foliaceous lunate coarsely serrate persistent stipules. Flowers 1.3–1.5 cm in diameter, on slender glabrous pedicels, in very compact mostly 5- or 6-flowered corymbs, with linear glandular bracts and bractlets; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, nearly entire, red and glandular at the apex, reflexed after anthesis; stamens 5–8; anthers dark rose color; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening at the end of September, on short dark red pedicels, in usually 1–3-fruited drooping clusters, subglobose to ovate, pruinose, marked by many small pale dots, 1–3 cm long, 1–1.1 cm in diameter; calyx prominent, with a short tube, a small deep cavity, and spreading minutely serrate persistent lobes dark red on the upper side below the middle; flesh thick, yellow, dry and mealy; nutlets 3 or 4, narrowed and acute at the ends or rounded at the base, rounded or slightly ridged on the back, with a low ridge, light colored, 6–7 mm long, and 4 mm wide.

A thin intricately branched shrub sometimes 4 m high, with irregularly spreading stems covered at the base with dark gray bark, and slender glabrous branchlets dark orange-green tinged with red when they first appear, becoming in their first season bright chestnut-brown, lustrous and marked by numerous dark lenticels, dull gray-brown the following year, and armed with many straight purplish shining ultimately dull gray-brown spines 4–6 cm long and very numerous and branched on old stems.

Buffalo, J. Dunbar (✱ 39, type), May 28 and September 26, 1905.

Crataegus promissa n. sp.

Leaves oblong-ovate, acuminate, gradually narrowed and concave-cuneate at the entire or glandular base, sharply doubly serrate above, with straight or incurved glandular teeth, and deeply divided into 4–6 pairs of slender acuminate lobes; about one third grown when the flowers open the first of June and then thin, yellow-green and roughened above by short white hairs, and at maturity thin, glabrous, dark blue-green and smooth on the upper surface and pale blue-green on the lower surface, 5–5.8 cm long and 4–7 cm wide, with slender yellow midribs, and thin primary veins arching to the points of the lobes; petioles slender, wing-margined at the apex, sparingly glandular through the season, 4–4.5 cm in length; stipules linear-obovate, glandular, fading brown, caducous; leaves on vigorous shoots thick, cuneate at the base, coarsely serrate, deeply lobed,

sometimes 8-9 cm long and 7-8 cm wide, with broadly winged petioles and foliaceous lunate coarsely serrate persistent stipules. Flowers 1.6 cm in diameter, on slender elongated glabrous pedicels, in broad lax many-flowered corymbs, with linear to oblong-obovate glandular caducous bracts and bractlets; calyx-tube narrowly obconic, glabrous, the lobes long, narrow, acuminate, entire or slightly dentate below the middle, glabrous, reflexed after anthesis; stamens 5-7; anthers pink; styles 3 or 4, surrounded at the base by a broad ring of long white hairs. Fruit ripening at the end of September, on long slender drooping pedicels, in many-fruited clusters, oblong-obovate, tapering at the long base, crimson, lustrous, 1-1.2 cm long and 7-8 mm wide; calyx little enlarged, with a small shallow cavity, and reflexed often closely appressed elongated narrow lobes; flesh thin, dry and mealy; nutlets 3 or 4, rounded at the base, acute at the apex, only slightly ridged on the back, 8-9 mm long, and about 4 mm wide.

A shrub 3-4 m high, with numerous stems covered with dark gray scaly bark, ascending branches, and slender zigzag glabrous branchlets bright orange-green more or less tinged with purple when they first appear, becoming light chestnut-brown and marked by large pale lenticels in their first season and pale gray-brown the following year, and armed with slender slightly curved light chestnut-brown shining spines 4-5 cm long, often pointing to the base of the branch, and compound and persistent on old stems.

Niagara Falls, J. Dunbar, (* 4, type), May 21 and September, 1903, June 1, 1904; J. Dunbar and C. S. Sargent (* 19), September 16, 1904, J. Dunbar, May 28, 1905, J. Dunbar (* 30), September 27, 1905, May 28, 1906.

Crataegus strigosa n. sp.

Leaves ovate, acuminate and long pointed at the apex, cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and divided into 5 or 6 pairs of small acuminate spreading lateral lobes; more than half grown when the flowers open at the end of May and then membranaceous, yellow-green and roughened above by short rigid white hairs and pale and glabrous below, and at maturity thin, yellow-green and scabrate on the upper surface and light yellow-green on the lower surface, 4-5 cm long and 3.5-4 cm wide, with stout midribs, and 5 or 6 pairs of prominent primary veins; petioles slender, slightly wing-margined at the apex, glandular throughout the season, 2-2.5 cm in length. Flowers

1.5 cm in diameter, on slender glabrous pedicels, in 5-8-, usually 5-6-flowered compact corymbs, the lowest peduncle generally from the axis of an upper leaf; calyx-tube narrowly obconic, glabrous, the lobes small, acuminate, entire or slightly glandular, glabrous, reflexed after anthesis; stamens 7-10; anthers purple; styles 3-5, surrounded at the base by a narrow ring of pale hairs. Fruit ripening early in October, on stout reddish drooping or spreading pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, scarlet, lustrous, marked by occasional dark dots, 1.3-1.4 cm long, 1-1.1 cm in diameter; calyx little enlarged, without a tube, with a narrow deep cavity, and small spreading or closely appressed persistent lobes, dark red on the upper side below the middle; flesh thin, yellow, dry and mealy; nutlets 3-5, narrowed and rounded at the ends or acute at the apex, ridged on the back, with a broad rounded or grooved ridge, light colored, 6-7 mm long, and about 4 mm wide.

A shrub 3-4 m high, with stout stems covered with dark scaly bark, ascending branches, and slender somewhat zigzag glabrous branchlets dark olive-green tinged with red when they first appear, becoming light chestnut-brown, lustrous and marked by many small dark lenticels in their first season, and armed with slender slightly curved light chestnut-brown shining spines 3-6 cm long.

Buffalo, J. Dunbar (* 20; type), September 30, 1904 and May 28, 1905.

Crataegus barryana n. sp.

Leaves broadly ovate, rounded or abruptly cuneate at the wide base, sharply doubly serrate, with straight glandular teeth, and very slightly divided into 4-6 pairs of small acuminate spreading lobes; nearly half grown when the flowers open about the 20th of May and then thin, dark yellow-green and roughened above by short white hairs and pale and glabrous below, and at maturity thin but firm in texture, dull yellow-green, scabrate and lustrous on the upper surface, glaucous on the lower surface, 6-8 cm long and 5-7 cm wide, with slender midribs, and thin primary veins extending obliquely to the points of the lobes; turning yellow in the autumn; petioles slender, narrowly wing-margined at the apex, slightly villose on the upper side while young, becoming glabrous, sparingly glandular, with persistent glands, 3-5 cm in length; leaves on vigorous shoots rounded or slightly cordate at the broad base, more coarsely serrate and more deeply lobed, often 8-9 cm long and broad. Flowers 2 cm in diameter, on stout glabrous pedicels, in compact mostly 7-10-flowered corymbs; calyx-tube narrowly ob-

conic, glabrous, the lobes slender, acuminate, entire or sparingly dentate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 7-10; anthers purple; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the middle of October, on stout erect or spreading reddish pedicels, in few-fruited clusters, obovate, full and rounded at the apex, abruptly narrowed at the rounded base, crimson, marked by small pale dots, pruinose, about 1.8 cm long and 1.5 cm wide; calyx little enlarged, with a narrow shallow cavity, and spreading persistent lobes villose above and dark red on the upper side below the middle; flesh thick, dark yellow, dry and mealy; nutlets usually 3, narrowed and rounded at the ends, prominently ridged on the back, with a broad grooved ridge, 7-8 mm long, and about 5 mm wide.

A shrub 4-5 m high, with small spreading or ascending branches covered with dark scaly bark and forming an open irregular head, and slender glabrous branchlets dark orange-brown and marked by numerous pale lenticles when they first appear, becoming dull red-brown in their first season and light gray-brown the following year, and armed with slender slightly curved light red-brown spines 3.5-4 cm long, long persistent and often becoming branched on old stems.

Rochester, common in moist heavy soil, J. Dunbar (№ 37, type), October 14, 1902, May 20, 1903.

At the suggestion of Mr Dunbar this species is named for William C. Barry of Rochester, whose practical knowledge and business ability have been powerful in advancing horticulture in America.

Crataegus foliata n. sp.

Leaves crowded, ovate-oblong, acuminate, rounded or concave-cuneate at the base, coarsely doubly serrate, and slightly divided into 4 or 5 pairs of small acuminate spreading lobes; more than half grown when the flowers open at the end of May and then membranaceous, yellow-green, slightly roughened above by short white hairs and glabrous below, and at maturity thin but firm in texture, glabrous, smooth, yellow-green on the upper surface and paler on the lower surface, 5-7 cm long and 4-5 cm wide, with stout yellow midribs and slender primary veins; petioles stout, slightly wing-margined at the apex, glandular while young, often rose color in the autumn, 2.5-3 cm in length; leaves on vigorous shoots rounded or cordate at the broad base, coarsely serrate, more deeply lobed, 6-7 cm long

and broad, with short stout conspicuously glandular petioles. Flowers 1.5-1.6 cm in diameter, on long slender glabrous pedicels, in broad lax usually 8-12-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes stout, broad, acuminate, slightly serrate usually only above the middle, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 7-10; anthers dark rose color; styles usually 3. Fruit ripening early in October, on long slender red drooping pedicels, in few-fruited clusters, obovate, crimson, lustrous, marked by numerous small pale dots, 1-1.2 cm long and 8-10 mm wide; calyx prominent, with a narrow deep cavity, and spreading or slightly appressed persistent lobes dark red on the upper side below the middle; flesh thin, yellow, dry and mealy; nutlets 3, narrowed and acute at the ends or rounded at the base, prominently ridged on the back, with a broad doubly grooved ridge, dark colored, 6-7 mm long, and about 4 mm wide.

A leafy shrub 3-4 m high, with ascending tortuous stems covered with dark scaly bark, stout glabrous branchlets purple and marked by large pale lenticels when they first appear, becoming light chestnut-brown and lustrous in their first season and light reddish brown the following year, and armed with stout straight or slightly curved bright chestnut-brown and shining ultimately dull gray-brown spines 1.5-4 cm. long.

Niagara Falls, J. Dunbar and C. S. Sargent (* 20, type, and 27), September 16, 1904, J. Dunbar, May 28, 1905.

Crataegus cruda n. sp.

Leaves ovate, acuminate, rounded or abruptly or gradually narrowed and cuneate at the entire base, sharply doubly serrate above, with straight glandular teeth, and slightly divided often only above the middle into 4 or 5 pairs of small acuminate spreading lobes; nearly half grown when the flowers open during the last week of May and then membranaceous, yellow-green and scabrate above and paler and glabrous below, and at maturity thin but firm in texture, yellow-green, smooth, glabrous, 5-6 cm long and 4-4.5 cm wide; petioles very slender, slightly wing-margined at the apex, glabrous, 2.5-3 cm in length; leaves on vigorous shoots coarsely serrate, more deeply lobed, gradually narrowed below into broad-winged petioles, often 9-10 cm long and 6-7 cm wide. Flowers 1.2-1.4 cm in diameter, on very slender glabrous pedicels, in long-branched lax usually 7-10-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes long, slender, acuminate, usually entire,

glabrous, reflexed after anthesis; stamens 5-8; anthers pale pink; styles 3 or 4, surrounded at the base by a broad ring of pale tomentum. Fruit ripening at the end of September, on slender drooping red pedicels, in few-fruited clusters, obovate, scarlet, lustrous, marked by small pale dots, 1.2-1.5 cm long and about 1 cm wide; calyx little enlarged, with a wide shallow cavity, and spreading and appressed persistent lobes dark red on the upper side below the middle; flesh thick, yellow, sweet and juicy; nutlets 3 or 4, acute at the ends, slightly ridged or grooved on the back, about 7 mm long, and 3 mm wide.

A shrub 3-4 m high, with dark gray stems, and stout zigzag glabrous branchlets dark orange-green when they first appear, becoming dark chestnut-brown or orange-brown and marked with numerous small dark lenticels in their first season and dull reddish brown the following year, and armed with very stout straight or slightly curved light red-brown shining spines 4-6 cm long and branched and persistent on old stems.

Niagara Falls, J. Dunbar (No. 31, type), September 27, 1905, and May 28, 1906.

Crataegus inusitata n. sp.

Leaves broadly ovate, acuminate and long pointed at the apex, rounded or abruptly concave-cuneate at the broad entire base, coarsely doubly serrate above, with straight glandular teeth, and divided usually only above the middle into 3 or 4 pairs of short broad acuminate lobes; tinged with red when they unfold, not more than one third grown when the flowers open about the first of June and then bluish green and roughened above by short white hairs and pale and slightly villose in the axils of the veins below, and at maturity subcoriaceous, dark blue-green, smooth or scabrate on the upper surface, pale blue-green and glabrous on the lower surface, 4-7 cm long and 2.5-5 cm wide, with thin yellow midribs and 3 or 4, usually 3 pairs of slender primary veins; petioles slender, slightly wing-margined at the apex, sparingly hairy on the upper side while young, becoming glabrous, glandular, with minute persistent glands, 1.5-3.5 cm in length; leaves on vigorous shoots thicker, rounded at the broad base, more coarsely serrate and more deeply lobed, often 7-8 cm long and 6-7 cm wide. Flowers 1.5 cm in diameter, on long slender sparingly villose pedicels, in compact mostly 5-7-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube broadly obconic, glabrous, the lobes gradually narrowed from wide bases, short, acuminate, entire or irregularly dentate, glabrous,

reflexed after anthesis; stamens 10, filaments persistent on the fruit; anthers yellow; styles 3 or 4, densely coated with white hairs from the base nearly to the middle, surrounded by a narrow ring of pale tomentum. Fruit ripening at the end of September, on slender still slightly hairy pedicels, in few-fruited drooping clusters, short-oblong, full and rounded at the ends or slightly narrowed at the apex, dull greenish red, pruinose, marked by large pale dots, about 1 cm in diameter; calyx little enlarged, with a deep narrow cavity, and spreading lobes, their tips incurved and often deciduous from the ripe fruit; flesh thin, yellow, dry and mealy; nutlets 3 or 4, narrowed and rounded at the ends or acute at the apex, irregularly grooved or occasionally slightly ridged on the back, 6-7 mm long, and 4-5 mm wide.

A shrub, with slender nearly straight glabrous branchlets, green tinged with red when they first appear, becoming bright chestnut-brown, lustrous and marked by numerous pale lenticels in their first season and dull reddish brown the following year, and armed with slender slightly curved or straight chestnut-brown shining spines 2.5-3 cm long.

In moist soil, Chapinville, Ontario co., J. Dunbar and C. S. Sargent (* E, type), October 1, 1902, M. S. Baxter, May 30 and September 20, 1903.

This and *Crataegus delawarensis* Sargent are the only species of *Pruinosae* that have yet been seen with 10 stamens and yellow anthers. From *C. delawarensis* it differs in the scabrate young leaves and villose pedicels, and from all other species in the dense covering of hairs on the lower part of the styles.

IV TENUIFOLIAE

Fruit short-oblong to obovate, red or scarlet, lustrous; anthers rose color or pink; leaves thin, hirsute on the upper surface while young.

Stamens 10 or less

Leaves yellow-green

Leaves glabrous at maturity; pedicels glabrous

Fruit usually short-oblong

Stamens 10; anthers pink

Flowers 1.6 cm in diameter, in wide loose corymbs..... 1

..... 1 *C. slavini*

Flowers not more than 1.2 cm in diameter, in compact

corymbs 2 *C. boothiana*

Stamens 7-10; anthers dark rose color..... 3 *C. suavis*

Fruit obovate..... 4 *C. colorata*

Leaves scabrate at maturity; pedicels villose... 5 *C. rubicunda*

Leaves blue-green

Leaves glabrous at maturity

Fruit short-oblong

Leaves oblong-ovate, deeply lobed, usually only above the middle; fruit often 1.4 cm in length.....6 *C. ornata*

Leaves broadly ovate, laterally lobed; fruit generally not more than 1 cm long.....7 *C. bella*

Leaves oval, only slightly lobed.....8 *C. genialis*

Fruit obovate.....9 *C. tenuiloba*

Leaves scabrate at maturity.....10 *C. streeterae*

Stamens 20

Leaves broadly ovate; flowers in compact corymbs; fruit short-oblong, in erect clusters.....11 *C. conferta*

Leaves oblong-ovate; flowers in wide long-branched corymbs; fruit obovate, in drooping clusters.....12 *C. luminosa*

Crataegus slavini n. sp.

Leaves oblong-ovate, acuminate, broad and rounded or gradually narrowed and cuneate at the base, finely doubly serrate, with straight glandular teeth, and divided into 5-8 pairs of widespreading often incurved acuminate lateral lobes; nearly half grown when the flowers open about the 25th of May and then thin, yellow-green and roughened above by short white hairs and pale and glabrous below, and at maturity thin but firm in texture, bright yellow-green, smooth and lustrous on the upper surface and pale and glaucous on the lower surface, 4.5-7 cm long and 4-5.5 cm wide, with stout midribs and slender primary veins arching obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, glandular, with minute persistent glands, 2-3 cm in length; leaves on vigorous shoots thin, rounded or slightly cordate at the base, more deeply lobed, often 6-7 cm long and 5-6 cm wide. Flowers 1.5-1.6 cm in diameter, on long slender glabrous pedicels, in wide lax, mostly 8-10-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes abruptly narrowed from broad bases, slender, acuminate, entire or occasionally obscurely dentate, glabrous, reddish, reflexed after anthesis; stamens 10; anthers pink; styles 3 or 4, surrounded at the base by a narrow ring of matted pale hairs. Fruit ripening from the first to the middle of October and persistent after the fall of the leaves, on slender reddish pedicels, in few-fruited drooping clusters, short-oblong or slightly obovate, somewhat angled, bright orange-red, lustrous, marked by numerous small pale dots, 1.2-1.4 cm long, and about 1 cm wide; calyx prominent, with a narrow deep cavity, and spreading and slightly incurved lobes, dark

red on the upper side below the middle, their tips often deciduous from the ripe fruit; flesh thick, yellow, sweet and succulent; nuts 3 or 4, narrowed at the ends, acute at the apex, prominently ridged on the back, with a broad deeply grooved ridge, 6-7 mm long, and 4 mm wide.

A shrub 3-4 m high, with erect intricately branched stems covered with pale gray bark and spreading into broad thickets, and slender nearly straight glabrous branchlets, dark orange color and marked by many pale lenticels when they first appear, becoming dull reddish brown in their first season and dark gray-brown the following year, and armed with straight or slightly curved chestnut-brown shining spines 3-4 cm long.

Brighton near Rochester, B. H. Slavin (× 1, type, and 4), October 12, 1903, May 24, 1904.

This species is named for Bernard Henry Slavin of Seneca park, Rochester, for many years a diligent and careful student and collector of *Crataegus* in western New York.

Crataegus boothiana n. sp.

Leaves ovate, acuminate and often long pointed at the apex, rounded at the base, finely often doubly serrate, with straight slender glandular teeth, and divided into 5 or 6 pairs of acuminate spreading lobes; tinged with red when they unfold, nearly half grown when the flowers open about the 20th of May and then membranaceous, yellow-green and roughened above by short white hairs and pale and glabrous below, and at maturity thin, light yellow-green, glabrous and lustrous on the upper surface and pale bluish green on the lower surface, 5-6 cm long and 4-4.5 cm wide, with slender midribs, and thin primary veins extending obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, glabrous, glandular, with occasional minute scattered often persistent glands, 1-2.5 cm in length; leaves on vigorous shoots rounded or often cordate at the broad base, deeply lobed, with stout winged conspicuously glandular petioles. Flowers about 1.2 cm in diameter, on slender glabrous pedicels, in compact mostly 8-10-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, entire or slightly toothed near the base, glabrous, red above the middle, reflexed after anthesis; stamens 10; filaments persistent on the fruit; anthers pink; styles 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the middle of September, on short reddish pedicels, in few-fruited drooping

clusters, short-oblong, full and rounded at the ends, bright orange-red, lustrous, marked by occasional small pale dots, 1-1.2 cm long and 8-9 mm wide; calyx prominent, with a broad shallow cavity, the lobes elongated, spreading, dark red on the upper side below the middle, their tips usually deciduous from the ripe fruit; flesh thin, yellow, slightly juicy; nutlets 3, narrowed and rounded at the base, acute at the apex, ridged on the back, with a narrow high ridge, 5-6 mm long, and 3-4 mm wide.

A shrub 2-2.5 m high, with small erect stems forming an open irregular head, and slender nearly straight glabrous branchlets light green tinged with red when they first appear, becoming dull reddish brown and marked by small pale lenticels in their first season and dull gray-brown the following year, and armed with stout or slender nearly straight purplish shining spines 2.5-3 cm long.

Wooded banks, near Rochester, J. Dunbar (№ 132, type), September 8, 1902, May 16 and September 16, 1903; Murray, common, M. S. Baxter (№ 133), October 11, 1902; Filmore, Baxter and Dewing (№ 309), September 4, 1905.

At the suggestion of Mr Dunbar this species is named in memory of Charles Miller Booth, M. D. (October 12, 1830-January 30, 1906), a resident of Rochester during nearly the whole of his life and a careful student of the flora of western New York, especially of the mosses and grasses in which he was particularly interested.

Crataegus suavis n. sp.

Leaves ovate, acuminate, rounded or abruptly concave-cuneate at the entire base, doubly serrate above, with slender glandular teeth, and divided into 5 or 6 pairs of acuminate spreading lateral lobes; tinged with red and roughened above by short white hairs when they unfold, about half grown when the flowers open at the end of May and then membranaceous, yellow-green, smooth and scabrate above, and at maturity thin, yellow-green, smooth and glabrous on the upper surface and pale on the lower surface, 5.6-7 cm long and 4.5 cm wide, with slender yellow midribs, and thin primary veins arching obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, glandular, with persistent glands, 2-2.5 cm long; stipules linear to linear-obovate, glandular, foliaceous and lunate on vigorous shoots, glandular, caducous. Flowers 1.5 cm in diameter, on slender elongated glabrous pedicels, in lax thin branched usually 7-10-flowered corymbs, with linear glandular bracts and bractlets fading brown; calyx-tube narrowly obconic,

glabrous, the lobes long, slender, acuminate, entire, glabrous, reflexed after anthesis; stamens 7-9; anthers light rose color; styles 2 or 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening from the middle to the end of September, on slender drooping pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends or slightly narrowed toward the base, orange-red, lustrous, marked by small pale dots, 1-1.3 cm long, and 8-9 mm wide; calyx little enlarged, with a deep narrow cavity, and slender closely appressed lobes, their tips often deciduous from the ripe fruit; flesh thick, pale yellow, sweet and juicy; nutlets 2 or 3, gradually narrowed and rounded at the ends, ridged on the back, with a low deeply grooved ridge, 7-8 mm long, and about 4 mm wide.

A shrub sometimes 4 m high, with small erect stems and branches, and slender slightly zigzag glabrous branchlets, dark orange-green deeply tinged with purple when they first appear, becoming dull reddish-brown and marked by small pale lenticels in their first season and light gray-brown the following year, and armed with slender straight purplish spines 2.5-3.5 cm long.

Buffalo, J. Dunbar (№ 9, type), September 29, 1903, June 1, 1905, and May 28, 1905; (№ 18), J. Dunbar, May 28, 1905.

Crataegus colorata Sargent

Rochester Acad. Sci. Proc. IV. 123 (1903).

Buffalo, common, J. Dunbar, September 26, 1905, May 28, 1906; Niagara Falls, J. Dunbar, September 28, 1905; also near Rochester, New York.

Crataegus rubicunda Sargent

Rochester Acad. Sci. Proc. IV. 121 (1903).

Buffalo, J. Dunbar, May 21, 1903, May 28, 1906; also near Rochester, New York.

Crataegus ornata Sargent

Rochester Acad. Sci. Proc. IV. 120 (1903).

Buffalo, J. Dunbar (№ 42), October 6, 1902, May 28, 1906; also near Rochester, New York.

Crataegus bella n. sp.

Leaves ovate, acuminate, rounded or abruptly cuneate at the broad entire base, finely doubly serrate above, with straight slender glandular teeth, and divided into 4 or 5 pairs of narrow acuminate spreading lateral lobes; dark red and covered on the upper surface with short white hairs when they first appear, nearly fully grown when the flowers open at the end of May and then membranaceous, light yellow-green and scabrate above and pale below, and at maturity thin but firm in texture, dark bluish green and very smooth on the upper surface, pale blue-green on the lower surface, 3.5-4.5 cm long and 3-3.5 cm wide, with slender midribs and thin primary veins; petioles slender, slightly wing-margined at the apex, glandular, with large dark glands occasionally persistent during the season, often rose color in the autumn, 1.5-2 cm in length; leaves on vigorous shoots rounded or slightly cordate at the base, and usually as broad as long, with stout broad-winged rose colored petioles. Flowers 1.6 cm in diameter, on slender glabrous pedicels, in crowded many-flowered corymbs, with linear bracts and bractlets fading brown; calyx-tube narrowly obconic, glabrous, the lobes slender, elongated, entire or sparingly dentate, glabrous, reflexed after anthesis; stamens, 10; anthers rose color; styles 3 or 4, surrounded at the base by a narrow ring of pale hairs. Fruit very showy, in wide many-fruited erect, or spreading clusters, full and rounded at the ends or slightly narrowed from below the middle to the base, scarlet, lustrous, marked by many small pale dots, about 1 cm long and 8-9 mm wide; calyx prominent, with a broad deep cavity, and spreading or slightly incurved persistent lobes red on the upper side toward the base; flesh thick, yellow, sweet and juicy; nutlets 3 or 4, narrowed and acute at the ends, ridged on the back, with a broad doubly grooved ridge 7-8 mm long, and 4-5 mm wide.

A shrub 3-4 m high, with stout ascending tortuous stems, small spreading branches, and slender zigzag branchlets dark purple and puberulous when they first appear, soon glabrous, becoming bright chestnut-brown and lustrous in their first season and dull gray-brown the following year, and armed with stout straight or slightly curved bright chestnut-brown shining ultimately dull gray-brown spines 2.5-3.5 cm long.

Buffalo, J. Dunbar (№ 24, type), September 24, 1904, May 28, 1905.

***Crataegus genialis* Sargent**

Rhodora V. 148 (1903).

Buffalo, J. Dunbar and C. S. Sargent (№ 18), September 24, 1904, J. Dunbar, May 21, 1905; also eastern New York and western Massachusetts.

***Crataegus tenuiloba* Sargent**

Rochester Acad. Sic. Proc. IV. 122 (1903).

Buffalo, J. Dunbar (№ 19 and 30), September 30, 1904, May 28, 1905; also near Rochester, N. Y.

***Crataegus streeterae* Sargent**

Rochester Acad. Sci. Proc. IV. 119 (1903).

Buffalo, J. Dunbar, May 28, 1906; Niagara Falls, September 27, 1905, May 28, 1906; also at Rochester, N. Y.

***Crataegus conferta* n. sp.**

Leaves broadly ovate, acuminate or rounded and short pointed at the apex, rounded or slightly cordate at the entire base, finely serrate above, with straight glandular teeth, and slightly divided into 3 or 4 pairs of small acuminate spreading lobes; tinged with red and covered above with soft white hairs when they unfold, nearly fully grown when the flowers open at the end of May and then membranaceous, light yellow-green and scabrate above, and at maturity thin, glabrous, yellow-green and smooth on the upper surface, paler on the lower surface, 3-4 cm long and 3-3.5 cm wide, with comparatively stout midribs, and 4 or 5 pairs of thin primary veins; petioles slender, slightly wing-margined at the apex, glandular throughout the season, 1.5-1.8 cm in length; leaves on vigorous shoots somewhat thickened, cuneate at the base, more coarsely serrate, more deeply lobed, and often 5-6 cm long and 4-5 cm wide, with stout shorter broadly winged petioles. Flowers 1.8 cm in diameter, on short glabrous pedicels, in very compact crowded usually 7-8-flowered showy corymbs, with linear glandular bracts and bractlets; calyx-tube broadly obconic, the lobes slender, elongated, entire or sparingly dentate, glabrous, reflexed after anthesis; stamens 20; filaments persistent on the ripe fruit; anthers rose color; styles 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening at the end of September, on short stout

reddish pedicels, in compact few-fruited erect clusters, short-oblong, slightly narrowed from the middle to the ends, orange-red, lustrous, marked by small pale dots, about 1.2 cm long and 8 mm wide; calyx little enlarged, with a deep narrow cavity, and small closely appressed persistent lobes bright red on the upper side; flesh thick, yellow, dry and sweet; nutlets 3, narrowed and acute at the ends or broader and rounded at the base, rounded and only slightly ridged on the back, about 7 mm long, and 4 mm wide.

A shrub 3-4 m high, with small ascending stems, and slender nearly straight branchlets dark orange-green more or less tinged with purple and puberulous when they first appear, soon glabrous, becoming bright chestnut-brown, lustrous, and marked by numerous small dark lenticles in their first season and dull reddish brown the following year, and armed with stout straight or slightly curved chestnut-brown shining spines 2-3 cm long.

Buffalo, J. Dunbar (☞ 10, type), May 28 and September 26, 1905; J. Dunbar (☞ 37), May 28, 1905.

Crataegus luminosa n. sp.

Leaves oblong-ovate, acuminate, rounded, truncate or rarely cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of small acuminate lateral lobes; deeply tinged with red and covered on the upper surface with soft white hairs and glabrous below when they unfold, about half grown when the flowers open at the end of May and then yellow-green and scabrate above, and at maturity thin, glabrous, smooth and yellow-green on the upper surface, pale on the lower surface, 5-6 cm long and 3.5-4.5 cm wide, with slender yellow midribs and thin primary veins extending to the points of the lobes; petioles very slender, slightly wing-margined at the apex, glandular throughout the season, often tinged with rose color in the autumn, 2-3 cm in length; stipules linear, glandular, fading brown, caducous; leaves on vigorous shoots long-pointed, cordate at the base, more coarsely serrate and more deeply lobed. Flowers 1.8 cm in diameter, on long slender glabrous pedicels, in wide long-branched usually 8-10-flowered corymbs, the lowest peduncles from the axils of upper leaves; calyx-tube broadly obconic, glabrous, the lobes short, slender, sparingly dentate near the middle, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; petals reflexed; stamens 20; anthers dark red; styles 5, surmounted at the base by a narrow ring of pale tomentum. Fruit

ripening early in September and soon falling, on stout red pedicels, in few-fruited drooping clusters, obovate, rounded at the apex, gradually narrowed from above the middle to the base, dark crimson, lustrous, marked by many small pale dots; calyx little enlarged, with a deep narrow cavity, the lobes usually deciduous from the ripe fruit; flesh thick, yellow, soft and juicy; nutlets 5, thin, rounded at the base, gradually narrowed and acute at the apex, slightly grooved on the back, about 7 mm long, and 4-5 mm wide.

A shrub sometimes 5 m high, with numerous ashy gray stems, small ascending and spreading branches, and slender slightly zigzag branchlets, dark orange-green deeply tinged with purple when they first appear, becoming in their first season light chestnut-brown, lustrous and marked by many small pale lenticels, and dull gray-brown the following year, and armed with stout slightly curved chestnut-brown or purplish spines 3-4 cm long.

Low wet woods, Buffalo, J. Dunbar (\times 36, type), May 28 and September 26, 1905.

V MOLLES

Fruit subglobose to obovate, scarlet, pubescent at the ends; flesh thick and succulent; nutlets 3-5, narrowed at the ends, usually slightly ridged; corymbs hairy; leaves thin, broad, cuneate or rounded at the base; stamens 15-20; anthers rose color.

Crataegus radians n. sp.

Leaves oval to ovate, acuminate, concave-cuneate or rounded at the often unsymmetrical glandular base, sharply doubly serrate above, with straight glandular teeth, and divided often only above the middle into 6 or 7 pairs of slender acuminate spreading lobes; nearly half grown when the flowers open about the 20th of May and then thin, light yellow-green and roughened above by short white hairs and villose below, and at maturity thin, yellow-green and scabrate on the upper surface, paler and coated below on the slender midribs and primary veins with matted white hairs, 6-8.5 cm long and 4-5 cm wide; petioles slender, slightly wing-margined at the apex, villose, 2.5-3.5 cm in length; leaves on vigorous shoots rounded or truncate at the broad base, more coarsely serrate and more deeply lobed, often 9-10 cm long and 8-9 cm wide, with slender glandular petioles. Flowers 1.7-1.9 cm in diameter, on slender villose pedicels, in wide lax 5-16-flowered hairy corymbs, with linear-obovate to linear glandular bracts and

bractlets fading brown and mostly persistent until the flowers open; calyx-tube narrowly obconic, thickly coated with long white hairs, the lobes gradually narrowed from wide bases, slender, acuminate, entire or minutely and irregularly glandular serrate, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 15-20, usually 20; anthers dark rose color; styles 4 or 5, surrounded at the base by a narrow ring of long white hairs. Fruit ripening from the 20th to the end of September, on stout villose reddish pedicels, in few-fruited drooping clusters, short-oblong, full and rounded at the ends or obovate and slightly narrowed at the base, crimson, lustrous, puberulous at the ends, marked by large pale dots; calyx little enlarged, with a deep narrow cavity, and slender spreading recurved usually persistent lobes dark red on the upper side below the middle; flesh thin, juicy, dark yellow; nutlets 4 or 5, gradually narrowed and acute at the ends or rounded at the base, rounded and grooved or irregularly ridged on the back, 6-7 mm long, and 4-5 mm wide.

An arborescent shrub 7-8 m high, with stout spreading stems covered with light gray scaly bark, small spreading and ascending branches forming an open irregular head, and slender slightly zig-zag branchlets, covered when they first appear with long matted white hairs, light red or orange-brown, pubescent and marked by pale lenticels in their first season, darker colored and glabrous the following year and ultimately ashy gray, and armed with slender nearly straight chestnut-brown shining spines 4.5-5 cm long.

Low moist woods, Rochester (Knickerbocker woods), Baxter and Dewing (* 302, type), October 10, 1904, May 21 and September 24, 1905, J. Dunbar, May 21, 1905.

VI FLABELLATAE

Fruit short-oblong to oval or obovate, scarlet, lustrous, 1.5-2 cm long; flesh succulent; nutlets 3-5, grooved and occasionally ridged on the back; leaves large, thin, ovate to oblong, more or less acutely lobed; anthers rose color or pink.

Stamens 20

Leaves broadly ovate, glabrous above at maturity; fruit obovate.....

..... 1 *C. dayana*

Leaves oblong-ovate, scabrate above at maturity; fruit short-oblong.....

..... 2 *C. limosa*

Stamens 10

Anthers pink; leaves ovate, glabrous above at maturity; fruit

obovate..... 3 *C. letchworthiana*

- Anthers rose color; leaves broadly ovate, scabrate above at maturity; fruit short-oblong.....4 *C. pedicellata*
- Stamens 7-10
- Flowers 2.4 cm in diameter, on slightly villose pedicels, in broad 10-15-flowered corymbs; anthers pale pink; fruit short-oblong, truncate at the apex, often unsymmetrical and mammillate at the base.....5 *C. gloriosa*
- Flowers not more than 1.5 cm in diameter, on densely villose pedicels, in compact 8-10-flowered corymbs; anthers dark rose color; fruit subglobose to oval.....6 *C. sejuncta*
- Stamens 5-7, usually 5
- Leaves oval to ovate, light yellow-green; flowers cup-shaped, on glabrous or slightly villose pedicels; fruit oblong to oval.....7 *C. holmesiana*
- Leaves oblong-ovate, dark yellow-green; flowers not cup-shaped; pedicels densely villose; fruit short-oblong.....8 *C. acclivis*

Crataegus dayana n. sp.

Leaves broadly ovate, acuminate, abruptly concave-cuneate or rounded at the entire or glandular base, sharply doubly serrate, with slender glandular teeth, and divided into 6 or 7 pairs of narrow acuminate spreading lateral lobes; when they unfold tinged with rose color and coated with soft white hairs more abundant on the lower than on the upper surface, nearly two thirds grown when the flowers open the last week of May and then very thin, yellow-green and scabrate above and pale and slightly hairy along the midribs and veins below, with short sometimes persistent hairs, and at maturity thin, dark yellow-green, smooth and glabrous on the upper surface, pale on the lower surface, 8-10 cm long and 7-9 cm wide, with stout midribs, and primary veins arching to the point of the lobes; petioles slender, wing-margined at the apex, slightly villose while young, becoming glabrous, rose colored in the autumn, 3-4 cm in length; stipules linear, only slightly glandular, fading brown, caducous; leaves on vigorous shoots thicker, cordate at the broad base, very coarsely serrate, more deeply lobed and often 10-11 cm long and wide, with stout glandular red petioles 2-2.5 cm in length, and foliaceous lunate glandular serrate deciduous stipules. Flowers 2-2.2 cm in diameter, on long stout slightly hairy pedicels, in wide lax long-branched usually 10-14 flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from broad bases, long, acuminate, coarsely glandular serrate above the middle, glabrous on the outer, slightly villose on the inner surface, reflexed after an-

thesis; stamens 20; anthers pink; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening from the first to the middle of September and soon falling, on long stout glabrous reddish drooping pedicels, in few-fruited clusters, obovate, full and rounded at the apex, gradually narrowed from above the middle to the base and sometimes decurrent on the pedicel, crimson, lustrous, marked by many small pale dots; calyx prominent, with a wide very deep cavity, and spreading and incurved coarsely serrate persistent lobes dark red on the upper side toward the base; flesh thick, dark yellow, juicy and edible; nutlets 3 or 4, acute at the ends, ridged on the back, with a narrow high ridge, 7-8 mm long, and about 5 mm wide.

A tree sometimes 5 m high, with a trunk occasionally 3 dm in diameter, covered with ashy gray bark, spreading horizontal branches forming a compact shapely head, and slender slightly zigzag glabrous branchlets dark orange-green deeply tinged with purple when they first appear, becoming bright chestnut-brown, very lustrous and marked by small pale lenticels in their first season and dull reddish brown the following year, and armed with slender nearly straight bright chestnut-brown shining spines 3.5-4.5 cm long; or an arborescent shrub, with numerous small stems.

Buffalo, J. Dunbar and C. S. Sargent (* 7, type), September 24, 1904, J. Dunbar, May 28, 1905.

This handsome tree is named in memory of David Fisher Day (June 11, 1829-August 21, 1901), the author with Judge Clinton, of *A Catalogue of the Native and Naturalized Plants of the City of Buffalo and its Vicinity* (1883), and of *A Catalogue of the Flowering and Fern-like Plants growing without Cultivation in the Vicinity of the Falls of Niagara* (1888).

Crataegus limosa n. sp.

Leaves oblong-ovate, acuminate, concave-cuneate or gradually narrowed and rounded at the entire base, coarsely doubly serrate above, with straight glandular teeth, and divided often only above the middle into 6 or 7 narrow acuminate lobes; more than half grown when the flowers open from the 15th to the 20th of May and then very thin, bright green and roughened above by short white hairs and pale bluish green and glabrous below, and at maturity thin, dark yellow-green and scabrate on the upper surface and pale yellow-green on the lower surface, 6-8 cm long and 4-5 cm wide, with stout orange colored midribs, and thin primary veins ex-

tending obliquely to the points of the lobes; petioles slender, narrowly wing-margined at the apex, slightly hairy on the upper side while young, soon glabrous, occasionally minutely glandular, 1.5-2.5 cm in length; leaves on vigorous shoots more deeply lobed and often 8-9 cm long and 6-6.5 cm wide. Flowers 1.8 cm in diameter, on long slender slightly hairy pedicels, in mostly 8-10-flowered compact thin-branched corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes slender, elongated, minutely glandular-dentate, glabrous on the outer, pubescent on the inner surface, reflexed after anthesis; stamens 20-25; anthers red; styles 2-4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the end of September, on stout nearly glabrous reddish pedicels, in few-fruited drooping clusters, short-oblong, full and rounded at the ends, crimson, lustrous, marked by large pale dots, 1-1.2 cm long and 8-10 mm wide; calyx little enlarged, with a deep narrow cavity, and spreading reflexed lobes red below the middle on the upper side and often deciduous from the ripe fruit; flesh thick, yellow, sweet and succulent; nutlets 2, narrowed and rounded at the ends or acute at the apex, ridged on the back, with a high often doubly grooved ridge, about 7 mm long, and 4 mm wide.

An arborescent shrub 5-7 m high, with widespreading stems often 2 dm in diameter and 1 m long covered with gray scaly bark, small drooping branches, forming a wide irregular open head, and slender zigzag glabrous branchlets dark orange-yellow and marked by pale lenticels when they first appear, becoming light chestnut-brown and lustrous in their first season and dull gray-brown the following year, and armed with few slender slightly curved chestnut-brown shining spines 3-4 cm long.

In the dense shade of thick woods, Hagaman's swamp near Rochester, J. Dunbar (♂ QQ), October 12, 1901, September 26, 1903, May 19 and September 26, 1902.

Crataegus letchworthiana n. sp.

Leaves ovate, acute or acuminate, concave-emneate or rounded at the broad entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided usually only above the middle into 3 or 4 pairs of small spreading acuminate lobes; slightly tinged with red when they unfold, nearly half grown when the flowers open at the end of May and then thin, yellow-green and covered above by soft white hairs and pale and slightly villose along the midribs and veins below, and at maturity thin but firm in texture,

yellow-green, smooth and glabrous on the upper surface, still slightly hairy along the slender yellow midribs and primary veins on the lower surface, 5-6 cm long and 4-5 cm wide; petioles slender, slightly wing-margined at the apex, hairy along the upper side when young, becoming nearly glabrous, glandular, with minute persistent glands, 1.5-2.5 cm in length; leaves on vigorous shoots rounded or slightly cordate at the base, long-pointed, more coarsely serrate, deeply divided into spreading or incurved lateral lobes, and 6-7 cm long and broad. Flowers 2 cm in diameter, on long slender slightly hairy pedicels, in broad rather compact mostly 10-15-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, finely glandular serrate below the middle, glabrous on the outer, pubescent on the inner surface, reflexed after anthesis; stamens 10; anthers pink; styles 2-4. Fruit ripening early in September, on glabrous reddish pedicels, in drooping many-fruited clusters, obovate and rounded at the apex, gradually narrowed at the base, scarlet, lustrous, marked by many small pale dots, 1.2-1.3 cm long and 1-1.1 cm in diameter; calyx little enlarged, with a wide shallow cavity, and spreading often persistent lobes dark red on the upper side below the middle and slightly hairy above; flesh thick, yellow, sweet and juicy; nutlets 2-4, narrowed and rounded at the ends, or acute at the apex, prominently and irregularly ridged on the back, with a broad deeply grooved ridge or rounded and slightly grooved on the back, 7-8 mm long, and 5-6 mm wide.

A tree 8-10 m high, with a trunk often 3 dm in diameter, spreading and ascending branches forming a broad round-topped symmetrical head, and slender glabrous branchlets orange-green and slightly tinged with red when they first appear, becoming dull light chestnut-brown and marked by small pale lenticels in their first season and light gray-brown and rather lustrous the following year.

Meadows near Portage, Baxter and Dewing (№ 249), September 7, 1904 and May 29, 1905.

This beautiful tree is named for the distinguished philanthropist, William P. Letchworth of Buffalo, for a long time chairman of the State Board of Charities of New York, on whose farm at Portage I saw it in the autumn of 1904.

Crataegus pedicellata Sargent

Bot. Gazette, XXXI. 226 (1901); Silva N. Am. XIII, 101, t. 677; Rochester Acad. Sci. Proc. IV. 116; Man. 448, f. 365.

Buffalo, J. Dunbar, September 26, 1905, May 28, 1906; abundant through Monroe and Ontario counties, New York.

Crataegus gloriosa n. sp.

Leaves ovate, acuminate, gradually narrowed and rounded or abruptly concave-cuneate at the entire base, coarsely doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of stout acuminate spreading lateral lobes; more than half grown when the flowers open from the 20th to the end of May and then yellow-green and roughened above by short white hairs and paler and slightly hairy along the midribs and primary veins below, and at maturity thin, slightly convex, dark green and scabrate on the upper surface, pale yellow-green and often still slightly hairy on the thin yellow midribs and primary veins below, 6-8 cm long and 5-7 cm wide; petioles slender, slightly wing-margined at the apex, sparingly villose on the upper side while young, often becoming glabrous, occasionally glandular, 3-4 cm in length; leaves on vigorous shoots thicker, rounded or abruptly cuneate at the base, more coarsely serrate and more deeply lobed, often 10-12 cm long and 9-10 cm wide, with prominent midribs and veins, and stout glandular petioles. Flowers 2.2-2.4 cm in diameter, on long slender slightly villose pedicels, in wide erect or spreading 10-15-flowered corymbs, with oblong-obovate to linear glandular rose colored bracts and bractlets often persistent until the flowers open; calyx-tube narrowly obconic, glabrous, tinged with red, the lobes abruptly narrowed from broad bases, large, acuminate, coarsely glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; claws of the petals concave and forming conspicuous cavities; stamens 7-10; anthers light pink; styles 3-5, surrounded at the base by a wide ring of long white hairs. Fruit ripening the middle of September, on stout slightly hairy reddish pedicels, in few-fruited erect or spreading clusters, short-oblong, broad and truncate at the apex, sometimes slightly narrowed below and then often unsymmetrical at the base by the development of a mammillate process adnate to the pedicel, deep crimson, very lustrous, marked by large pale dots, 1.8-2.2 cm long and 1.5-1.8 cm in diameter; calyx prominent, with a broad deep cavity, and erect and incurved persistent lobes; flesh thick, yellow, sweet, very juicy, of excellent flavor; nutlets 3-5, acute at the apex, rounded and slightly ridged on the back, 6-7 mm long, and 3-4 mm wide

A tree often 8-9 m high, with a tall trunk covered with pale close bark, and sometimes 3 dm in diameter, spreading and ascending branches forming a broad symmetrical round-topped head, and

slender slightly zigzag glabrous branchlets dark orange color and marked by numerous pale lenticels when they first appear, becoming light reddish brown and lustrous in their first season and pale orange-brown the following year, and armed with few stout straight or slightly curved chestnut-brown shining spines 3-3.5 cm long.

Clay soil near the borders of woods, Rochester, J. Dunbar (✳ L, type), May 31, 1901, J. Dunbar and C. S. Sargent, September 27, 1901, September 19, 1902; Rochester (Knickerbocker woods), Baxter and Dewing (✳ 304), May 21 and September 25, 1905.

Formerly referred to *Crataegus pedicellata* Sargent, the "L" tree of Rochester is distinct from that species in its larger flowers peculiar in the development of sacklike cavities at the base of the petals, by its pink not dark rose colored anthers, by the much larger and more lustrous fruit usually mammillate at the base and ripened 10 to 12 days earlier, and by its convex leaves. In habit, in its large and abundant flowers, and in the large and brilliant abundant fruits, *C. gloriosa* is not surpassed in beauty by any North American *Crataegus*.

Crataegus sejuncta Sargent

N. Y. State Mus. Bul. 105. 62 (1906).

Buffalo, J. Dunbar (✳ 34), May 28 and September 30, 1905; also near Albany, New York, and in western New England.

Crataegus holmesiana Ashe

Jour. Elisha Mitchell Sci. Soc. XVI. pt 11. 78 (1899), Sargent, Bot. Gazette XXXI. 10; Silva N. Am. XIII. 119, t. 676; Rochester Acad. Sci. Proc. IV. 114; Man. 449, f. 366.

Buffalo, J. Dunbar (✳ 35), September 30, 1904, May 28, 1905; also near Rochester, New York and eastward to eastern Massachusetts and eastern Pennsylvania.

Crataegus acclivis Sargent

Rochester Acad. Sci. Proc. IV. 115 (1903); Man. 459, f. 367.

Niagara Falls, J. Dunbar, September 28, 1905, May 28, 1906; also near Rochester and Albany, New York.

VII DILATATAE

Fruit medium size, subglobose, scarlet; calyx much enlarged; nutlets 5, prominently ridged on the back; corymbs many-flowered; stamens 20; anthers rose color; leaves thin, on vigorous shoots as broad or broader than long.

Crataegus durobrivensis Sargent

Trees and Shrubs I. 3, t. 2 (1902); Rochester Acad. Sci. Proc. IV. 114.
Sargent and Peck, N. Y. State Mus. Bul. 105. 64 (1906).

Niagara Falls, J. Dunbar, September 28, 1905; near Hemlock lake, Livingston co., Henry T. Brown, May and October 1906; also near Rochester and Albany, New York.

VIII COCCINEAE

Leaves cuncate at the base, subcoriaceous or thin dark green and lustrous above; fruit subglobose, 9-15 mm in diameter.

Stamens 5-10

Anthers pale yellow

Leaves subcoriaceous; fruit 1.2-1.5 cm in diameter..... I *C. coccinea*

Leaves thin; fruit usually less than 1 cm in diameter 2 *C. dodgei*

Anthers rose color

Leaves thin; fruit 1-1.3 cm in diameter..... 3 *C. puberis*

Stamens, 20; anthers pink; leaves thin; ovate to oval or rhombic..... 4 *C. neo-baxteri*

Crataegus coccinea Linneus

Spec. 1. 476 (1753). Sargent, Bot. Gazette XXXI. 14; Silva N. Am. XIII. 133, t. 683; Man. 459, f. 375.

Buffalo, J. Dunbar (*40), May 31, June 12 and September 26, 1905; also on the New England coast and in the valley of the St Lawrence river.

Crataegus coccinea var. *rotundifolia* Sargent

Bot. Gazette XXXI. 14 (1900); Silva N. Am. XIII. 134; Man. 460; Acad. Sci. Phila. Proc. IV. 631.

Buffalo, J. Dunbar (*E), September 25, 1901; (*33), September 30, 1904 and May 28, 1905; also common from Canada to eastern Pennsylvania.

Crataegus dodgei Ashe

Jour. Elisha Mitchell Sci. Soc. XIX. 26 (March 1903). Sargent, Acad. Sci. Phila. Proc. 632 (1905); Rhodora VII. 213 (*Crataegus gravesii* Sargent, Rhodora V. 159 (June 1903)). (*Crataegus fallens* Gruber, Bucks County Nat. Sci. Club. Proc. 1. 19 (October 1903)).

Buffalo, J. Dunbar (*B), September 25, 1901, May 26 and October 6, 1902, (*12), September 29, 1903 and June 1, 1904; also from southern Michigan to eastern Massachusetts and eastern Pennsylvania.

Crataegus puberis n. sp.

Leaves rhombic to obovate, acuminate, gradually narrowed and concave-cuneate at the long entire base, finely doubly serrate above, with straight or incurved glandular teeth and slightly divided above the middle into 4 or 5 pairs of small acuminate lobes; more than half grown when the flowers open from the 20th to the 25th of May and then thin, dark yellow-green and covered above by soft white hairs and paler and villose below, and at maturity thin and firm in texture, dark green and glabrous on the upper surface, light yellow-green and nearly glabrous on the lower surface, 4.5-5.5 cm long and 3-4.5 cm wide, with slender slightly villose yellow midribs and veins; petioles slender, broadly wing-margined at the apex, hairy on the upper side, 1.5-3 cm in length. Flowers 1.2-1.3 cm in diameter, on slender densely villose pedicels, in compact 5-10-flowered corymbs, with linear glandular bracts and bractlets fading brown and often persistent until the flowers open; calyx-tube narrowly obconic, thickly coated with long matted pale hairs, the lobes slender, acuminate, obscurely glandular serrate, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 5-7; anthers dark rose color; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening about the middle of October, on slender slightly villose erect pedicels, in few-fruited clusters, short-oblong, full and rounded at the apex, slightly narrowed below, orange-red, lustrous, marked by pale dots, 1-1.3 cm long and 9-10 mm in diameter; calyx little enlarged, with a wide shallow cavity, and spreading and erect or recurved lobes dark red on the upper side below the middle; nutlets 3 or 4, rounded at the ends, rounded and only slightly grooved on the back, 6-7 mm long, and 4-5 mm wide.

A shrub sometimes 6-7 m high, with numerous stout gnarled stems covered with scaly bark, spreading and ascending branches, and slender nearly straight branchlets dark green and coated with matted white hairs when they first appear, becoming light orange color and glabrous during their first season and dull gray-brown the following year, and armed with occasional very slender nearly straight orange colored ultimately gray-brown spines 1-1.5 cm in length.

Borders of swamps and river bottoms in rich alluvial soil, near Belfast, Allegany co., Baxter and Dewing (♯ 220, type), May 24, September 17 and October 17, 1903.

Crataegus neo-baxteri n. sp. °

Leaves ovate to oval or rhombic, acuminate, cuneate and often unsymmetrical at the entire base, finely serrate above, with straight or incurved glandular teeth, and slightly divided above the middle into 4 or 5 pairs of small acuminate lateral lobes; nearly fully grown when the flowers open at the end of May and then thin, yellow-green, smooth and glabrous with the exception of a few hairs along the upper side of the midribs, and at maturity thin but firm in texture, yellow-green, glabrous, 4-4.5 cm long and 2-3.5 cm wide, with slender orange colored midribs and primary veins; petioles very slender, slightly wing-margined and sometimes minutely glandular at the apex, sparingly hairy along the upper side while young, becoming nearly glabrous, 2-2.5 cm in length. Flowers 1.8-2 cm in diameter, on very long slender glabrous pedicels, in wide lax 7-10-flowered corymbs, with linear glandular caducous bracts and bractlets, fading brown; calyx-tube narrowly obconic, glabrous, the lobes slender, acuminate, entire or occasionally obscurely dentate, glabrous, reflexed after anthesis; stamens 20, filaments persistent on the ripe fruit; anthers pink; styles 2 or 3, surrounded at the base by a narrow ring of pale hairs. Fruit ripening the end of September, on long very slender spreading reddish pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, rich deep red marked by large pale dots and covered by a thick glaucous bloom, 1-1.3 cm long and nearly as broad; calyx little enlarged, with a wide deep cavity, and spreading and recurved lobes often deciduous from the ripe fruit; flesh thin, yellow, dry and mealy; nutlets 3 or 4, gradually narrowed and rounded at the ends, slightly ridged on the back, 6-7 mm long, and about 4 mm wide.

A shrub 6-7 m high, with thin stems, spreading branches forming a broad symmetrical head, and slender glabrous branchlets light orange color when they first appear, becoming light chestnut-brown and lustrous in their first season and light gray-brown the following year, and armed with slender nearly straight red-brown spines 2-3 cm long.

Clay banks near Tuscarora, Livingston co., Baxter and Dewing (№ 251, type), May 30 and September 23, 1905.

With this species, described by its discoverers as being "as ornamental a species as we know in the genus," I am glad to associate the name of Mr M. S. Baxter, as the species which I named for him in the Proceedings of the Rochester Academy of Science, volume 4, page 107 was afterward found to have been described a few months

earlier by Ashe under another name from plants growing in Pennsylvania.

IX ANOMALAE

Fruit medium size, short-oblong, orange-scarlet; nutlets occasionally furnished with obscure ventral depressions; leaves usually cuneate at the base, thickish to subcoriaceous, scabrate above while young; petioles slender, elongated; flowers in many-flowered corymbs; anthers rose color or pink.

Stamens 20; leaves ovate to oval, divided above the middle into short broad lobes; fruit short-oblong.....1 *C. brachyloba*
Stamens 10

Leaves ovate to oval or suborbicular, often rounded at the base, nearly smooth at maturity; fruit subglobose.....2 *C. dunbari*

Leaves oval, scabrate above at maturity; fruit short-oblong.....
.....3 *C. asperifolia*

Stamens 5-15; leaves oval to obovate, scabrate above at maturity; fruit subglobose.....4 *C. scabrida*

Crataegus brachyloba n. sp.

Leaves ovate to oval, acuminate, concave-cuneate at the entire base, finely doubly serrate above, with straight or incurved glandular teeth, and divided usually only above the middle into 5 or 6 pairs of very short acuminate spreading lobes; slightly tinged with red when they unfold, roughened above by short white hairs and glabrous below, more than half grown when the flowers open during the last week of May and then membranaceous, yellow-green and scabrate on the upper surface and pale on the lower surface, and at maturity thick to subcoriaceous, dark blue-green, smooth and glabrous above, pale below, 5-7 cm long and 3.5-5 cm wide, with slender yellow midribs, and 5 or 6 pairs of thin primary veins; petioles slender, slightly wing-margined at the apex, glabrous, glandular often through the season, with minute scattered glands, and 2-3 cm in length; stipules linear, acuminate, glandular, fading brown, caducous; leaves on vigorous shoots subcoriaceous, long-pointed and acuminate at the apex, gradually narrowed and rounded at the base, coarsely serrate, with thick midribs and stout broadly winged conspicuously glandular rose colored petioles. Flowers 1.5 cm in diameter, on slender glabrous pedicels, in wide mostly 8-12-flowered corymbs, their lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from wide bases, entire, red and glandular at the acuminate apex, reflexed after anthesis; stamens 20, filaments often

persistent on the ripe fruit; anthers pink; styles 3-5, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening at the end of September, on slender reddish pedicels, in few-fruited erect clusters, short-oblong to obovate, orange-red, lustrous, marked by large pale lenticels, about 1 cm long and 8-10 mm wide; calyx little enlarged, with a narrow deep cavity, and closely appressed lobes dark red on the upper side below the middle; flesh thin, yellow-green, dry and mealy; nutlets usually 4, narrowed and acute at the ends or rounded at the base, rounded or ridged on the back, with a low broad ridge, light colored, 7-8 mm long, and about 4 mm wide.

A shrub 4-5 m high, with crowded slender fastigate light gray branches, the lower spreading, the upper ascending, and stout only slightly zigzag glabrous branchlets light orange-green when they first appear, becoming dull olive-brown and marked by small dark lenticels in their first season and dull gray-brown the following year, and armed with few stout nearly straight dull dark chestnut-brown spines 2.5-3 cm in length.

Buffalo, J. Dunbar (№ 41, type), May 28, June 12 and September 26, 1905.

Crataegus dunbari Sargent

Rochester Acad. Sci. Proc. IV. 126 (1903).

Buffalo, J. Dunbar (№ 43), September 26, 1905, May 28, 1906; also near Rochester, New York.

Crataegus asperifolia Sargent

Rhodora III. 31 (1901). Sargent and Peck, N. Y. State Mus. Bul. 105. 64 (1906).

Buffalo, J. Dunbar (№ 13), September 29, 1903, June 1 and September 20, 1904; (№ 46), May 28, 1906; (№ 43), September 26, 1905, May 28, 1906; also near Albany, New York and in western New England.

Crataegus scabrida Sargent

Rhodora III. 29 (1901); Silva N. Am. XIII. 133, t. 677.

Belfast, Allegany co., Baxter and Dewing (№ 210), May 29 and September 17, 1903, September 13, 1904, May 29 and September 19, 1905; also in western New England.

2 NUTLETS WITH LONGITUDINAL CAVITIES ON THE VENTRAL FACES

X TOMETOSAE

Fruit pyriform to subglobose or short-oblong, 1-1.5 cm in diameter, lustrous, orange or scarlet; nutlets 2 or 3, usually obtuse at the ends and prominently ridged on the back.

Leaves thin, with midribs and veins only slightly impressed on their upper surface; fruit obovate to short-oblong.

Stamens 20

Anthers yellow.....	1	<i>C. structilis</i>
Anthers pink.....	2	<i>C. finitima</i>
Stamens 10; anthers yellow	3	<i>C. venustula</i>

Leaves thick to subcoriaceous or coriaceous on vigorous shoots, with midribs and veins deeply impressed on their upper surface; fruit subglobose to short-oblong or ovate, scarlet.

Stamens 20

Anthers pink; leaves nearly glabrous at maturity; pedicels slender		
Leaves ovate to obovate; flowers 1-1.2 cm in diameter, on slightly villose pedicels.....	4	<i>C. succulenta</i>
Leaves oblong-ovate to oval, 1.6-1.8 cm in diameter, on densely villose pedicels.....	5	<i>C. admiranda</i>
Anthers rose color; leaves rhombic to oval or ovate, pubescent below at maturity; flowers on stout densely villose pedicels.....		
.....	6	<i>C. calvini</i>

Stamens 10; anthers yellow

Leaves rhombic to oval or obovate; flowers on short pedicels, in compact corymbs; calyx-lobes densely villose on the inner surface; fruit at least 1.2 cm in diameter, in drooping clusters; spines stout, nearly straight	7	<i>C. ferentaria</i>
Leaves broadly obovate to elliptic; flowers on long slender pedicels, in wide corymbs; calyx-lobes only slightly villose on the inner surface; fruit only 7-8 mm in diameter, in erect clusters; spines long, slender, usually curved.....	8	<i>C. macracantha</i>

Crataegus structilis Ashe

Jour. Elisha Mitchell Sci. Soc. XIX. 12 (1903). Gruber, Bucks County (Penn.) Nat. Sci. Club Proc. I. 3. Sargent, Acad. Sci. Phila. Proc. 656 (1905).

Seneca park, Rochester, B. H. Slavin, 1906; also in eastern Pennsylvania and in Ontario and southern Michigan.

Crataegus finitima n. sp.

Leaves rhombic to oblong-ovate, acuminate and long-pointed at the apex, gradually narrowed and concave-cuneate at the acuminate entire base, sharply doubly serrate above, with straight glandular teeth, and divided above the middle into 4 or 5 pairs of small acuminate lobes; nearly fully grown when the flowers open about the 20th of May and then membranaceous, bright yellow-green, scabrous and sparingly villose along the midribs above and pale and slightly villose below, and at maturity thin but firm in texture, light green, smooth, lustrous and glabrous on the upper surface, and pale blue-green and villose-pubescent on the lower surface especially on the slender yellow midribs and thin pale primary veins extending very obliquely to the points of the lobes, 7.5-9 cm long and 4.5-5 cm wide; petioles slender, broadly wing-margined at the apex, villose on the upper side while young, soon glabrous, occasionally glandular early in the season, with minute glands, often rose color in the autumn, 2-3 cm in length; stipules linear, only slightly glandular, fading rose color, caducous; leaves on vigorous shoots sometimes obovate and rounded at the apex, more coarsely serrate and 8-9 cm long and 6-7 cm wide. Flowers 1.6 cm in diameter, on slender pedicels thickly covered with matted pale hairs, in wide villose 20-30-flowered corymbs, the lower peduncles from the axils of upper leaves, their bracts and bractlets linear, glandular, fading brown, caducous; calyx-tube narrowly obconic, covered with long white hairs, the lobes long, slender, acuminate, minutely glandular serrate below the middle, slightly villose on both surfaces, reflexed after anthesis; stamens 20; anthers pink; styles 2 or 3, sur-rounded at the base by a narrow ring of pale tomentum. Fruit ripening about the first of October, on short erect reddish pedicels in many-fruited clusters, short-oblong to subglobose, full and rounded at the ends, orange-red, lustrous, marked by large pale dots, about 1 cm in diameter; calyx prominent, with a narrow shallow cavity, and elongated spreading narrow coarsely serrate lobes red toward the base and puberulous on the upper surface; flesh thick, yellow, sweet and succulent; nutlets 2 or 3, broad, rounded at the ends, ridged on the back, with a low narrow ridge, penetrated on the inner face by broad deep cavities, about 6 mm long, and 4 mm wide

A tree or arborescent shrub 6-7 m high, sometimes with a trunk 2-2.5 dm in diameter and 2 m long covered with dark bark divided into narrow ridges, large spreading branches, and stout slightly

zigzag glabrous branches light orange-green when they first appear, becoming bright chestnut-brown, very lustrous and marked by oblong pale lenticels in their first season and dull red-brown the following year, and armed with many stout slightly curved chestnut-brown or purplish shining spines 6-8 cm long and often pointing toward the base of the branch, persistent and branched on old stems.

Niagara Falls, C. S. Sargent (* 6, type), September 19, 1901, J. Dunbar, May 22, 1903, September 29, 1904, May 28, 1906.

Crataegus venustula n. sp.

Leaves oblong-ovate, acuminate, sharply or abruptly concave-cuneate at the entire base, coarsely doubly serrate above, with straight glandular teeth, and divided into 5 or 6 pairs of small acuminate spreading lateral lobes; nearly fully grown when the flowers open during the last week of May and then membranaceous, dark yellow-green and roughened above by short white hairs, and pale and slightly villose along the midribs below, and at maturity thin but firm in texture, dark green, smooth and lustrous on the upper surface, pale yellow-green on the lower surface, 5-7 cm long and 3.5-4.5 cm wide, with slender dark yellow midribs, and thin primary veins arching obliquely to the points of the lobes; petioles slender, wing-margined at the apex, sparingly glandular while young, villose on the upper side early in the season, soon glabrous, 2-2.5 cm in length; leaves on vigorous shoots broadly ovate to oval, mostly rounded at the base and often 8-9 cm long and 7-8 cm wide, with stout broadly winged glandular petioles. Flowers on slender glabrous pedicels, in wide usually 15-20-flowered thin-branched corymbs; calyx-tube narrowly obconic, glabrous, the lobes long, slender, acuminate, coarsely glandular serrate, glabrous on the outer, villose on the inner surface, reflexed after anthesis; stamens 10; anthers pale yellow; styles 2 or 3, surrounded at the base by a narrow ring of white tomentum. Fruit ripening early in October, on stout erect red pedicels, in drooping many-fruited clusters, subglobose, often slightly broader than high, crimson, lustrous, marked by large pale dots, about 1 cm in diameter; calyx prominent, with a broad deep cavity, and long closely appressed coarsely serrate persistent lobes villose on the upper side and red toward the base; flesh thick, yellow, sweet and succulent; nutlets 2 or 3, broad and rounded at the ends, rounded and ridged on the back, with a broad low grooved ridge, penetrated on the inner faces by deep cavities, 6-7 mm long, and about 4 mm wide.

A shrub 3-4 m high, with slender erect stems covered with dark scaly bark, small erect branches, and thin nearly straight branchlets light olive-green and lustrous in their first season and dull gray-brown the following year, and armed with stout straight or slightly curved light chestnut-brown shining spines 3-3.5 cm in length.

Niagara Falls, J. Dunbar (*14, type), June 1, 1904, May 28, 1906, J. Dunbar and C. S. Sargent, September 16, 1904.

Crataegus succulenta Link

Handbook n. 76 (1831). Sargent, Silva N. Am. XIII. 139, t. 131; Rochester Acad. Sci. Proc. IV. 133; Man. 497, f. 411; Acad. Sci. Phila. Proc. 675 (1905). Sargent & Peck, N. Y. State Mus. Bul. 105. 72 (1906).

Buffalo, J. Dunbar (*21), September 29, 1903, September 20, 1904, June 12, 1905; Niagara Falls, J. Dunbar (*29), June 12 and September 27, 1905, J. Dunbar (*7), May 22 and September 29, 1903; also eastern New York to southern New England and Michigan.

Crataegus admiranda n. sp.

Leaves oblong-obovate to oval, acute or acuminate at the apex, concave-cuneate and gradually narrowed to the long entire base, finely doubly serrate above, with straight glandular teeth, and very slightly divided above the middle into 4 or 5 pairs of small acuminate spreading lobes; nearly half grown when the flowers open during the first week of June and then thin, yellow-green, lustrous and roughened above by short white hairs and pale and villose below especially along the midribs and veins, and at maturity dark yellow-green, lustrous, smooth and glabrous on the upper surface, pale and almost glabrous on the lower surface, 6-8 cm long and 4-5 cm wide, with stout midribs often rose color in the autumn, and slender primary veins extending obliquely to the points of the lobes; petioles slender, slightly wing-margined sometimes to the middle, villose on the upper side while young, becoming almost glabrous, usually rose color in the autumn, 1.5-1.8 cm in length; leaves on vigorous shoots subcoriaceous, broadly ovate to oval, gradually narrowed and rounded at the base, more coarsely serrate, often 7-8 cm long and 6-7 cm wide. Flowers 1.6-1.8 cm in diameter, on long slender pedicels coated with matted pale hairs, in wide usually 18-20-flowered hairy corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, densely villose, the lobes slender, acuminate, coarsely glandular serrate, villose on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens

20; anthers pale pink; styles 2 or 3. Fruit ripening early in October, on stout villose erect or spreading reddish pedicels, in few-fruited clusters, subglobose to short-oblong or ovate, bright cherry-red, lustrous, marked by pale dots, 1.2-1.4 cm in diameter; calyx little enlarged, with a deep narrow cavity, and spreading and appressed lobes often deciduous from the ripe fruit; flesh yellow, soft and succulent; nutlets 2 or 3, gradually narrowed and rounded at the ends, ridged on the back, with a broad slightly grooved ridge, penetrated on the inner surface by large shallow cavities, 7-8 mm long, and 5-6 mm wide.

An arborescent shrub 3-4 m high, with stems covered with dark gray bark, spreading branches forming a round-topped open head, and stout nearly straight branchlets, light orange-green, slightly hairy and marked by large lenticels when they first appear, becoming light red-brown and lustrous in their first season and dull dark reddish brown the following year and armed with stout nearly straight chestnut-brown or purplish shining spines 5-6 cm long, becoming branched and very abundant on old stems.

Niagara Falls, J. Dunbar (№2), October 7, 1902, June 7 and September 18, 1906.

Crataegus calvini n. sp.

Leaves rhombic to oval or ovate, acuminate or acute at the apex, gradually narrowed and concave-cuneate or rounded at the entire base, coarsely doubly serrate above, with straight glandular teeth, and very slightly divided above the middle into 4 or 5 pairs of small acuminate lobes; more than half grown when the flowers open about the first of June and then thin, yellow-green and slightly roughened above by short white hairs and pale and pubescent below, and at maturity subcoriaceous, dark green, smooth, glabrous and lustrous on the upper surface, paler and pubescent on the lower surface principally on the stout rose colored midribs and slender primary veins extending obliquely to the points of the lobes, 5-7 cm long and 4-5 cm wide; petioles stout, narrowly wing-margined sometimes to the middle, villose-pubescent on the upper side while young, becoming glabrous, rose colored in the autumn, 1-1.5 cm in length; leaves on vigorous shoots broadly ovate to oval or rarely obovate, short-pointed and acute at the apex, more coarsely serrate, often 9-10 cm long and 7-8 cm wide. Flowers 1.2-1.5 cm in diameter, on short stout densely villose pubescent pedicels, in broad many-flowered thick-branched hairy corymbs, with foliaceous

oblong-obovate acuminate glandular serrate bracts and bractlets fading brown and persistent until the flowers open, the long lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, thickly coated with matted pale hairs, the lobes abruptly narrowed from broad bases, wide, acuminate, laciniately glandular serrate, sparingly hairy toward the base on the outer surface, slightly villose on the inner surface, reflexed after anthesis; stamens 20; filaments often persistent on the ripe fruit; anthers light rose color; styles 2, surrounded at the base by a broad ring of tomentum. Fruit ripening late in September, on slender reddish hairy pedicels, in wide lax many-fruited drooping clusters, oval to ovate, full and rounded at the ends, scarlet, lustrous, marked by large pale dots; calyx prominent, with a wide deep cavity, and closely appressed persistent lobes dark red above at the base and villose on the upper surface; flesh thin, yellow, sweet and succulent; nutlets 2, full and rounded at the base, narrow and rounded at the apex, slightly ridged on the back, with a narrow grooved ridge, deeply penetrated on the inner face by long wide cavities, about 7 mm long, and 4 mm wide.

A shrub 2.5-3 m high, with numerous stems covered with dark gray bark, spreading branches, stout zigzag glabrous branchlets light yellow-green when they first appear, becoming bright chestnut-brown, very lustrous and marked by large pale lenticels in their first season and dull red-brown the following year, and armed with nearly straight stout or slender purplish shining spines 3-4 cm long.

Rich alluvial soil, near Canandaigua, Ontario co., C. C. Laney (* A. type), October 14, 1901, C. S. Sargent, October 1, 1902, M. S. Baxter, May 30 and September 20, 1903.

This handsome species is named for Mr Calvin Cook Laney, superintendent of the parks of the city of Rochester, New York, a keen and enthusiastic student of *Crataegus*, by whom it was first noticed in 1901.

Crataegus ferentaria Sargent

Rochester Acad. Sci. Proc. IV. 135 (1903); *Rhodora* VII. 184.

Buffalo, J. Dunbar (* 15), June 1, 1904, May 28 and June 12, 1905; also near Rochester and Utica, New York and eastward to New England.

Crataegus macracantha Koehne

Deutsche Dendr. 236 (1893). Sargent, Silva N. Am. XIII. 147, t. 689;
Rochester Acad. Sci. Proc. IV. 135; Man. 501, f. 415.

Crataegus glandulosa macracantha Lindley, Bot. Reg. XXII.
t. 1912 (1836).

Crataegus coccinea var. *macracantha* Dudley, Cornell Univ.
Bul. II. 33 (1886).

Niagara Falls, J. Dunbar (№28), June 12 and September 28,
1905; also near Rochester, New York and eastward to New
England.

NOTES ON A COLLECTION OF CRATAEGUS MADE BY
MR G. D. CORNELL IN THE NEIGHBORHOOD OF
COOPERS PLAINS, STEUBEN COUNTY, NEW YORK.

BY C. S. SARGENT

PUNCTATAE

Crataegus desueta n. sp.

Leaves rhombic to slightly obovate, acuminate at the ends, finely doubly serrate, with straight glandular teeth, and divided above the middle into 5 or 6 pairs of slender acuminate spreading or recurved lobes; when they unfold tinged with red and covered on the upper surface with long soft white hairs, more than half grown when the flowers open about the middle of May and then very thin, light yellow-green and nearly glabrous above and pale and glabrous below, and at maturity thin but firm in texture, dark yellow-green, smooth, glabrous and lustrous on the upper surface, pale yellow-green on the lower surface, 5-6 cm long and 3-4 cm wide, with slender prominent yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly hairy on the upper surface, 1.5-2.5 cm in length; leaves on vigorous shoots oval to obovate, usually abruptly long-pointed at the apex, concave-cuneate at the base, more coarsely serrate, more deeply lobed and often 6-7 cm long and 4.5-5 cm wide. Flowers about 1.5 cm in diameter, on slender slightly villose pedicels, in lax mostly 8-10-flowered corymbs, the much elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes long, slender, acuminate, entire or occasionally glandular dentate near the base, glabrous, reflexed after anthesis; stamens 10; anthers rose color; styles 2-4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening late in September, on long slender glabrous or slightly hairy drooping pedicels, in few-fruited clusters, short-oblong full and rounded at the ends, scarlet, lustrous, marked by small pale dots, 1-1.2 cm long, 8-10 mm in diameter; calyx prominent, with a deep narrow cavity, and much elongated erect and incurved nearly entire persistent lobes dark red on the upper side below the middle; flesh thin, dark yellow, dry and mealy; nutlets usually 3 or 4, narrowed and acute at the ends or rounded at the apex, rounded and only slightly grooved on the back, 6.5-7 mm long, and 4-4.5 mm wide.

A shrub not more than 4 m high, with numerous small erect or slightly spreading stems covered with dark gray bark, small ascending branches and slender nearly straight glabrous branchlets, dark orange-green and marked by pale lenticels when they first appear, becoming bright chestnut-brown in their first season and dull gray-brown the following year, and armed with slender nearly straight chestnut-brown shining spines 4.5-5.5 cm long, and often persistent and becoming stout and dark gray on old stems.

Rich moist hillsides, Coopers Plains, G. D. Cornell (№ 23, type), September 21, 1905, May 27 and September 24, 1906, (№ 23A), September 23, 1905, May 17, 1906, (№ 9), September 17, 1905, May 28, 1906.

PRUINOSAE

Stamens 20

Anthers rose color or pink

Crataegus beata Sargent

Rochester Acad. Sci. Proc. IV. 97 (1903).

Hillsides, Coopers Plains, G. D. Cornell (№ 102), September 1906, June 1907; also valley of the Genesee river, New York.

Crataegus arcana Beadle

Bilt. Bot. Studies I. 122 (1902). Sargent, Bot. Gazette XXXV. 101; Acad. Sci. Phila. Proc. 588 (1905).

Rich hillsides, Coopers Plains, G. D. Cornell (№ 28), September 30, 1906, May 25 and October 28, 1907; also Niagara Falls, New York and eastern Pennsylvania to western North Carolina.

Crataegus pellecta n. sp.

Glabrous with the exception of the hairs on the upper side of the young leaves and petioles. Leaves ovate, acuminate, rounded or abruptly cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided above the middle into 3 or 4 pairs of small spreading acuminate lobes; about half grown when the flowers open at the end of May or early in June and then thin, light yellow-green above and slightly hairy along the upper side of the midribs and paler below, and at maturity thin, dull bluish green, 5-6 cm long and 3.5-4.5 cm wide, with thin prominent midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly villose on the upper side while

young, 2.5-3 cm in length; leaves on vigorous shoots broadly ovate, usually rounded at the base, more deeply lobed, and often 5-6 cm long and wide. Flowers 2-2.4 cm in diameter, on long slender pedicels, in mostly 4-10-flowered lax corymbs, the lower peduncles from the axils of upper leaves; calyx-tube broadly obconic, the lobes gradually narrowed from broad bases, short, acuminate, entire or occasionally dentate near the middle, reflexed after anthesis; stamens 20; anthers faintly tinged with pink; styles 3-5. Fruit ripening at the end of October, on stout erect pedicels, in few-fruited clusters, short-oblong to subglobose or often rather broader than long, slightly angled toward the base, dark red, pruinose, 1.2-1.4 cm in diameter; calyx prominent, with a broad deep cavity tomentose in the bottom, and small spreading persistent lobes; flesh thin, tinged with red, dry and mealy; nutlets 3-5, acute at the ends or rounded at the apex, rounded and slightly grooved on the back, 6.5-7 mm long, and about 5 mm wide.

A shrub sometimes 3-4 m high, with numerous small stems, ascending branches, and slender nearly straight branchlets dark orange-green tinged with red when they first appear, becoming dark chestnut-brown, lustrous and marked by small dark lenticels in their first season and dull reddish brown the following year, and armed with stout slightly curved bright chestnut-brown shining spines 3-4 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (№ 86, type), October 20, 1906, June 8, 1907.

Crataegus amoena Sargent

Rich hillsides, Coopers Plains, G. D. Cornell (№97), October 28, 1906, June 5, 1907; (№ 38), October 1, 1905, June 2, 1907; (№89), October 28, 1906, June 8, 1907; also at Niagara Falls, New York.

Crataegus gracilis Sargent

Rich hillsides, Coopers Plains, G. D. Cornell (№40), May 26, 1906, June 1907.

Crataegus ramosa n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves oblong-ovate, acuminate, rounded or abruptly cuneate at the broad base, finely doubly serrate, and divided into 3 or 4 pairs of short broad acuminate lobes; when they unfold deeply tinged with red, villose above and furnished below with axillary tufts of

short hairs; more than half grown when the flowers open at the end of May or early in June and then thin, yellow-green, glabrous and paler below than above, and at maturity thin but firm in texture, dark yellow-green, smooth and lustrous on the upper surface, paler on the lower surface, 4.5-6 cm long and 3.5-5 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, conspicuously glandular while young, with usually deciduous glands, 2-2.5 cm long; leaves on vigorous shoots subcoriaceous, ovate, acuminate, rounded or slightly cordate at the base, coarsely serrate, deeply lobed, often 7-8 cm long and wide, with stout broad-winged coarsely glandular petioles, and linear falcate glandular caducous stipules. Flowers 2-2.8 cm in diameter, on long slender pedicels, in 5-8-flowered compact corymbs, with linear-obovate to linear bracts and bractlets fading brown and often persistent until the flowers open, the long lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base, long, slender, acuminate, red and glandular at the apex, entire or irregularly glandular dentate, reflexed after anthesis; stamens 20; anthers pink; styles 3-5, surrounded at the base by a narrow ring of pale tomentum. Fruit on long slender drooping red pedicels, in few-fruited clusters, ripening and falling at the end of October, short-oblong to oval, full and rounded at the ends, red, pruinose, becoming lustrous, marked by large dots, 1.2-1.3 cm long, 1-1.1 cm in diameter; calyx prominent, with a short tube, a wide deep cavity, broad and tomentose in the bottom, and small spreading persistent lobes; flesh green, dry and hard; nutlets 3-5, narrowed and acute at the ends or rounded at the base, ridged on the back, with a high narrow slightly grooved ridge, 7-7.5 mm long, and 4-4.5 mm wide.

A shrub 3 m high, with small intricately branched stems covered with light gray bark, small ascending branches forming a compact round-topped head, and stout straight or slightly zigzag branchlets deeply tinged with red when they first appear, becoming light chestnut-brown, lustrous and marked by numerous small dark lenticels in their first season and pale gray-brown the following year, and armed with slender straight light chestnut-brown shining spines 3.5-4 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (No. 98, type), October 21, 1906, June 5, 1907.

Anthers yellow

Crataegus cognata Sargent

Rhodora V. 58 (1903).

Hillsides, Coopers Plains, G. D. Cornell (№ 6, 43 and 103), September and October 1905, May 1906; also southern Ontario, through western New York to western and southern New England.

Crataegus rubro-lutea n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves ovate to oval, acuminate, rounded or cuneate at the entire base, finely doubly serrate above, with straight or incurved glandular teeth, and slightly divided above the middle into 3 or 4 small acuminate spreading lobes; bronze color and roughened above by short white hairs and furnished below with axillary tufts of hairs when they unfold, more than half grown when the flowers open late in May or early in June and then thin, yellow-green, nearly glabrous and paler below than above, and at maturity thin but firm in texture, dull yellow-green, smooth and glabrous on the upper surface, pale yellow-green on the lower surface, 4-5 cm long and 3.5-4 cm wide, with prominent yellow midribs, and primary veins still furnished with a few axillary hairs; petioles slender, slightly wing-margined at the apex, glandular with small dark often persistent glands, 1.5-2 cm in length; stipules linear, green, glandular-serrate, caducous; leaves on vigorous shoots subcoriaceous, ovate, rounded or subcordate at the broad base, often 4.5-5.5 cm long and wide and often broader than long. Flowers 1.8-2.2 cm in diameter, on long slender pedicels, in wide, lax, mostly 6-10-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base, wide, short, acuminate and glandular at the apex, entire or minutely glandular dentate, reflexed after anthesis; stamens 20; anthers pale yellow; styles 4 or 5. Fruit on long slender red drooping pedicels, in few-fruited clusters, ripening and falling from the middle to the end of October, subglobose and often broader than high, or obovate and abruptly narrowed at the base, slightly angled, light orange-red, lustrous, marked by large dark dots, 1.2-1.5 cm in diameter; calyx prominent, with a short tube, a broad deep cavity tomentose in the bottom, and small spreading slightly incurved appressed lobes; flesh hard, mealy, light orange-red; nutlets 4 or 5, narrowed and acute at the ends, ridged on the back, with a high narrow often deeply grooved ridge, 6-6.5 mm long, and 4-4.5 mm wide.

A shrub 3-4 m high, with numerous small stems covered with dark gray bark, spreading and ascending branches forming an open head, and slender nearly straight branchlets, light green when they first appear, becoming light chestnut-brown, lustrous and marked by small dark lenticels in their first season and dull red-brown the following year, and armed with numerous stout or slender, straight or slightly curved chestnut-brown shining spines 1-1.5 cm long.

Hillsides, Coopers Plains, G. D. Cornell (✱ 96, type), October 21, 1906, June 5, 1907.

Stamens 15-20; anthers pale rose color.

Crataegus macrocalyx n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves ovate, acuminate, rounded or cuneate at the base, finely and often doubly serrate above, with straight glandular teeth, and divided into 4 or 5 pairs of short broad acuminate spreading lobes; sometimes deeply 3-lobed on stump shoots; tinged with red and setose above when they unfold, nearly fully grown when the flowers open late in May and then very thin, yellow-green and nearly glabrous, and at maturity thin, yellow-green and scabrate on the upper surface, pale bluish green on the lower surface, 5-6 cm long and 4.5-5 cm wide, with thin rose colored midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular, with minute often persistent glands, 2-3 cm in length; stipules linear to linear-falcate, acuminate, glandular, fading brown, caducous. Flowers 1.8-2.5 cm in diameter, on long slender pedicels, in narrow mostly 5-7-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube broadly obconic, the lobes separated by wide sinuses, gradually narrowed from the base, short, slender and glandular at the apex, entire or occasionally dentate, reflexed after anthesis; stamens 15-20; anthers pale rose color; styles 3 or 4, surrounded at the base by a narrow ring of pale hairs. Fruit ripening the end of October, on slender spreading red pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, slightly angled, red, pruinose, marked by small pale dots, 1-1.2 cm in diameter; calyx very prominent, with a broad deep cavity narrow and tomentose in the bottom, and spreading lobes dark red on the upper side below the middle; flesh green, dry and mealy; nutlets 3 or 4, acute at the ends, rounded and slightly grooved or irregularly ridged on the back, 6.5-7 mm long, and 4-4.5 mm wide.

A shrub 2-3 m high, with stems covered with dark gray bark, ascending branches and slender slightly zigzag branchlets dark green and marked by pale lenticels when they first appear, becoming bright chestnut-brown and lustrous in their first season and dull reddish brown the following year, and armed with slender straight dark chestnut-brown shining ultimately dull gray spines 1.5-2 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (№41, type), May 28 and October 3, 1906.

Stamens 10 or less

Anthers rose color

Leaves smooth

Crataegus numerosa n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves. Leaves oblong-ovate, long-pointed and acuminate at the apex, abruptly concave-cuneate or occasionally rounded at the entire base, coarsely often doubly serrate above, with straight glandular teeth, and divided into 4 or 5 pairs of short broad acuminate lateral lobes; bronze color when they unfold, about one third grown when the flowers open at the end of May and then very thin, dark yellow-green, smooth, lustrous and slightly hairy along the midribs above and glaucous below, and at maturity thin, dull yellow-green on the upper surface, very pale bluish green on the lower surface, 5-6 cm long and 4-5 cm wide, with slender yellow midribs, and thin primary veins arching obliquely to the points of the lobes; turning yellow in autumn before falling; petioles slender, slightly wing-margined at the apex, pubescent on the upper side while young, soon becoming glabrous, 2.5-3.5 cm in length. Flowers 1.5-2 cm in diameter, on slender pedicels, in small mostly 5-8-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes separated by wide sinuses, short, broad, glandular and red at the acuminate apex, entire or minutely glandular dentate near the base, reflexed after anthesis; stamens 10; anthers rose color; styles 3-5, usually 3 or 4, surrounded at the base by a narrow ring of pale hairs. Fruit ripening the middle of October, on long drooping pedicels, in few-fruited clusters, obovate, rounded at the apex, abruptly narrowed and often mammillate at the base, scarlet, pruinose, marked by large pale dots, about 1 cm long and 9-10 mm in diameter; calyx little enlarged, with a short tube, a broad deep cavity tomentose in

the bottom, and small spreading lobes red on the upper side; flesh yellow, thin and dry; nutlets 3 or 4, acute at the ends or slightly narrowed and rounded at the apex, ridged on the back, with a low grooved ridge, 5-5.6 mm long, and 4-4.5 mm wide.

A narrow shrub sometimes 4 m high, with stems covered with gray-green scaly bark, small ascending branches, and slender slightly zigzag branchlets deeply tinged with red when they first appear, becoming bright chestnut-brown, lustrous and marked by pale lenticels in their first season and dull reddish brown the following year, and armed with stout straight or slightly curved chestnut-brown shining spines 2-3.5 cm long, very numerous and becoming branched on old stems and branches.

Rich hillsides, Coopers Plains, common; G. D. Cornell (*32, type), September 21, 1905, May 26, 1907; (*87), October 21, 1906.

Crataegus uncta n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves ovate, acuminate, rounded at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly divided above the middle into 2 or 3 pairs of small acuminate spreading lobes; when they unfold bronze color and slightly hairy on the upper surface and in the axils of the veins below, nearly fully grown when the flowers open at the end of May and then very thin, nearly glabrous, smooth and dark yellow-green above and pale below, and at maturity thin but firm in texture, dark yellow-green, 4-4.5 cm long and 3-3.5 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, pubescent on the upper side while young, soon becoming glabrous, occasionally glandular, 1.5-2 cm in length; leaves on vigorous shoots thicker, often truncate at the broad base, more coarsely serrate and more deeply lobed, 6-7 cm long and 5-6 cm wide. Flowers 1.5-2 cm in diameter, on long slender pedicels, in small mostly 4-8-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes short, broad, acuminate and glandular at the apex, coarsely glandular serrate, reflexed after anthesis; stamens 8-10; anthers slightly tinged with rose color; styles 4 or 5, surrounded at the base by a broad ring of white tomentum. Fruit ripening the end of September, on long slender drooping pedicels, in few-fruited clusters, broader than long, truncate at the wide apex, slightly narrowed to the base; red, lustrous, marked by large pale dots, 1.2-1.4 cm in diameter; calyx little enlarged, with a deep narrow cavity, and small spreading or incurved persistent

lobes; flesh thick, deeply tinged with red; nutlets 4 or 5, acute at the base, abruptly narrowed and rounded or acute at the apex, rounded and grooved or irregularly ridged on the back, about 7 mm long, and 3.5-4 mm wide.

A shrub 3-4 m high, with stems covered with dark gray-brown bark, ascending branches and stout nearly straight branchlets dark orange-green and marked by large pale lenticels when they first appear, becoming dark chestnut-brown and lustrous in their first season and dull gray-brown the following year, and armed with stout straight purplish shining spines 3.5-4 cm long.

Hillsides, Coopers Plains, G. D. Cornell (№ 61, type), May 26 and September 21, 1906.

Crataegus plana Sargent

Hillsides, Coopers Plains, G. D. Cornell (№ 2), September 30, 1905, May 25, 1906, (№ 36), October 1, 1905, May 26, 1906, (№ 101), September 21, 1906, June 5, 1907; also in the Genesee valley and near Buffalo, New York.

Crataegus dissona Sargent

Rhodora V. 60 (1903); Bot. Gazette XXXV. 379; Acad. Sci. Phila. Proc. 601 (1905).

Coopers Plains, G. D. Cornell (№ 4), October 8, 1905, May and October 1906 (№ 53), October 1, 1905, May 26, 1906; also Illinois to western and southern New England and to eastern Pennsylvania.

Leaves scabrate

Crataegus ovatifolia n. sp.

Leaves ovate, long-pointed and acuminate at the apex, gradually or abruptly narrowed and concave-cuneate at the entire base, finely often doubly serrate above, with straight glandular teeth, and slightly divided above the middle into 3 or 4 pairs of narrow acuminate spreading lobes; deeply tinged with red and covered by soft white hairs on the upper surface when they unfold, about half grown when the flowers open at the end of May and then very thin, yellow-green above and glabrous below, and at maturity thin, dark yellow-green, slightly hairy and scabrate on the upper surface, pale bluish green on the lower surface, 4-5 cm long and 3-3.5 cm wide, with thin midribs and primary veins; petioles very slender, slightly wing-margined at the apex, sparingly villose on the upper side while

young, soon becoming glabrous, glandular, with minute generally deciduous glands, 2-2.5 cm in length; leaves on vigorous shoots thicker, rounded or abruptly cuneate at the base, more coarsely serrate and more deeply lobed, often 6 cm long and 4-4.5 cm wide. Flowers 1.7-2 cm in diameter, on long slender glabrous pedicels, in compact mostly 5-10-flowered corymbs, the lower peduncles from the axils of the upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from wide bases, long, slender, acuminate, entire or minutely glandular serrate, glabrous, reflexed after anthesis; stamens 10; anthers red; styles 3 or 4, surrounded at the base by a narrow ring of pale hairs. Fruit ripening late in October and often persistent during the winter, on slender drooping reddish pedicels, in few-fruited clusters, obovate, full and rounded at the apex, gradually narrowed at the base, scarlet, pruinose, marked by large dark dots, 1-1.2 cm long, 8-10 mm in diameter; calyx prominent, with a broad deep cavity wide and tomentose in the bottom, and spreading persistent lobes dark red on the upper side below the middle; flesh thin, greenish yellow, rather juicy; nutlets 3 or 4, acute at the ends, ridged on the back, with a broad low grooved ridge, 6-6.5 mm long, and 4-4.5 mm wide.

A shrub 3-4 m high, with numerous small stems covered with ashy gray bark and often spreading into large thickets, ascending branches, and slender nearly straight branchlets dark orange-green and marked by pale lenticels when they first appear, becoming bright chestnut-brown and lustrous in their first season and dull red-brown the following year, and armed with slender straight or slightly curved dark chestnut-brown shining spines 3-4.5 cm long, often persistent and becoming compound on old stems.

Coopers Plains, G. D. Cornell (№ 1, type), September 21, 1905, May 27, 1906 (№ 24), May 24 and September 21, 1905 (№ 33), October 1906, May 1907.

Crataegus barryana Sargent

Hillsides, Coopers Plains, G. D. Cornell (№ 27), September 21, 1905, May 25 and October 14, 1906, May and October 1907; also near Rochester, New York.

Crataegus acerba n. sp.

Leaves ovate to rhombic, acuminate at the apex, cuneate at the entire base, sharply often doubly serrate above, with straight or

incurved glandular teeth, and divided usually above the middle into 3 or 4 pairs of narrow acuminate spreading lobes; deeply tinged with red, strigose above and glabrous below when they unfold, about half grown when the flowers open late in May or early in June, and then thin, yellow-green and scabrate on the upper surface and paler on the lower surface, and at maturity thin but firm in texture, dark dull bluish green and still slightly roughened above and paler below, 4-5 cm long and 3.5-4 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, pubescent on the upper side while young, soon becoming glabrous, glandular with minute usually deciduous glands 2-2.5 cm in length; stipules linear to linear-obovate, glandular, green, caducous; leaves on vigorous shoots thicker, broadly ovate, rounded, truncate or cuneate at the base, coarsely serrate, more deeply lobed and often 6-7 cm long and broad, with stout conspicuously glandular petioles 2.5-3 cm in length. Flowers 1.6-1.9 cm in diameter, on long slender glabrous pedicels, in small mostly 5-9-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes slender, glandular at the acuminate apex, minutely glandular serrate near the middle, glabrous, often bright red, reflexed after anthesis; stamens 5-7; anthers light rose color; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit falling late in October without becoming soft, on stout drooping pedicels, in few-fruited clusters, full and rounded at the apex, abruptly narrowed at the base, crimson, pruinose, marked by small pale dots, 1-1.2 cm long and 9-10 mm in diameter; calyx little enlarged, without a tube, with a deep narrow cavity tomentose in the bottom, and small spreading and incurved lobes dark red on the upper side; flesh green, dry and hard; nutlets 3 or 4, acute at the ends, rounded and grooved or ridged, with a high narrow ridge on the back, 6-6.5 mm long, and 4-4.5 mm wide.

A dense shrub 3-4 m high, with stems covered with dark gray bark, ascending branches forming a narrow compact head, and stout slightly zigzag glabrous branchlets deeply tinged with red when they first appear, becoming light chestnut-brown, lustrous and marked by dark lenticels in their first season and dull gray-brown the following year, and armed with stout straight or slightly curved chestnut-brown shining spines 3-3.5 cm long.

Coopers Plains, G. D. Cornell (No. 84, type), October 7, 1906, June 3, 1907.

Crataegus dissociabilis n. sp.

Leaves broadly ovate to triangular, acuminate, rounded, truncate or abruptly cuneate at the wide entire base, finely often doubly serrate above, with small glandular teeth, and slightly divided usually only above the middle into 3 or 4 pairs of small acuminate lobes; when they unfold deeply tinged with red and covered on the upper surface with soft white hairs and slightly hairy in the axils of the veins below, nearly fully grown when the flowers open late in May or early in June, and then thin, light yellow-green, scabrate and slightly hairy on the midribs above, and at maturity thin, yellow-green, slightly roughened and lustrous on the upper surface, pale bluish green on the lower surface, 3.5-4 cm long and 3-4 cm wide, with thin midribs, and primary veins arching obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, glandular while young, with mostly deciduous glands, 1.5-3 cm in length. Flowers 1.5-2 cm in diameter, on slender glabrous pedicels, in compact mostly 5-10-flowered corymbs, with linear-obovate to linear glandular bracts and bractlets fading brown and deciduous before the flowers open, the long lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from the base, slender, glabrous, red and glandular at the acuminate apex, irregularly and coarsely glandular serrate usually only below the middle, reflexed after anthesis; stamens 5-10; anthers pale rose color; styles 3 or 4. Fruit ripening and falling late in September, on long slender drooping pedicels, in few-fruited clusters, obovate, full and rounded at the apex, abruptly narrowed at the base, light cherry-red, very pruinose, marked by large pale dots, about 1 cm long and 9 mm in diameter; calyx little enlarged, without a tube, with a wide deep cavity narrow in the bottom, and small spreading lobes dark red on the upper side; flesh pink, sweet and juicy; nutlets 3 or 4, acute or acuminate at the base, gradually narrowed and rounded at the apex, ridged on the back, with a broad deeply grooved ridge, 6-7 mm long, and 4-4.5 mm wide.

An arborescent shrub 3-4 m high, with a short stem sometimes 1.5 dm in diameter, covered near the ground with dark scaly bark, small ascending and spreading branches, and slender nearly straight glabrous-branchlets, dark orange-green tinged with red when they first appear, becoming dark chestnut-brown, lustrous and marked by pale lenticels in their first season and dull red-brown the follow-

ing year, and armed with slender slightly curved purple shining spines 2.5-4 cm long.

Coopers Plains, G. D. Cornell (№88, type), September 22, 1906, June 8, 1907.

Anthers pale yellow

Crataegus inusitula Sargent

Rich hillsides, Coopers Plains, G. D. Cornell (№57), May 26 and October 14, 1906, May and September 1907; also at Chapinville, Ontario co.

The Coopers Plains plant differs from the type of *Crataegus inusitula* in the fewer hairs on the pedicels, which are sometimes nearly glabrous.

TENUIFOLIAE

Stamens 10 or less; anthers rose color, red or pink

Crataegus ignea n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves and calyx-lobes. Leaves oblong-ovate, long-pointed and acuminate at the apex, rounded or abruptly concave-cuneate at the entire base, finely often doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of small acuminate spreading lateral lobes; deeply tinged with red and covered on the upper surface with soft white hairs when they unfold, more than half grown when the flowers open at the end of May or early in June, and then thin, yellow-green, still slightly hairy above and pale below, and at maturity thin but firm in texture, dull yellow-green and slightly roughened on the upper surface, pale yellow-green on the lower surface, 4-5 cm long and 2.5-4 cm wide, with thin yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly villose while young, soon becoming glabrous, occasionally glandular, often dark rose color in the autumn, 1.5-2.5 cm in length; stipules linear to lanceolate, glandular, with bright red glands, green, caducous; leaves on vigorous shoots thick, ovate, acute, rounded, truncate or subcordate at the broad base, more coarsely serrate, more deeply lobed, and often 6-7 cm long and 5-6 cm wide, with thick conspicuously glandular petioles. Flowers 1.5-1.7 cm in diameter, on long slender pedicels, in compact mostly 6-12-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes slender, red and acuminate at the apex, very

minutely glandular serrate or entire, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 7-10; anthers dark rose color; styles 2-4, usually 3. Fruit ripening at the end of September, on slender drooping or spreading reddish pedicels, in few-fruited clusters, short-oblong, truncate at the ends, scarlet, lustrous, marked by small pale dots, about 1 cm long and 8-9 mm in diameter; calyx little enlarged, with a deep narrow cavity, and spreading slightly incurved persistent lobes; flesh thick, pale yellow; nutlets 3 or 4, narrowed and rounded at the ends, ridged on the back, with a broad low grooved ridge, about 6 mm long, and 4.5-5 mm wide.

A shrub sometimes 3-4 m high, with stems covered with ashy gray bark, ascending branches forming a narrow rather open head, and extremely slender slightly zigzag branchlets deeply tinged with red when they first appear, becoming dark chestnut-brown, lustrous and marked by small pale lenticels in their first season and dull red-brown the following year, and armed with stout straight or slightly curved light chestnut-brown shining spines 2.5-4 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (♯83, type), September 22, 1906, June 5, 1907.

Crataegus recta n. sp.

Glabrous with the exception of the hairs on the upper side of the young leaves. Leaves ovate, long-pointed and acuminate at the apex, rounded or abruptly concave-cuneate at the base, finely often doubly serrate, with straight or incurved glandular teeth, and slightly divided into 5 or 6 pairs of small acuminate spreading lobes; deeply tinged with red and roughened on the upper surface by short white hairs when they unfold, more than half grown when the flowers open at the end of May or early in June, and then thin, yellow-green, still slightly hairy especially along the midribs above, and at maturity thin, yellow-green, lustrous and slightly roughened on the upper surface, paler on the lower surface, 5-6 cm long and 3.5-4.5 cm wide, with slender midribs and thin primary veins extending obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, very glandular while young, the glands generally caducous, 1.5-2.5 cm in length; leaves on vigorous shoots coarsely serrate and sometimes 8-9 cm long and 5-6 cm wide, with foliaceous lunate persistent stipules. Flowers 1.5-1.8 cm in diameter on long slender pedicels, in compact mostly 5-12-flowered corymbs, the elongated lower peduncles from the axils of upper

leaves; calyx-tube narrowly obconic, gradually narrowed from the base, the lobes long, slender, acuminate, deep rose color above the middle, glandular serrate, reflexed after anthesis; stamens 5-9; anthers light rose color; styles 2 or 3. Fruit ripening the middle of September, on slender drooping pedicels, in few-fruited clusters, short-oblong, truncate at the apex, rounded and depressed at the base, scarlet, lustrous, marked by pale dots, 9-10 mm long and 8-9 mm in diameter; calyx little enlarged, with a deep narrow cavity tomentose in the bottom, and small spreading or incurved persistent lobes; flesh thin, light orange color; nutlets 2 or 3, gradually narrowed and rounded at the ends, ridged on the back, with a low broad grooved ridge, about 5 mm long and 4 mm wide.

A narrow shrub sometimes 4 m high, with fastigiately erect stems covered with dark green bark scaly near the ground, erect branches and stout nearly straight branchlets dark green when they first appear, becoming light chestnut-brown, lustrous and marked by large pale lenticels in their first season and dull reddish brown the following year, and armed with stout straight or slightly curved light chestnut-brown ultimately gray spines 2.5-3.5 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (*85, type), September 16, 1906, June 3, 1907, (*81), June and September 1907.

Crataegus spatifolia n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves. Leaves oblong-ovate, long-pointed and acuminate at the apex, rounded, subcordate or abruptly cuneate at the broad base, finely often doubly serrate, with straight glandular teeth, and divided into 5-7 pairs of broad acuminate spreading or reflexed lateral lobes; more than half grown when the flowers open about the 1st of June and then thin, yellow-green, slightly hairy and rough above, and at maturity thin, dark yellow-green, smooth and lustrous on the upper surface, pale bluish green on the lower surface, 6-7 cm long and 5-6 cm wide, with slender midribs, and thin primary veins arching obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, occasionally glandular, 3-3.5 cm in length; leaves on vigorous shoots subcoriaceous, cordate or truncate at the base, more coarsely serrate and more deeply lobed, and often 6-7 cm long and wide. Flowers 1.4-1.9 cm in diameter, on long slender pedicels, in wide lax mostly 8-16-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base,

long, slender, red and glandular at the acuminate apex, entire or minutely glandular dentate, reflexed after anthesis; stamens 8-10; anthers pale rose color; styles 3 or 4. Fruit ripening at the end of September, on long drooping reddish pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, crimson, lustrous, marked by large pale dots, 1-1.1 cm long and 8-9 mm in diameter; calyx little enlarged, with a deep narrow cavity, and spreading often incurved persistent lobes; flesh thin, light yellow; nutlets 2-4, gradually narrowed and rounded or acute at the ends, ridged on the back, with a low grooved ridge, 6-6.5 mm long, and 4-4.5 mm wide.

A shrub 4-5 m high, with stems covered with greenish gray bark, ascending branches, and stout nearly straight branchlets dark orange-green more or less tinged with red when they first appear, becoming dark chestnut-brown, lustrous and marked by pale lenticels in their first season and dull gray-brown the following year, and armed with slender slightly curved dark red-brown shining spines 3-4 cm long.

Hillsides near Coopers Plains, G. D. Cornell (♯90, type), September 27, 1906, June 8, 1907.

Crataegus fucata n. sp.

Glabrous with the exception of the hairs on the young leaves and calyx-lobes. Leaves ovate, long-pointed and acuminate at the apex, rounded or abruptly cuneate at the often glandular base, sharply doubly serrate above, with straight glandular teeth, and slightly divided usually only above the middle into 3 or 4 pairs of small acuminate spreading lobes; when they unfold slightly tinged with red, covered above by short white hairs and glabrous below, about a quarter grown when the flowers open in the last week of May and then very thin, light yellow-green and still hairy on the upper surface, and at maturity thin but firm in texture, dark yellow-green and slightly roughened above and pale bluish green below, 5-6 cm long and 4.5-5 cm wide, with thin yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular while young, with mostly deciduous glands, often rose color in the autumn, 2-3 cm in length; leaves on vigorous shoots rounded or subcordate at the base, coarsely serrate, deeply lobed and often 5.5-6 cm long and broad. Flowers about 1.5 cm in diameter, on slender pedicels, in small compact mostly 8-10-flowered corymbs, the lowest peduncle from the axil of an upper leaf; calyx-tube

narrowly obconic, the lobes slender, acuminate, minutely dentate or entire, glabrous on the outer, furnished on the inner surface with occasional hairs, reflexed after anthesis; stamens 5-9; anthers dark rose color; styles 3-5, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening and falling late in September, on slender drooping pedicels, in few-fruited clusters, short-oblong to oval, slightly narrowed at the ends, often unsymmetrical and somewhat mammillate at the base, crimson, lustrous, 9-10 mm long and 8-9 mm in diameter; calyx little enlarged, with a wide shallow cavity, and spreading and appressed lobes, red and sparingly villose on the upper side; flesh thin, yellow, slightly tinged with red; nutlets usually 3 or 4, narrowed and rounded at the ends, ridged on the back, with a broad high doubly grooved ridge, 5-6 mm long, and 4-4.5 mm wide.

A shrub 3-4 m high, with ascending and spreading flexuose stems forming a wide open head and covered below with ashy gray bark, small spreading branches, and slender zigzag branchlets dark orange-green and marked by pale lenticels when they first appear, becoming bright chestnut-brown and lustrous in their first season and dull red-brown the following year, and armed with numerous stout straight or slightly curved chestnut-brown shining spines 3.5-4.5 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (#62, type), May 26 and September 21, 1906, May and September 1907.

Crataegus nescia n. sp.

Glabrous with the exception of the hairs on the young leaves and petioles. Leaves ovate, acuminate, cuneate or on vigorous shoots truncate or rounded at the entire base, sharply often doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of narrow acuminate spreading lateral lobes; more than half grown when the flowers open about the 20th of May and then very thin, light yellow-green and roughened above by short white hairs and paler and glabrous below, and at maturity thin, yellow-green, smooth and glabrous on the upper surface, light bluish green on the lower surface, 4-6 cm long and 3.5-5 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly hairy on the upper side while young, soon becoming glabrous, 1.5-2.5 cm in length. Flowers 1.5-1.8 cm in diameter, on long slender pedicels, in small compact mostly 5-12-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-

tube narrowly obconic, the lobes slender, acuminate, entire or minutely glandular dentate near the middle, reflexed after anthesis; stamens 4-8; anthers bright pink; styles 2-4, usually 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening and falling early in October, on slender drooping pedicels, in few-fruited clusters, short-oblong to slightly obovate, full and rounded at the ends, scarlet, lustrous, marked by small pale dots, 1-1.2 cm long and 9-10 mm in diameter; calyx little enlarged, with a deep narrow cavity and spreading and appressed or incurved generally persistent lobes dark red on the upper side below the middle; flesh thin, yellow tinged with pink; sweet and juicy; nutlets usually 3, narrowed and rounded at the ends, ridged on the back, with a broad deeply grooved ridge, 5.5-6 mm long, and 4-4.5 mm wide.

A slender shrub 3-4 m high, with stems spreading into small clumps, and covered with light gray bark scaly near the ground, long slender ascending dark greenish branches, and slender wand-like conspicuously zigzag branchlets dark orange-green when they first appear, becoming light chestnut-brown, lustrous, and marked by pale lenticels in their first season and light gray-brown the following year, and armed with stout straight or usually slightly curved chestnut-brown shining spines 2.5-4 cm long.

Rich hillsides, near Coopers Plains, G. D. Cornell (№46, type), May 25 and October 3, 1906.

Crataegus insignata n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves ovate, acuminate, rounded or abruptly cuneate at the base, finely often doubly serrate, with straight glandular teeth, and slightly divided usually only above the middle into 5 or 6 pairs of narrow acuminate spreading lobes; more than half grown when the flowers open about the 20th of May and then thin, yellow-green and roughened above by short white hairs, and at maturity thin, yellow-green, scabrate on the upper surface, paler on the lower surface, 5-6 cm long and 4.5-6 cm wide, with stout midribs, and thin prominent primary veins extending to the points of the lobes; petioles slender, slightly wing-margined at the apex, 3-3.5 cm in length. Flowers 1.3-1.6 cm in diameter, on short slender pedicels, in compact mostly 6-14-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes long, slender, acuminate, entire or minutely glandular dentate below the middle, reflexed after anthesis; stamens 5-8; anthers pale rose

color; styles 2-5, usually 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening late in October, on short pedicels, in few-fruited drooping clusters, short-oblong, slightly narrowed to the rounded ends, deeply impressed at the insertion of the stalk, dull red, 9-10 mm long, and 8-9 mm in diameter; calyx little enlarged, with a deep narrow cavity tomentose in the bottom, and spreading and appressed lobes, their tips often deciduous from the ripe fruit; flesh thin, orange color, sweet and juicy; nutlets usually 3 or 4, narrowed and rounded at the ends, ridged on the back, with a broad deeply grooved ridge, 6-6.5 mm long, and 4-4.5 mm wide.

A shrub 4-5 m high, with numerous small ascending stems covered near the ground with ashy gray scaly bark, small spreading gray-brown branches, and stout slightly zigzag branchlets dark orange-green and marked by pale lenticels when they first appear, becoming dark chestnut-brown or purple and lustrous in their first season and dull gray-brown the following year, and armed with few stout slightly curved light chestnut-brown ultimately gray spines 2-2.5 cm long.

Hillsides, Coopers Plains, G. D. Cornell (*63, type), May 23 and September 21, 1906.

Crataegus bella Sargent

Hillsides, Coopers Plains, G. D. Cornell (*31), September 21, 1905, May 20, 1906; also at Buffalo, and at Chippewa, Ontario.

Crataegus genialis Sargent

Rhodora V. 148 (1903).

Hillsides, Coopers Plains, G. D. Cornell (*44), September 24, 1905, May 25, 1906, May and September 1907 (*47), September 28, 1905, May 24 and September 4, 1906.

Crataegus suavis Sargent

Hillsides, Coopers Plains, G. D. Cornell (99), September 22, 1906, June 3, 1907; also at Buffalo.

Crataegus glaucophylla Sargent

Rhodora V. 140 (1903); Rochester Acad. Sci. Proc. IV. 120 (1903).

Hillsides, Coopers Plains, G. D. Cornell (*48), September 28, 1905, May 23, 1906; also southern Michigan and through Ontario to western New England.

Crataegus matura Sargent

Rhodora III. 24 (1901); V. 144 (1903).

Hillsides, Coopers Plains, G. D. Cornell (§21), September 21, 1905, May 21, 1906, (§59) May 24 and September 21, 1906; also Genesee valley, New York to western New England.

Crataegus streeterae Sargent

Rochester Acad. Sci. Proc. IV. 119 (1903).

Hillsides, Coopers Plains, G. D. Cornell (§5), September 21, 1905, May 24, 1906, (§82) September 16, 1906, May 30, 1907; also at Rochester, Buffalo, Niagara Falls, New York, and in southern Michigan.

Crataegus ornata Sargent

Rochester Acad. Sci. Proc. IV. 120 (1903).

Hillsides, Coopers Plains, G. D. Cornell (§95), September 21, 1906, June 2, 1907; also valley of the Genesee river, New York and southern Ontario.

FLABELLATAE

Crataegus steubenensis n. sp.

Leaves ovate, long-pointed and acuminate, rounded at the base, finely often doubly serrate, with straight or reflexed glandular teeth, and slightly divided above the middle into 5 or 6 pairs of small spreading acuminate lobes; slightly tinged with red when they unfold, nearly half grown when the flowers open about the 20th of May and then thin, yellow-green and strigose above and paler and glabrous below, and at maturity thin but firm in texture, yellow-green and scabrate above, pale below, 5-6 cm long and 4.5-5 cm wide, with thin prominent midribs often rose color late in the season, and conspicuous primary veins extending obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, villose while young, becoming glabrous, occasionally sparingly glandular, often rose color in the autumn, 2.5-3 cm in length. Flowers 2-2.3 cm in diameter, on long slender sparingly villose pedicels, in lax mostly 7-14-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes long, slender, acuminate, glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 20; anthers pale rose color; styles 3-5, usually 5. Fruit ripening the end of September, on long slender glabrous

red drooping pedicels, in few-fruited clusters, obovate, full and rounded at the apex, abruptly narrowed at the base, scarlet, lustrous, marked by large pale dots, 1-1.2 cm long, and 9-10 mm in diameter; calyx prominent, with a broad deep cavity, and elongated spreading persistent lobes; flesh thick, yellow, sweet and juicy; nutlets usually 5, thin and acute at the ends, flat and slightly grooved on the back, 6-6.5 mm long, and 4-4.5 mm wide.

A narrow shrub 3-4 m high, with small stems covered with pale gray bark, erect branches forming a narrow open head, and stout slightly zigzag branchlets deeply tinged with red when they first appear, becoming light orange-brown, lustrous and marked by numerous pale lenticels in their first season and dull gray-brown the following year, and armed with few stout slightly curved light chestnut-brown shining spines 2-2.5 cm long.

Hillsides, Coopers Plains, G. D. Cornell (№49, type), September 28, 1905, May 21 and September 21, 1906.

COCCINEAE

Crataegus dodgei Ashe

Jour. Elisha Mitchell Sci. Soc. XIX. 26 (March 1903). Sargent, Acad. Sci. Phila. Proc. 632 (1905); *Rhodora* VII. 213 (1905).

Moist hillsides near Coopers Plains, G. D. Cornell (№30), September 21, 1905, May 26, 1906; also southern Michigan to southern New England.

INTRICATAE

Stamens 10; anthers pale yellow

Crataegus intricata Lange

Bot. Tidskr. XIX. 246 (1894). Sargent, *Rhodora* III. 28 (1901).

Moist hillsides, Coopers Plains, G. D. Cornell (№25), September 30, 1905, June 2, 1906, September 1907; also eastern New York and western and southern New England.

Crataegus foetida Ashe

Ann. Carnegie Mus. I, pt III. 389 (1902). Sargent, Acad. Sci. Phila. Proc. 641 (1905); *Rhodora* VII. 219 (1905).

Moist hillsides, Coopers Plains, G. D. Cornell (№34), October 1, 1905, June 2, 1906, (№55) October 8, 1905, June 4, 1906, (№98) September 1907; also Genesee valley, New York to western Massachusetts and eastern Pennsylvania.

Crataegus verecunda Sargent

Rochester Acad. Sci. Proc. IV. 109 (1903).

Moist hillsides, near Coopers Plains, G. D. Cornell (✱ 51), October 1, 1905, June 2, 1906 (✱ 56), October 8, 1905, May 30, 1906; grooved ridge, 7-8 mm long, and 4.5-5 mm wide. also at Rochester and near Albany, N. Y.

Crataegus cornellii n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves. Leaves oval and acuminate at the ends to ovate-acute and abruptly cuneate at the base, finely doubly serrate, with straight glandular teeth, and divided into 4 or 5 pairs of small acuminate lateral lobes; about half grown when the flowers open late in May or early in June and then very thin, dark yellow-green and slightly hairy above, especially on the midribs and veins, and paler below, and at maturity thin but firm in texture, dark yellow-green, smooth and glabrous on the upper surface, pale yellow-green on the lower surface, 4-4.5 cm long and 3-4 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, often rose color in the autumn, 1-1.2 cm in length; leaves on vigorous shoots ovate, truncate at the broad base, deeply 3-lobed by narrow sinuses, the terminal lobe often lobed toward the apex, and 3.5-5.5 cm long and broad, with stouter glandular petioles. Flowers about 1.5 cm in diameter, on short slender pedicels, in compact mostly 4-10-flowered simple corymbs, with linear-obovate to linear conspicuously glandular bracts and branchlets fading rose color; calyx-tube narrowly obconic, the lobes broad, acuminate, glandular serrate, often widened and laciniately divided toward the apex, reflexed after anthesis; stamens 10; anthers pale yellow; styles 3-5, usually 3. Fruit ripening the end of September, on short stout erect or spreading pedicels, in few-fruited clusters, obovate, rounded at the apex, abruptly narrowed at the base, light orange-yellow, lustrous, marked by small dark dots, 1.3-1.4 cm long and 1-1.2 cm in diameter; calyx very prominent, with a short tube, a wide deep cavity, and elongated spreading and appressed persistent lobes dark red on the upper side below the middle; flesh thin, yellow, dry and hard; nutlets usually 3, rounded and obtuse at the ends, ridged on the back, with a broad low slightly grooved ridge, 7-8 mm long and 4.5-5 mm wide.

A shrub about 1 m high, with small intricately branched erect stems, and slender nearly straight branchlets deeply tinged with red when they first appear, becoming bright chestnut-brown, lustrous, and marked by small pale lenticels in their first season and dull red brown the following year, and armed with very numerous slender nearly straight chestnut-brown shining spines 5.5-6 cm long.

Moist hillsides, Coopers Plains, C. H. Peck (*67, type), June 2 and September 21, 1906.

I am glad to associate with this distinct and pretty species the name of the industrious and careful student of the thorns which cover the hills surrounding his home.

Crataegus modesta Sargent

Rhodora III. 28 (1901); Acad. Sci. Phila. Proc. 635 (1905).

Moist hillsides, Coopers Plains, G. D. Cornell (*39), September 21, 1905, June 2, 1906; also western Vermont and eastern New York to eastern Pennsylvania.

ANOMALAE.

Stamens 10 or less; anthers rose color

Crataegus singularis n. sp.

Leaves ovate to oval, long-pointed and acuminate at the apex, gradually or abruptly narrowed to the concave-cuneate or rounded entire base, coarsely often doubly serrate above with straight glandular teeth, and slightly divided usually only above the middle into 5 or 6 pairs of small acuminate spreading lobes; nearly half grown when the flowers open about the 20th of May and then very thin, convex, dark yellow-green and strigose above and pale yellow-green and slightly villose along the primary veins below, and at maturity thin, glabrous, dark yellow-green and scabrate on the upper surface, light yellow-green and glabrous on the lower surface, 6-7 cm long and 4-4.5 cm wide, with slender yellow midribs and primary veins; turning yellow in the autumn before falling; petioles slender, slightly wing-margined at the apex, sparingly hairy on the upper side while young, soon becoming glabrous, glandular, with minute dark glands, often rose color in the autumn, 2-3 cm in length; leaves on vigorous shoots long-pointed, narrowed and rounded at the base, more coarsely serrate, deeply lobed, with slender acuminate lobes, often 6-7 cm long and 5.5-6 cm wide. Flowers 1.5-1.9 cm in diameter, on long slender slightly villose

pedicels, in compact mostly 6-15-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes long, slender, red and acuminate at the apex, finely glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 5-8; anthers dark rose color; styles 2-4, usually 3. Fruit ripening from the middle to the end of September, on slender drooping pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, scarlet, lustrous, marked by large pale dots, 1.3-1.5 cm long, 8-10 mm in diameter; calyx little enlarged, with a narrow deep cavity, and elongated spreading and incurved lobes slightly hairy on the upper side; flesh orange-yellow slightly tinged with pink, thick and juicy; nutlets 2 or 3, full and rounded at the ends, or when 3 gradually narrowed at the ends, ridged on the back, with a broad low slightly grooved ridge, marked on the inner faces by broad depressions, 6-7 mm long, and about 4 mm wide.

A shrub 2-3 m high, with stems covered with gray-brown bark, ascending and spreading branches, and stout slightly zigzag glabrous branchlets light orange-green and marked by pale lenticels when they first appear, becoming light olive-green, lustrous and marked by small pale lenticels in their first season and dull gray-brown the following year, and armed with stout slightly curved light red-brown ultimately dark gray spines 3.5-4 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (*20, type), September 21, 1905, May 24, 1906 (*26, with less deeply divided leaves and nearly glabrous pedicels), September 21, 1905, May 14, 1906.

Crataegus repulsans n. sp.

Leaves ovate to rhombic, acuminate and long-pointed at the apex, abruptly or gradually narrowed and concave-cuneate at the entire base, finely often doubly serrate above, with straight or incurved glandular teeth, and slightly divided usually only above the middle into short broad acuminate spreading lobes; nearly fully grown when the flowers open in the last week of May and then thin, yellow-green and strigose above and pale and glabrous below, and at maturity thin but firm in texture, dull yellow-green, glabrous and scabrate on the upper surface, paler on the lower surface, 4-5 cm long and 3-3.5 cm wide, with thin yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, spar-

ingly hairy on the upper side while young, soon becoming glabrous, 1.2-1.6 cm in length; leaves on vigorous shoots abruptly narrowed at the apex into long broad acuminate points, gradually narrowed to the rounded base, thicker, more coarsely serrate, and often 7-8 cm long and 5-5.5 cm wide, with stout rose colored petioles. Flowers 1.5-1.9 cm in diameter, on long slender slightly villose pedicels, in small mostly 5-8-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from the base, red and glandular at the acuminate apex, minutely glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 5-9; anthers rose color; styles 1-3, usually 2. Fruit ripening the end of September, on slender slightly hairy erect pedicels, in few-fruited clusters, short-oblong to subglobose, orange-red, lustrous, marked by small pale dots, 9-10 mm in diameter; calyx prominent, with a deep wide cavity, and elongated spreading and appressed lobes villose on the upper surface; flesh yellow, dry and mealy; nutlets 2 or 3, gradually narrowed and rounded at the ends, or when 3 acuminate at the base and broad and rounded at the apex, ridged on the back, with a broad low grooved ridge, marked on the inner face, by broad depressions, 6-6.5 mm long, and 3.5-4 mm wide.

A shrub 3-4 m high, with stems covered with greenish gray bark, ascending branches, and stout slightly zigzag glabrous branchlets dark orange-green and marked by pale lenticels when they first appear, becoming bright orange-brown and very lustrous in their first season and pale gray-brown the following year, and armed with very numerous stout straight or slightly curved light chestnut-brown shining spines 4-5 cm long.

Rich hillsides, Coopers Plains, G. D. Cornell (№45, type), September 24, 1905, May 28, 1906.

Crataegus inopinata n. sp.

Leaves ovate to oval, acuminate, cuneate or rounded at the entire base, coarsely doubly serrate above, with straight glandular teeth, and occasionally very slightly divided above the middle into small acute lobes; bronze color when they unfold, about half grown when the flowers open in the last week of May and then thin, light yellow-green and roughened above by short white hairs and pale and slightly villose in the axils of the veins below, and at maturity thin but firm in texture, dark yellow-green and scabrate on the upper surface, light yellow-green and glabrous on the lower sur-

face, 4.5-6 cm long and 4-5 cm wide, with thin prominent yellow midribs and primary veins; petioles stout, slightly wing-margined at the apex, glabrous, sparingly glandular early in the season, usually with deciduous glands, generally rose color in the autumn, 2-3 cm in length; leaves on vigorous shoots rounded at the base, coarsely serrate, rarely slightly lobed, and often 8-10 cm long and 6-7.5 cm wide, with stout broadly winged conspicuously glandular petioles. Flowers 1-1.2 cm in diameter, on slender slightly villose pedicels, in narrow compact mostly 10-16-flowered corymbs; calyx-tube narrowly obconic, glabrous, the lobes wide, acuminate and red at the apex, glandular serrate, glabrous on the outer, villose on the inner surface, reflexed after anthesis; stamens 5-7; anthers pale rose color; styles 2 or 3, surrounded at the base by a narrow ring of long white hairs. Fruit ripening the end of September, on stout slightly spreading pedicels, in few-fruited clusters, subglobose, dark red, lustrous, marked by small pale dots, 1-1.1 cm in diameter; calyx little enlarged, with a broad shallow cavity, small spreading and closely appressed persistent lobes villose and dark red on the upper side; flesh thick, juicy, orange color; nutlets 2 or 3, rounded at the ends, ridged on the back, with a broad high doubly grooved ridge slightly penetrated on the inner faces by wide depressions, 5-5.5 mm long, and 3.5-4 mm wide.

A shrub occasionally 6-8 but more often 3-4 m high, with stout stems covered with dark bark scaly near the ground, ascending branches forming an open irregular head, and stout slightly zigzag glabrous branchlets dark orange-yellow and marked by pale lenticeles when they first appear, becoming dark chestnut-brown and lustrous in their first season and dull reddish brown the following year, and armed with numerous stout straight or slightly curved chestnut-brown shining spines 3.5-6 cm long.

Rich hillsides, near Coopers Plains, G. D. Cornell (*60, type), May 26 and September 21, 1906, June and September, 1907.

TOMENTOSAE

Leaves thin

Anthers rose color; stamens 12-20

Crataegus diversa n. sp.

Leaves oblong-obovate, acute, acuminate or rarely rounded at the apex, gradually narrowed to the long concave-cuneate entire base, coarsely often doubly serrate above, with straight glandular

teeth, and sometimes slightly divided above the middle into 2 or 3 pairs of small acute lobes; nearly half grown when the flowers open the middle of June and then thin, light yellow-green and slightly roughened above by short white hairs and pale and villose on the midribs and veins below, and at maturity thin but firm in texture, dark yellow-green, glabrous and smooth on the upper surface, still villose on the lower surface along the stout midribs and prominent primary veins, 6-8 cm long and 4.5-5 cm wide; petioles stout, wing-margined to below the middle, tomentose early in the season, becoming pubescent or nearly glabrous, 8-12 mm in length. Flowers 1.3-1.6 cm in diameter, on short stout villose pedicels, in compact mostly 15-18-flowered hairy corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, coated with long matted white hairs, the lobes long, slender, acuminate, glabrous on the outer, villose on the inner surface, reflexed after anthesis; stamens 12-20; anthers rose color; styles 2, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening late in September, on slightly hairy red drooping pedicels, in few-fruited clusters, oval or slightly obovate, crimson, lustrous, marked by small pale dots, 9-10 mm long, and 6-7 in diameter; calyx little enlarged, with a short tube, a deep wide cavity, and small spreading and appressed often deciduous lobes dark red and villose on the upper side; flesh thin, yellow, dry and mealy; nutlets 2, rounded at the ends, rounded and slightly ridged on the back, penetrated on the inner faces by large deep cavities, 5-5.5 mm long, and 3-3.5 mm wide.

A shrub 3-4 m high, with numerous small erect stems covered with ashy gray bark, small ascending slightly spreading branches forming an open head, slender nearly straight branchlets covered when they first appear with long matted white hairs, becoming light orange-brown or chestnut-brown, lustrous, puberulous and marked by pale lenticels at the end of their first season, and dull reddish brown in their second or third years, and armed with straight slender chestnut-brown and shining ultimately dull gray spines 3-4 cm long, occasionally persistent and compound on old stems.

Hillsides, near Coopers Plains, G. D. Cornell (*70, type), June 18 and September 21, 1906 (*78), June and October 1906, 1907.

Well distinguished from *Crataegus tomentosa* Linneus, by the color of the branches and spines, the smaller number of stamens, and by the shape and color of the fruit.

Anthers pink; stamens 20

Crataegus spinifera n. sp.

Leaves ovate to obovate, acute or acuminate, gradually narrowed and concave-cuneate at the entire base, and sharply often doubly serrate above, with straight glandular teeth; about one third grown when the flowers open the 1st of June and then very thin, dark yellow-green and covered above by soft white hairs and pale and villose below along the midribs and veins, and at maturity thin but firm in texture, yellow-green, smooth and lustrous on the upper surface, pale bluish green and still slightly villose on the lower surface on the stout yellow midribs and slender primary veins, 5.5-7 cm long and 3.5-5 cm wide; petioles stout, narrow wing-margined to below the middle, slightly hairy on the upper side while young, soon becoming glabrous, 1-2 cm in length; leaves on vigorous shoots abruptly cuneate or rounded at the base, often slightly lobed toward the apex, and frequently 7-8 cm long and 5-6 cm wide. Flowers about 1.5 cm in diameter, on slender villose pedicels, in broad lax hairy mostly 20-30-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, coated with long matted white hairs, the lobes long, slender, glandular serrate, villose, reflexed after anthesis; stamens 20; anthers pale pink; styles 2-4. Fruit ripening the end of September, on long stout slightly hairy red drooping pedicels, in broad many-fruited clusters, subglobose to slightly ovate, scarlet, lustrous, sparingly hairy at the ends, marked by large pale dots, becoming soft and succulent, 1-1.2 cm in diameter; calyx little enlarged, with a deep narrow cavity, and small spreading and appressed lobes hairy on the upper side; flesh yellow, thin and dry; nutlets 2-4, slightly narrowed and rounded at the ends, ridged on the back, with a broad low grooved ridge, irregularly penetrated on the inner faces by broad deep cavities, 6-7 mm long, and 4-5 mm wide.

A dense round-topped shrub 3-4 m high, with small intricately branched stems spreading in thickets and covered with dark gray-brown scaly bark, ascending flexuous greenish gray branches, and slender slightly zigzag glabrous branchlets dark orange-green and marked by pale lenticels when they first appear, becoming orange-brown and lustrous in their first season and dull gray-brown the following year, and armed with numerous stout nearly straight purple shining spines 4-5 cm long.

Hillside, Coopers Plains, G. D. Cornell (№ 66, type), June 4 and September 21, 1906.

Anthers pale yellow; stamens 20

Crataegus structilis Ashe

Jour. Elisha Mitchell Sci. Soc. XIX. 12 (1903). Sargent, Acad. Sci. Phila. Proc. 656 (1905).

Hillsides, near Coopers Plains, G. D. Cornell (№ 50), September 30, 1905, June 18, 1906, (№ 52), June 13 and September 21, 1906, (№ 69), June 18 and September 21, 1906, (№ 71), with stamens sometimes reduced to 15), June and September 1906; also Illinois and southern Michigan, and through southern Ontario to the valley of the Genesee river, New York and eastern Pennsylvania.

Crataegus comans n. sp.

Leaves ovate to rhombic, acute at the apex, concave-cuneate at the entire base, and coarsely doubly serrate above, with straight glandular teeth; tinged with red when they unfold, about half grown when the flowers open from the 10th to the middle of June and then thin, yellow-green and roughened above by short white hairs most abundant on the midribs and veins, paler and villose below especially on the midribs and veins, and at maturity thin but firm in texture, dull yellow-green, smooth and lustrous on the upper surface, pale yellow-green and still villose below, 4.5-6 cm long and 3.5-5 cm wide, with stout midribs, often rose color in the autumn, and thin prominent primary veins; petioles stout, wing-margined nearly to the base, villose, 4-5 mm in length. Flowers 1.2-1.5 cm in diameter, on short stout densely villose pedicels, in very compact hairy mostly 10-15-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, slightly hairy, the lobes short, slender, minutely glandular serrate, nearly glabrous on the outer, slightly hairy on the inner surface, reflexed after anthesis; petals sometimes tinged with pink; stamens 20; anthers pale yellow; styles 2 or 3. Fruit ripening late in September, on long slender hairy erect pedicels, in wide many-fruited clusters, short-oblong to subglobose, orange-red, lustrous, covered with short pale hairs most abundant at the base, 7-8 mm in diameter; calyx little enlarged, with a short tube, a wide deep cavity and small spreading and appressed persistent lobes villose on the upper surface; flesh thin, yellow, becoming soft and

succulent; nutlets usually 2, suborbicular, rounded and slightly grooved on the back, penetrated on the inner faces by broad deep cavities, about 5 mm long, and 2-2.5 mm wide.

A shrub 2-3 m high, with stems covered with pale gray bark, ascending branches, and slender nearly straight branchlets dark orange-red and covered with long matted pale hairs when they first appear, becoming light orange-red and lustrous and still hairy in their first season and dark gray-brown the following year, and armed with slender straight or slightly curved gray spines 2.5-3 cm long.

Hillsides, Coopers Plains, G. D. Cornell (*35, type), June 13 and September 21, 1906.

Leaves thick

Stamens 20; anthers purple

Crataegus frutescens n. sp.

Leaves obovate, gradually narrowed and acute or rounded at the apex, concave-cuneate at the entire base, finely often doubly serrate above, with straight glandular teeth, and slightly divided generally only above the middle into 3 or 4 pairs of small acuminate lobes; faintly tinged with bronze color and slightly hairy above, especially along the midribs, when they unfold, more than half grown when the flowers open late in May or early in June, and then thick, light yellow-green and nearly glabrous above and pale and villose on the midribs and veins below, and at maturity subcoriaceous, conspicuously reticulate venulose, dark yellow-green, smooth and very lustrous on the upper surface, light yellow-green and still slightly hairy on the lower surface along the stout rose colored midribs and slender primary veins, 4-5 cm long and 3.5-4 cm wide; petioles stout, slightly wing-margined to below the middle, sparingly villose while young, soon becoming glabrous, often deep rose color in the autumn, 7-10 mm in length; leaves on vigorous shoots ovate to oval, more coarsely serrate and 6-6.5 cm long and 5-6 cm wide, with stout broadly winged often glandular petioles. Flowers 1.4-1.6 cm in diameter, on slender villose pedicels, in compact mostly 10-15-flowered corymbs, with long narrow obovate to linear acuminate glandular caducous bracts and bractlets, the long lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, slightly hairy at the base, glabrous above, the lobes gradually narrowed, short, broad, acuminate, finely glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after

anthesis; stamens 20; anthers purple; styles 2 or 3. Fruit ripening the end of September, on slender slightly hairy erect pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, scarlet, very lustrous, marked by large pale dots, 7-8 mm in diameter; calyx little enlarged, with a broad deep cavity, and small spreading and appressed lobes; flesh yellow, dry; nutlets 2 or 3, gradually narrowed and rounded at the ends, rounded and slightly ridged on the back, penetrated on the inner faces by deep narrow cavities, 4.5-5 mm long, and about 3 mm wide.

A shrub sometimes 2 m high, with stems covered with dark greenish gray bark and spreading into thickets, small ascending branches, slender nearly straight glabrous branchlets light orange-green and marked by pale lenticels when they first appear, light chestnut-brown and very lustrous in their first and second seasons and dull reddish brown the following year, and armed with numerous stout slightly curved chestnut-brown shining spines 3-4 cm long, compound and long persistent on old stems, and accrescent bright rose colored very conspicuous inner bud scales deciduous before the opening of the flower buds.

Coopers Plains, G. D. Cornell (* 37, type), September 21, 1905, June 3, 1906.

Stamens 10 or less; anthers pale yellow

Crataegus ferentaria Sargent

Rochester Acad. Sci. Proc. IV. 135 (1903); *Rhodora* VII. 184 (1905).

Hillsides, Coopers Plains, G. D. Cornell (* 22), September 21, 1905, June 2, 1906; also southern Ontario to eastern New England.

NEW YORK SPECIES OF CRATAEGUS FROM VARIOUS LOCALITIES

BY C. S. SARGENT

PRUINOSAE

Crataegus bronxensis n. sp.

Leaves ovate, acuminate, gradually or abruptly narrowed and concave-cuneate at the entire base, sharply often doubly serrate above, with straight glandular teeth, and divided above the middle into 3 or 4 pairs of short acuminate lobes; nearly half grown when the flowers open late in May and then thin, light yellow-green and slightly hairy especially on the midribs above, and paler and sparingly villose along the midribs and veins below, with persistent hairs, and at maturity very thin, dark bluish green and scabrate on the upper surface, pale blue-green on the lower surface, 4.5-5.5 cm long and 3-4 cm wide, with slender midribs, and thin primary veins extending very obliquely to the points of the lobes; petioles slender, wing-margined at the apex, glabrous, glandular, with occasional mostly persistent glands, often rose colored in the autumn, 2.5-3 cm in length; leaves on vigorous shoots sometimes rounded at the broad base, more coarsely serrate and more deeply lobed, and often 6-7 cm long and 5-6 cm wide. Flowers 1.8-2 cm in diameter, on short slender slightly hairy pedicels, in compact mostly 5-7-flowered corymbs, with linear acuminate bracts and bractlets fading brown and often persistent until the flowers open, the lower peduncles from the axils of upper leaves; calyx-tube broadly obconic, glabrous, the lobes abruptly narrowed from wide bases, slender, acuminate, entire or occasionally minutely glandular dentate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 20; anthers light pink; styles 4 or 5. Fruit on erect slender pedicels, in few-fruited clusters, falling late in the autumn without becoming soft, subglobose or rather broader than high, apple-green, slightly pruinose, becoming lustrous, marked by large dark dots, 1-1.2 cm in diameter; calyx prominent, with a short tube, a broad shallow cavity, and spreading and reflexed often deciduous lobes dark red on the upper side below the middle; flesh thin, green, dry and hard; nutlets 4 or 5, gradually narrowed and rounded at the ends, rounded and grooved or irregularly ridged on the back, 6-6.5 mm long and about 4 mm wide.

A shrub, with slender slightly zigzag glabrous branchlets orange-green more or less tinged with red when they first appear, becoming light chestnut-brown, lustrous and marked by pale lenticels in their first season and dull red-brown the following year, and armed with numerous slender straight or slightly curved chestnut-brown shining spines 3.5-5.5 cm long.

In Bronx park, New York city, W. W. Eggleston (* 154, type), October 5, 1904, May 25, 1907.

Crataegus livingstoniana n. sp.

Glabrous with the exception of the hairs on the upper side of the leaves. Leaves ovate, acuminate, abruptly cuneate or rounded at the entire base, coarsely often doubly serrate above, with straight glandular teeth, and slightly divided into 4 or 5 pairs of small acuminate spreading lobes; about half grown when the flowers open in the last week of May and then very thin, yellow-green and slightly hairy above and pale below, and at maturity thin, light yellow-green, smooth or occasionally hairy and roughened on the upper surface, paler on the lower surface, 5-7 cm long and 4-5.5 cm wide, with thin midribs, and primary veins extending obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, occasionally glandular, 1.5-3 cm in length; leaves on vigorous shoots thicker, rounded or cordate at the base, more deeply lobed and more coarsely serrate. Flowers 1.6-1.8 cm in diameter, on long slender pedicels, in mostly 5-8-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base, long, slender, glandular and acuminate at the apex, minutely glandular dentate, reflexed after anthesis; stamens usually 8; anthers dark red; styles 3-5, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the middle of October, on stout spreading or drooping pedicels, in few-fruited clusters, short-oblong, full and rounded at the ends, red, lustrous, marked by many small pale dots, 1.2-1.5 cm long and 1-1.2 cm in diameter; calyx prominent, with a deep narrow cavity pointed and tomentose in the bottom, and elongated spreading and incurved persistent lobes dark red on the upper side; nutlets 3-5, narrowed and acute at the ends or when 3 rounded at the ends, rounded and grooved or slightly ridged on the back, 6.5-7 mm long, and about 4 mm wide.

An arborescent shrub sometimes 5-6 m high, with stems 1-1.5 dm in diameter covered with ashy gray bark, ascending branches form-

ing a narrow fastigiate head, and slender nearly straight branchlets dark orange-green and marked by pale lenticels when they first appear, becoming light chestnut-brown and lustrous in their first season, dull gray the following year, and armed with occasional stout nearly straight light chestnut-brown shining spines 2.5-3 cm long.

Roadside, near east bank of Hemlock lake, Livingston co., Henry T. Brown (* 23, type), May 28 and October 1906, (* 13) May 28 and October 13, 1906, (* 18, with 6-8 stamens) May 18 and October 1906, (* 16, with rather lighter colored anthers) May and October 1906.

Crataegus macera n. sp.

Leaves ovate, rounded, truncate or cuneate at the entire base, finely often doubly serrate above, with glandular teeth, and slightly divided into 5 or 6 pairs of small acuminate lateral lobes; more than half grown when the flowers open the end of May and then thin, dark yellow-green, slightly hairy above and pale and glabrous below, and at maturity very thin, dull yellow-green and scabrate on the upper surface, paler on the lower surface, 4-5 cm long, and 3.5-4 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular while young, 1.5-2.5 cm in length; leaves on vigorous shoots thin, truncate or rounded at the broad base, more coarsely serrate, more deeply lobed, and often 6.5-7 cm long and 6.6-5 cm wide, with slender rose colored glandular petioles. Flowers about 2 cm in diameter, on long slender glabrous pedicels, in wide mostly 6-10-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube broadly obconic, glabrous, the lobes separated by wide sinuses, gradually narrowed from the base, long, slender, acuminate and glandular at the apex, entire or occasionally glandular dentate above the middle, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 5-7, usually 7; anthers light rose color; styles 4 or 5, surrounded at the base by a ring of pale tomentum. Fruit ripening the middle of October, on slender drooping pedicels, in few-fruited clusters, subglobose to short-oblong, scarlet, lustrous, marked by small dark dots, about 1 cm in diameter; calyx little enlarged, with a broad deep cavity tomentose on the inner surface, and spreading lobes dark red on the upper side below the middle; flesh yellow-green, dry and mealy; nutlets 4 or 5, gradually narrowed and rounded at the ends or

acute at the base, ridged on the back, with a broad high grooved ridge, 6-6.5 mm long, and 4.5-5 mm wide.

An arborescent shrub 5-6 m high, with numerous light ashy gray stems sometimes 1.3-1.5 dm in diameter, spreading and drooping branches, and slender slightly zigzag branchlets dark orange-green and marked by pale lenticels when they first appear, becoming light chestnut-brown and lustrous in their first season and dull gray-brown the following year, and armed with numerous slender often recurved chestnut-brown shining spines 3.5-4.5 cm long.

Moist soil in dense thickets, near the east bank of Hemlock lake, Livingston co., Henry T. Brown ($\times 22$, type), May 28 and October 16, 1906.

TENUIFOLIAE

Crataegus leptopoda n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves and petioles. Leaves oblong-ovate, gradually narrowed at the base, finely often doubly serrate, with straight glandular teeth, and slightly divided into 6 or 7 pairs of narrow acuminate spreading lobes; about half grown when the flowers open in the last week of May and then very thin, yellow-green and slightly roughened above by short white hairs and pale below, and at maturity thin, smooth and dull dark yellow-green on the upper surface, paler on the lower surface, 6-7 cm long and 3.5-4 cm wide, with slender midribs and primary veins; petioles very slender, slightly wing-margined at the apex, sparingly hairy on the upper side while young, soon becoming glabrous, glandular, with minute often persistent glands, 2-3 cm in length. Flowers about 1.5 cm in diameter, on long slender pedicels, in mostly 10-12-flowered narrow corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base, long, slender, red and glandular at the acuminate apex, entire or minutely glandular dentate near the middle, reflexed after anthesis; stamens 5-10; anthers dark red or maroon; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening late in September, on long slender drooping pedicels, in few-fruited clusters, obovate, rounded at the apex, gradually narrowed at the base, bright cherry-red, lustrous, marked by small pale dots, 1-1.2 cm long, and 8-9 mm in diameter; calyx little enlarged, with a shallow narrow cavity and erect or incurved persistent lobes dark red on the upper side below the middle; flesh thin, yellow-green and juicy; nutlets 3 or 4, acuminate

at the base, narrow and rounded at the apex, slightly ridged on the back, with a rounded ridge 6-6.5 mm long, and about 4 mm wide.

A shrub sometimes 5 m high, with stout slightly zigzag branchlets dark orange-green and marked by pale lenticels when they first appear, becoming dark chestnut-brown and lustrous in their first season and dull gray-brown the following year, and armed with numerous stout curved or nearly straight chestnut colored shining spines 3.5-4 cm long, persistent and simple on the stem.

East bank of Hemlock lake, Livingston co., H. T. Brown (№26 type), May 28 and October 3, 1906, (№25, with lighter colored anthers) May and September 1906.

Crataegus gracilipes n. sp.

Glabrous with the exception of the hairs on the upper surface of the leaves. Leaves ovate, long-pointed and acuminate at the apex, gradually or abruptly narrowed and concave-cuneate at the entire base, sharply often doubly serrate, with long straight glandular teeth, and divided often only above the middle into 5 or 6 pairs of long slender acuminate spreading lobes; nearly fully grown when the flowers open in the last week of May and then very thin, light yellow-green, lustrous and slightly hairy above and pale and glaucous below, and at maturity thin, scabrate and dull yellow-green above, paler below, 7-8 cm long and 4.5-6 cm wide, with slender midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular while young, with minute deciduous glands, 3-5 cm in length. Flowers about 1.5 cm in diameter, on long slender pedicels, in mostly 5-12-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes gradually narrowed from the base, slender, very long, acuminate and red at the apex, finely glandular serrate usually only near the middle, reflexed after anthesis; stamens 6-8; anthers light red; styles 3 to 5. Fruit ripening the end of September, on long slender drooping pedicels, in few-fruited clusters, narrow-obovate, gradually narrowed and rounded at the apex, gradually narrowed to the long slender base, scarlet, lustrous, 1.2-1.3 cm long, 6-7 mm wide; calyx little enlarged, with a deep wide cavity, and spreading persistent lobes; flesh yellow-green, thick and juicy; nutlets 3-5, narrowed and acute at the ends, or when 3 broader and rounded at the apex, ridged on the back, with a broad low slightly grooved ridge, 6.5-7 mm long, and 5-5.5 mm wide.

A shrub sometimes 6 m high, with small stems covered with pale gray bark, ascending and drooping tortuous branches, and slender branchlets deeply tinged with red and marked by pale lenticels when they first appear, becoming dark chestnut-brown and lustrous in their first season and dark dull gray-brown the following year, and armed with stout slightly curved or straight dull chestnut-brown spines 2.5-3 cm long.

Thickets in moist soil, near the eastern bank of Hemlock lake, Livingston co., New York, Henry T. Brown (№ 21, type), May 28 and October 4, 1906.

Crataegus claytoniana n. sp.

Glabrous with the exception of the hairs on the young leaves. Leaves oblong-ovate, acuminate, rounded or abruptly cuneate at the base, finely often doubly serrate above, with straight or incurved glandular teeth, and divided into 4 or 5 pairs of slender spreading acuminate lateral lobes; bronze-red and covered above by short white hairs when they unfold, more than half grown when the flowers open about the 10th of June and then thin, light yellow-green and still hairy above and pale and glabrous below, and at maturity thin, dark yellow-green and slightly roughened on the upper surface, light yellow-green on the lower surface, 3-4.5 cm long and 2.5-3 cm wide, with thin midribs and primary veins; petioles slender, slightly wing-margined at the apex, glandular, with occasional persistent glands, 1.5-2.5 cm in length; leaves on vigorous shoots thicker, long-pointed, rounded or truncate at the broad base, more coarsely serrate and more deeply lobed, and often 5-6 cm long and 4-5 cm wide, with stout rose colored midribs, and conspicuously glandular petioles. Flowers 1-1.2 cm in diameter, on slender pedicels, in small lax 5-10-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes slender, acuminate and red at the apex, entire or occasionally minutely glandular dentate, reflexed after anthesis; stamens 5-8; anthers red; styles 2 or 3. Fruit ripening the end of September, on short drooping pedicels, in 1-3-fruited clusters, subglobose to short-oblong, scarlet, lustrous, 1-1.2 cm long, about 1 cm in diameter; calyx little enlarged, with a wide shallow cavity, and spreading mostly persistent lobes bright red on the upper side below the middle; flesh thick, rather juicy, yellow slightly tinged with red; nutlets 2 or 3, narrowed and rounded at the ends, ridged

on the back, with a low broad slightly grooved ridge, 6.5-7 mm long, and 4-4.5 mm wide.

A shrub 3-4 m high, with stout stems, long slender erect or diverging branches, and slender nearly straight branchlets dark orange-green more or less tinged with red when they first appear, becoming light chestnut-brown, lustrous and marked by small pale lenticels in their first season and dark grayish brown the following year, and armed with slender straight or slightly curved bright chestnut-brown shining spines 2.5-3 cm long.

Clayton, Jefferson co., C. H. Peck (✳ 3, type), June 14 and September 27, 1907.

COCCINEAE

Crataegus chateaugayensis n. sp.

Leaves ovate, acuminate or acute at the apex, concave-cuneate or rarely rounded at the entire base, finely often doubly serrate above with straight glandular teeth, and divided into 4-6 pairs of small acuminate spreading lateral lobes; deeply tinged with red when they unfold, about half grown when the flowers open in the first week of June, and then thin, yellow-green and roughened above by short white hairs and glabrous below, and at maturity dark yellow-green, smooth and slightly villose along the midribs on the upper surface, and paler and lustrous on the lower surface, 5.5-6.5 cm long, and 3.5-4 cm wide, with slender midribs rose colored in the autumn, and thin primary veins arching obliquely to the points of the lobes; petioles slender, slightly wing-margined at the apex, sparingly villose on the upper side while young, becoming glabrous, glandular, with numerous dark usually persistent glands, 2-3 cm in length. Flowers 1.6-1.8 cm in diameter, on long slender glabrous or occasionally slightly hairy pedicels, in compact mostly 10-12-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes long, slender, acuminate and red at the apex, coarsely and conspicuously glandular dentate, reflexed after anthesis; stamens 5; filaments persistent on the ripe fruit; anthers dark rose color; styles 4 or 5, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the middle of September, on stout drooping red glabrous or occasionally slightly hairy pedicels, in few-fruited clusters, short-oblong to oval, scarlet, marked by large pale dots, slightly pruinose, 1.2-1.4 cm long, 8-10 mm in diameter; calyx prominent, with a short tube, a wide cavity tomentose in the bottom, and spreading and reflexed persistent lobes; flesh thick, firm light

yellow; nutlets 4 or 5, gradually narrowed and rounded at the base, thicker and rounded at the apex, ridged on the back, with a broad low deeply grooved ridge, 7-9 mm long, and 3.5-4 mm wide.

An arborescent shrub or tree 7-8 m high, with stout slightly zigzag glabrous branchlets, dark green and marked by pale lenticels when they first appear, becoming orange-brown or chestnut-brown in their first season and dull gray-brown the following year, and armed with very numerous stout straight or slightly curved light chestnut-brown shining spines 4-7 cm long.

Near Chateaugay lake, Franklin co., J. G. Jack (♯1, type), September 15, 1903, June 8, 1905.

Crataegus spissa n. sp.

Leaves ovate, acuminate, gradually narrowed and concave-cuneate at the entire base, sharply doubly serrate above, with straight glandular teeth, and divided usually only above the middle into 4 or 5 pairs of small acuminate lobes; tinged with red and covered with long white hairs when they unfold, nearly half grown when the flowers open at the end of May and then thin, yellow-green and roughened above by short hairs and paler and glabrous below, and at maturity thin, dark yellow-green, smooth, glabrous and lustrous on the upper surface, pale yellow-green on the lower surface, 4-5 cm long and 3-4 cm wide, with slender yellow midribs, and thin primary veins arching obliquely to the points of the lobes; petioles slender, wing-margined at the apex, sparingly villose on the upper side while young, soon becoming glabrous, glandular with often persistent glands, 1.2-2 cm in length; leaves on vigorous shoots thicker, often rounded or truncate at the broad base, more coarsely serrate and more deeply lobed, 7-9 cm long and 7-8 cm wide, with broadly winged glandular petioles. Flowers 1.2-1.3 cm in diameter, on short glabrous or slightly hairy pedicels, in small very compact 5-10-flowered corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, glabrous, the lobes gradually narrowed from broad bases, acuminate, glandular dentate usually only above the middle, glabrous on the outer, villose on the inner surface, reflexed after anthesis; stamens 10; anthers pink or purplish red; styles 3 or 4, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the middle of September, on short drooping pedicels, in few-fruited clusters, subglobose to oval, scarlet, lustrous, marked by small pale dots; calyx little enlarged, with a wide shallow cavity, and small spreading serrate lobes, their tips

often deciduous from the ripe fruit; flesh thin, yellow, dry and mealy; nutlets 3 or 4, gradually narrowed and rounded at the ends, ridged on the back, with a long narrow ridge, 6-7 mm long, and 3.5-4 mm wide.

A shrub 3-4 m high, with numerous small stems, ascending or suberect branches, and slender slightly zigzag glabrous branchlets dark orange-green when they first appear, becoming bright chestnut-brown, lustrous and marked by pale lenticels in their first season and dull gray-brown the following year, and armed with numerous slender straight or slightly curved chestnut-brown shining spines 3.5-6 cm long.

Dry sandy or rocky soil, North Elba, Essex co., common and the prevailing species, C. H. Peck (№41, type), May 27, June 2 and September 18, 1903, (№41') July 22 and September 18, 1904.

Crataegus verrucalis n. sp., Peck

Leaves ovate to slightly obovate, acuminate and long-pointed at the apex, gradually narrowed and cuneate at the base, finely often doubly serrate, with straight glandular teeth, and divided usually only about the middle into 4 or 5 pairs of slender acuminate spreading lobes; bronze-red and covered on the upper surface with short white hairs when they unfold, more than half grown when the flowers open at the end of May or early in June and then thin, yellow-green and still slightly hairy above and paler below, and at maturity thin, yellow-green on the lower surface, 4-4.5 cm long and 2.5-3 cm wide, with thin prominent midribs, and rather obscure primary veins; petioles slender, slightly wing-margined at the apex, glabrous, glandular, with often persistent glands, 1.5-2 cm in length; leaves on vigorous shoots broadly ovate to suborbicular, rounded at the base, more coarsely serrate and more deeply lobed. Flowers 1.2-1.4 cm in diameter, on short slender slightly villose pedicels, in small compact 4-10-flowered hairy corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, villose, the lobes slender, acuminate, glandular dentate, glabrous on the outer, sparingly villose on the inner surface, reflexed after anthesis; stamens 5-10; anthers red; styles 2-4, usually 3. Fruit ripening from the middle to the end of September and often persistent until after the leaves have fallen, on slender slightly hairy drooping, pedicels, in few-fruited clusters, subglobose to short-oblong, scarlet, lustrous, 1-1.2 cm long and 8-10 mm in diameter; calyx little enlarged, with a deep narrow cavity, and small

spreading often deciduous lobes; flesh thin, yellow; nutlets usually 3, acute at the base, thicker and rounded at the apex, ridged on the back, with a low doubly grooved ridge, 6.5-7 mm long, and 3.5-4 mm wide.

A shrub or small tree 2-4 m high, with a stem sometimes 5 dm in diameter and like the long slender mostly erect branches covered with dark brown verrucose bark, and slender glabrous branchlets yellow-green and marked by pale lenticels when they first appear, becoming light chestnut-brown and lustrous in their first season and dark red-brown the following year, and armed with numerous stout straight light chestnut-brown shining spines 3.5-4 cm long.

Adirondack region, common; C. H. Peck (✕ ffc, type), June 18 and October 1, 1907.

Related to *Crataegus praecoqua* Sargent, *Crataegus verrucalis* may be distinguished from that species by its smaller leaves and flower clusters, fewer stamens and styles, by its smaller and late hanging fruit, and by the peculiar wartlike excrescences on the bark.

Crataegus harryi n. sp.

Glabrous with the exception of the hairs on the upper surface of the young leaves and on the calyx-lobes. Leaves obovate, gradually narrowed and acute or acuminate at the apex, concave-cuneate at the entire base, or occasionally oval and acuminate at the ends, sharply doubly serrate, with straight glandular teeth, and divided above the middle into numerous short slender acuminate lobes; nearly fully grown when the flowers open the last of May and then very thin, dark yellow-green and covered above by soft white hairs and paler below, and at maturity thin, dull light yellow-green and scabrate on the upper surface and yellow-green and lustrous on the lower surface, 6-7 cm long and 4-4.5 cm wide, with slender yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, 1.5-3 cm in length; leaves on vigorous shoots thicker, deeply lobed, more coarsely serrate, and often 12-14 cm long and 8-9 cm wide. Flowers 1.3-1.5 cm in diameter, on slender pedicels, in wide mostly 7-15-flowered corymbs, the long lower peduncles from the axils of upper leaves; calyx-tube very narrow, obconic, the lobes long, slender, acuminate, minutely glandular dentate, glabrous on the outer, villose on the inner surface, reflexed after anthesis; stamens 5 or 6; anthers pink; styles 2-4. Fruit ripening and falling early in October, on slender reddish pedicels, in few-fruited spreading clusters, short-oblong to slightly obovate,

rounded at the ends, cherry-red, lustrous, marked by small pale dots, about 1 cm long and 8-9 mm in diameter; calyx prominent, with a wide deep cavity tomentose in the bottom, and long spreading and incurved persistent lobes; flesh thin, yellow-green, dry and mealy; nutlets 2-4, rounded at the base, gradually narrowed and acute at the apex, or when 4 acute at the ends, ridged on the back, with a high broad irregularly grooved ridge 7-7.5 mm long, and about 5 mm wide.

A slender tree sometimes 8 m high, with a short trunk occasionally 2 dm in diameter and covered with pale gray very scaly bark, small spreading dark gray branches spotted with lighter gray, and very slender nearly straight branchlets dark orange-brown and marked by pale lenticels when they first appear, becoming light yellow-brown and lustrous in their first season and dull light gray-brown the following year, and armed with occasional slender nearly straight or slightly curved light chestnut-brown spines 2.5-3 cm long.

Borders of woods in low bottom lands of Wet-stone brook near the Honeoye state road, Richmond, Ontario co., Henry T. Brown (№ 38, type), May 28 and October 17, 1906.

Both Brown and Henry having been used in forming specific names in *Crataegus*, *Crataegus harryi*, one of the most distinct and interesting of his discoveries will serve to commemorate the name of Henry T. Brown of Rochester, New York, who has carefully studied and collected the numerous thorns found by him near Hemlock and Honeoye lakes in Livingston and Ontario counties.

ANOMALAE

Crataegus simulans n. sp.

Leaves ovate to slightly obovate or oval, acuminate or rounded at the apex, gradually narrowed to the concave-cuneate entire base, sharply often doubly serrate above, with straight glandular teeth, and slightly divided usually only above the middle into 4 or 5 pairs of small acuminate spreading lobes; nearly fully grown when the flowers open in the last week of May and then thin, yellow-green and slightly roughened above by short white hairs and paler and glabrous below, and at maturity thin, dull yellow-green and scabrate on the upper surface, paler on the lower surface, 5-6 cm long and 2.5-5 cm wide, with thin light yellow midribs and primary veins; petioles slender, slightly wing-margined at the apex, sparingly villose on the upper side while young, soon becoming glabrous, often rose colored in the autumn at the base, 1.5-2.5 cm in length; leaves

on vigorous shoots somewhat larger, more deeply lobed and more coarsely serrate. Flowers 1.8-2 cm in diameter, on long slender slightly villose pedicels, in wide lax mostly 9-14-flowered corymbs, the elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes abruptly narrowed at the base, long, slender, acuminate, minutely glandular dentate, glabrous on the outer, slightly hairy on the inner surface, reflexed after anthesis; stamens 10; anthers light pink; styles 3 or 4, surrounded at the base by a few pale hairs. Fruit ripening early in October, on long slender reddish pedicels furnished with occasional hairs, in few-fruited clusters, short-oblong to slightly obovate, bright red, lustrous, marked by small pale dots, 8-10 mm long and 7-9 mm in diameter; calyx prominent, with a short tube, a broad shallow cavity narrowed and tomentose in the bottom, and elongated persistent lobes villose and bright red on the upper side; flesh thin, yellow-green, dry and mealy; nutlets 3 or 4, gradually narrowed and rounded, or when 4 acute at the ends, ridged on the back, with a broad high grooved ridge, more or less penetrated on the inner faces by long wide depressions, 6.5-7 mm long, and 4-4.5 mm wide.

A shrub 3-4 m high, with small stems covered with pale gray bark, spreading horizontal and drooping branches, and very slender nearly straight branchlets, light orange-green and marked by pale lenticels when they first appear, becoming light chestnut-brown and very lustrous in the first season and pale gray-green in their third year, and armed with slender nearly straight dark purple spines 4-5 cm long.

Near the road along the east side of Hemlock lake, Livingston co., Henry T. Brown (♯11, type), May 28 and October 3, 1906.

This species has the foliage, habit and general appearance of a *Coccineae*. From that group it is excluded by the depressions on the inner faces of the nutlets which are sometimes as much developed as in some of the species of *Tomentosae*. On many of the nutlets these depressions are much less deep than on others, however, and as they show so much variation in this character it is perhaps best to place it among the *Anomalae*, which by the discovery of this species appears to be even more closely related than was before supposed; on one hand with the *Coccineae* and on the other with the *Tomentosae*.

Crataegus floridula n. sp.

Glabrous with the exception of the hairs on the young leaves and calyx lobes. Leaves ovate to oblong-ovate or oval, long-pointed

and acuminate at the apex, gradually narrowed and concave-cuneate at the entire base, finely doubly serrate above, with straight glandular teeth, and slightly and irregularly divided usually only above the middle into 3 or 4 pairs of small acute lobes; slightly tinged with red when they unfold, nearly fully grown when the flowers open the first week of June and then very thin, dark yellow-green and slightly hairy above especially along the midribs, and glabrous and glaucous below, and at maturity thin, dark bluish green, smooth and lustrous on the upper surface, pale blue-green on the lower surface, 5-7 cm long and 3-4.5 cm wide, with thin yellow midribs and primary veins; petioles very slender, slightly wing-margined at the apex, sparingly glandular, with mostly deciduous glands, often tinged with red in the autumn, 1.8-2.5 cm in length; leaves on vigorous shoots thicker, occasionally rounded at the base, more coarsely serrated, more deeply lobed, and often 7-8 cm long and 5.5-6.5 cm wide, with foliaceous lunate often persistent stipules. Flowers 1.2-1.3 cm in diameter, on long slender pedicels, in very narrow compact 4-8-flowered corymbs, the much elongated lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, the lobes long, slender, acuminate and rose colored at the apex, entire or furnished near the base with 1 or 2 glands, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 5-8; anthers red or purple; styles 3 or 4. Fruit ripening late in September, on slender drooping pedicels, in loose clusters, short-oblong to somewhat obovate, slightly narrowed at the ends, crimson, lustrous, 1.1-1.2 mm long, and 7-8 mm in diameter; calyx little enlarged, with a deep narrow cavity, and reflexed and appressed lobes dark red on the upper side below the middle and often deciduous from the ripe fruit; flesh thin, greenish yellow; nutlets 3 or 4, usually 3, gradually narrowed and rounded at the ends, or when 3 broader at the apex than at the base, marked on the inner face by shallow irregular depressions, 6.5-7 mm long, and about 4 mm wide.

A shrub 2-3 m high, with gray stems, 2.5-5 cm in diameter near the ground, ascending branches, and slender slightly zigzag branchlets dark orange-green and marked by pale lenticels when they first appear, becoming bright chestnut-brown and lustrous in their first season and dull reddish brown the following year, and armed with stout slightly curved chestnut-brown shining spines 2.5-3 cm long.

Piseco, Hamilton co., C. H. Peck (№62, type), June 10 and September 16, 1904.

TOMENTOSAE

Crataegus efferata n. sp.

Leaves oblong-ovate to rhombic, acute or acuminate at the apex, abruptly or acutely concave-cuneate at the entire base, finely often doubly serrate above, with straight or incurved glandular teeth, and sometimes slightly divided above the middle into 3 or 4 pairs of small acute lobes; more than half grown when the flowers open the last days of May and then very thin, yellow-green and slightly hairy above on the midribs and covered below by soft pale hairs, and at maturity thin but firm in texture, light yellow-green, very smooth and glabrous on the upper surface, pale and villose-pubescent on the lower surface on the stout often rose colored midribs and slender primary veins and veinlets, 5.5-7.5 cm long and 4-6 cm wide; petioles stout, narrowly wing-margined often to the base, hairy on the upper side while young, becoming nearly glabrous and often dark rose color in the autumn, 1.5-1.8 cm in length; leaves on vigorous shoots thicker, more coarsely serrate, more deeply lobed, and often 7-8 cm long and 5-6 cm wide. Flowers about 1.2 cm in diameter, on long slender slightly villose pedicels, in small rather compact 10-15-flowered hairy corymbs, the lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, coated with short white hairs, the lobes abruptly narrowed at the base, long, wide, acuminate, laciniately glandular serrate, glabrous on the outer, slightly villose on the inner surface, reflexed after anthesis; stamens 16-20; anthers light rose color; styles 2 or 3. Fruit ripening early in October, on long slender slightly hairy red pedicels, in few-fruited spreading or drooping clusters, subglobose, scarlet, very lustrous, marked by large pale dots, 8-9 mm in diameter; calyx prominent, with a deep narrow cavity, and long spreading lobes dark red on the upper side below the middle; flesh thick, yellow-green, becoming soft and succulent when fully ripe; nutlets usually 2, nearly orbicular, rounded and slightly ridged on the back, penetrated on the inner face by long narrow deep cavities, 4.5-5 mm long, and 3-3.5 mm wide.

An arborescent shrub 5-7 m high, with stout stems covered with dark brown scaly bark, erect and spreading branches, and stout slightly zigzag glabrous branchlets light orange-yellow when they first appear, becoming dark chestnut-brown, very lustrous and marked by small pale dark lenticels in their first season and dull reddish brown the following year, and armed with numerous very

stout straight or slightly curved light chestnut-brown shining spines 4-5 cm long, compound and long persistent on old stems and branches.

Banks of the outlet of Hemlock lake at Hemlock railroad station, Livingston co., New York, Henry T. Brown (*6, type), May 28 and October 4, 1906.

Crataegus honeoyensis n. sp.

Leaves oval to ovate or slightly obovate, rounded or acute at the apex, gradually or abruptly narrowed and concave-cuneate at the entire base, sharply doubly serrate above, with straight or incurved glandular teeth, and sometimes slightly divided above the middle into 2 or 3 pairs of short broad acuminate lobes; nearly fully grown when the flowers open, in the last week of May and then thin, yellow-green, smooth, lustrous and slightly hairy along the midribs above and pale bluish green and covered below with short soft hairs, and at maturity thick, reticulate-venulose, dull yellow-green, smooth and glabrous on the upper surface, pale and slightly hairy on the lower surface on the stout rose colored midribs, and slender primary veins extending very obliquely to the apex of the leaf, 6-8 cm long and 4-4.5 cm wide; petioles stout, narrowly wing-margined sometimes to the base, slightly hairy on the upper side, often rose color in the autumn, 1.5-2 cm in length; leaves on vigorous shoots rather thicker, ovate or oval, more coarsely serrate, more deeply lobed, and sometimes 8-10 cm long and 5-6 cm wide. Flowers about 1.5 cm in diameter, on long slender drooping villose pedicels, in narrow compact many-flowered corymbs, the long lower peduncles from the axils of upper leaves; calyx-tube narrowly obconic, covered with long scattered pale hairs, the lobes long, wide, acute, laciniately glandular serrate, villose, reflexed after anthesis; stamens 20; anthers pale pink, styles 2 or 3, surrounded at the base by a narrow ring of pale tomentum. Fruit ripening the end of September, on stout slightly hairy erect reddish pedicels, in few-fruited clusters, short-oblong or slightly ovate, scarlet, lustrous, marked by small pale dots, 8-10 mm in diameter; calyx prominent, with a broad deep cavity, and elongated spreading persistent lobes slightly hairy and dark red on the upper side; flesh thin, dry and yellow, becoming soft and succulent; nutlets 2 or 3, rounded at the ends, or when 3 acute at the base, ridged on the back, with a low broad slightly grooved ridge, penetrated on the inner faces by shallow cavities, 6-6.5 mm long, and 4-4.5 mm wide.

A narrow shrub 3-4 m high, with small ashy gray stems, ascending branches, and stout slightly zigzag glabrous branchlets light orange-green and marked by pale lenticels when they first appear, becoming light chestnut-brown and very lustrous in their first season and light reddish-brown the following year, and armed with stout straight purplish shining spines 3.5-4 cm long and pointing toward the apex of the branch.

Roadside west of Honeoye lake, Ontario co., New York, H. T. Brown (№35, type), May 28 and October 16, 1906.

REMARKS AND OBSERVATIONS

Aster paniculatus bellidiflorus (Willd.) Burg.

A form answering well to the description of this subspecies was found growing plentifully near the railroad station at Cairo, Greene co. in September.

Carya glabra odorata Sargent

Specimens were collected near Dykemans, Putnam co. June. The leaflets are generally five and the lowest pair are generally much smaller than the pair above them. The fruit is subglobose with a thin husk.

Castanea dentata Borkh.

Fruiting specimens of the remarkable tree near Freehold, Greene co. known as the "burless chestnut" were obtained in September. The fruit at that time was quite small, but the nuts show the exposed manner of their development. The tree is mentioned in Sargent's *Silva of North America*, volume IX, page 14, footnote.

Clitopilus caespitosus Pk.

This rather rare and singular mushroom, has appeared in several localities this season and has shown a wider range of variation than formerly. The pileus varies from 1-4 inches broad and the lamellae from slightly rounded behind or subsinuate to slightly decurrent. The mode of growth is not always strictly caespitose for occasionally single specimens are found. The color of the spores is very similar to that of the spores of *Tricholoma personatum* Fr., *T. nudum* (Bull.) and *T. sordidum* Fr. but in the colors of the plant it is more closely related to *Clitopilus noveboracensis* Pk. another species with very pale pink spores.

Clitopilus conissans Pk.

This species was described from inadequate material collected in a dry time and showing the specific characters imperfectly. Undue weight was given to the red color of the spores and the plant was thereby referred to a genus with which it has but little affinity. Specimens observed and collected this season indicate that its true relationship is with *Psilocybe* on account of the entire absence of a veil and its general habit. Its characters place it near *P. spadicea*, but the plants also have a striking similarity to *Hypoph*

loma hydrophilum, but from both, the species is separated by the color of the lamellae and spores. A new description follows.

***Psilocybe conissans* n. comb.**

Clitopilus conissans N. Y. State Mus. Rep't 41:64; 42:45

Pileus fleshy but thin, broadly convex becoming nearly plane, glabrous, hygrophanous, pale chestnut or watery ferruginous and striatulate on the margin when moist, pale alutaceous or pale buff and sometimes slightly rugose when dry, flesh whitish; lamellae thin, close, rounded behind, adnexed or rarely adnate, bay verging to dark purple or liver color; stem equal, rather slender, firm, glabrous, hollow, curved or flexuous, white, veil none; spores vinaceous, elliptic, .0003-.0004 of an inch long, .00016-.0002 broad, (8-10 μ long, 4-5 μ broad).

Cespitose on or about the base of deciduous trees. Catskill and Adirondack mountains, also at Gansevoort, Saratoga co. September and October. Cystidia occur sparingly on the lamellae.

***Collybia lacunosa* Pk.**

In *New York State Museum Report* 26, page 51 this plant is described under the name *Agaricus* (*Tricholoma*) *lacunosus*. Its texture is too tough to permit its reference to the genus *Tricholoma* and it is here placed in the genus *Collybia* as a better place for it. It is a pretty little golden yellow mushroom inhabiting decaying wood. It is neither common nor plentiful.

***Crataegus bissellii* Sargent**

A small shrub whose flowers have pale pink anthers soon fading to pale yellow or whitish was found near Staatsburg, Dutchess co. and referred to this species. A similar shrub but having flowers with bright red anthers occurs in North Greenbush, Rensselaer co. As the anthers of the flowers of *C. bissellii* are described as either pink or rose purple the North Greenbush shrub is also referred to this species.

***Cypripedium arietinum* R. Br.**

Near Hague, Warren co. Mrs E. Watrous. This is a rare species in our State and it is becoming more scarce from year to year. It is therefore gratifying to add this new locality to those previously known. Mrs Watrous sends both flowering and fruiting specimens.

Erysimum cheiranthoides L.

A small form 6-10 inches tall with leaves scarcely more than one inch long was found growing about water holes in a pasture near Clayton, Jefferson co.

Geoglossum peckianum Cke.

Specimens of this rare species were found growing among hair cap mosses near Wading River, Suffolk co. August. A slender form of *Geoglossum nigratum* (Fr.) Cke. was found by S. H. Burnham growing among sphagnum in a marsh near Shushan.

Habenaria ciliaris (L.) R. Br.

This beautiful orchid still lingers near Karner in what appears formerly to have been a swamp hole. It was discovered there two years ago and was in fine flowering condition at that time, July 22. The past season it was in the same flowering condition August 18, illustrating strikingly the influence of the season in retarding the development of vegetation.

Hydnum septentrionale Fr.

The difference between the young plant and the mature one is very great, and to illustrate this difference a figure of each is given on plates 9 and 10 in *Icones Hymenomycetum*. A specimen of the young plant was found near Fine, St Lawrence co. growing on the trunk of a standing sugar maple. It corresponds beautifully with the Friesian figure.

Hypholoma sublateritium (Schaeff.) Fr.

This species has been unusually abundant the latter part of the season. It has, in those cases coming under my observation, shown a darker and more uniformly brownish red color of the cap than is shown in *H. perplexum* Pk. This, taken in connection with its stuffed stem, makes the separation of the two quite easy. Its flavor, however, is not always bitter, as is indicated by the descriptions of the European plant.

Morchella deliciosa Fr.

The name of the delicious morel implies that it is specially agreeable as an article of food. In confirmation of this I am pleased to

make the following quotation from a letter received concerning it. "On two successive days this month, May 1907, I have collected on my lawn in Patterson, N. J. a double handful of *Morchella deliciosa*, had them cooked and have eaten them with the result that they were quite as palatable as the common mushroom." Unfortunately the species is not very common and, like other morels, its time of occurrence is limited to a short period early in the season.

Polyporus volvatus Pk.

This singular species of polyporus inhabits the trunks of various coniferous trees. It emerges from holes made in the bark by insect borers. While young, the pores, from which the spores drop, are concealed by a thin prolongation of the exterior coat of the pileus, which forms a continuous membrane beneath them. In due time the central part of this membrane opens in a circular aperture and reveals the mouths of the pores and the heaps of pinkish spores that have fallen from them and lodged on the inner surface of the membrane about the aperture. Small insects are often found inside the wrapper and apparently feeding on the spores. In some specimens of the polyporus received early in the season small holes were observed in the wrapper and insects were found in the cavity dusted with and evidently feeding on the spores, for there was no evidence of their having eaten or bored into the substance of the fungus. The appearance indicated that the borers had eaten one or two holes through the wrapper before its aperture had been formed and that they had thereby gained entrance to the storehouse of spores on which they were feeding. In the examples in which the insects were found within specimens with no small apertures in the wrapper it is clear that they gained entrance through the larger natural aperture. It is possible that one purpose of the visit of the insects is to deposit eggs within the fungus, for this species of polyporus is one specially liable to be quickly destroyed by insect larvae developing within. Here appears to be a peculiar case of mutual benefit between insect and fungus. The insect bores holes through the bark of the tree. Through these holes the spores of the fungus have access to the sapwood of the tree and through them also the mycelium of the fungus finds an exit to the external light and air where it forms the fruiting body and develops its spores. These in turn furnish food and a place for propagation to insects.

Salix serissima (Bail.) Fern.

A fine clump of this late willow was found growing in a wet place by the roadside near Fulton Chain, Herkimer co. This is the third station known for it in the Adirondack region.

Sphaeronema pruinorum Pk.

On the trunk of the low June berry, *Amelanchier spicata* (Lam.) Dec. Arnold clearing near Fulton Chain. June. This rare fungus was published in *New York State Museum Report* 24, page 85. 1872. Apparently the same species was published under the same name by Berkeley and Curtis in *Grevillea* 2:177. 1874.

EDIBLE FUNGI**Lycoperdon subincarnatum** Pk.

PINKISH PUFFBALL

PLATE II4, FIG. 1-6.

Gregarious or cespitose; peridium 6-12 lines broad, globose or subglobose, sessile, the surface covered with small close subpyramidal granular or spiny warts which in the mature plant fall, leaving minute pits in the surface of the inner peridium, pinkish brown; capillitium and spores olivaceous; spores globose, .00016-.0002 of an inch broad.

The pinkish puffball is found in woods, growing on decaying wood, stumps, and prostrate trunks of trees and may be found from July to September. It is peculiar to this country. It rarely exceeds one inch in diameter and except when growing in dense clusters it is quite regularly globose and either sessile or with a very short sterile base. It is easily distinguished by its dull pinkish brown color and sessile peridium while immature, and by the grayish minutely pitted inner peridium of the mature or old plants. It is well to remove the exterior peridium before cooking. The texture is a little tough and the flesh is not highly flavored, but when fried in butter it is agreeable to the taste, digestible and harmless. No puffball should be eaten after its flesh has lost its white color.

Lycoperdon gemmatum Batsch

STUDDED PUFFBALL

PLATE II4, FIG. 7-15

Scattered, gregarious or cespitose; peridium 10-20 lines broad, globose, depressed globose or obovate, obtuse or umbonate, generally

abruptly narrowed below into a more or less stemlike base, the surface covered with warts of unequal size, the larger ones solid, conic or pyramidal, bluntly pointed, early deciduous, intermingled with smaller granular and more persistent ones, where falling leaving small pale dotlike spots on the inner peridium, about which the smaller warts form rows of minute dots, white, whitish, grayish or brownish, the apex or umbo sometimes more highly colored than the rest, the old denuded peridium grayish, brownish or cinereous, often retaining the dotlike spots for a long time; capillitium and spores olivaceous; spores globose, .00016 of an inch broad.

The studded puffball grows on the ground and on decaying wood, in woods, groves and open places and may be found from June to October. It is a common and a very variable species. It is readily distinguished from all our other species by the peculiar character of its larger gemlike warts and the pale dots they leave on the inner peridium when they have fallen. The anastomosing rows of the smaller warts often give a reticulate appearance to the surface. The stemlike sterile base is sometimes cylindrical and nearly equal in diameter to the diameter of the peridium, sometimes it is much more narrow and again it may gradually taper downward. In some cases it is very short or wanting, in others it exceeds the peridium in length. In large specimens it may be coarsely pitted at the top or plicately grooved, the grooves often extending upward and forming plications on the base of the peridium. In some specimens both the grooves and pits occur. The larger warts are usually more numerous and conspicuous on the upper half of the peridium and are smaller and more scattered toward the base. Sometimes they are tipped with black or brown, and in some specimens they are more closely placed than in others.

The outer coat should be removed before cooking. In the raw state the taste is disagreeable, but cooking destroys this and makes a very palatable dish of this common puffball.

Clitocybe subcyathiformis n. sp.

SAUCER CLITOCYBE

PLATE IIO, FIG. I-6

Pileus fleshy but thin, broadly convex or nearly plane becoming centrally depressed, glabrous, hygrophonous, watery white when

moist and often obscurely striatulate on the thin soon spreading margin, white when dry, sometimes slightly colored in the center, flesh white, taste mild; lamellae thin, moderately close, adnate or slightly decurrent, white or whitish; stem equal or slightly tapering upward, stuffed, fibrillose-reticulate, whitish, often with a whitish mycelioid tomentum at the base; spores elliptic, .00024-.0003 of an inch long, .00016-.0002 broad.

The saucer clitocybe is gregarious and grows among fallen leaves under alders and white birches, and occurs late in the season. Its cap is 1-2 inches broad; its stem 1-1.5 inches long and 2-4 lines thick. It is generally white throughout. In the character of the stem the species is related to the cup shaped clitocybe, *C. cyathiformis* Fr., but in its white color, in its thin quickly expanding margin, and closer gills it is more closely related to *C. dealbata* Sow. The central depression of the cap is partly due to the elevation of the thin margin. The upper surface of the cap is therefore concave or saucer shaped and does not become funnel form. The margin is sometimes wavy or irregular. The small size and rarity of the species detracts from its importance as an edible species, but its agreeable flavor and harmless character make it worthy of a place in our list of edible species.

Collybia dryophila (Bull.) Fr.

OAK LOVING COLLYBIA

PLATE III, FIG. I-II

Pileus thin, convex or nearly plane, sometimes depressed in the center with the margin elevated and often wavy or irregular, glabrous, obtuse, variable in color, pale alutaceous, yellowish, dark tan or chestnut, flesh white; lamellae thin, close, narrow, rounded behind, slightly adnexed or nearly free, white or whitish, rarely tinged with yellow; stem equal, thickened toward the base or bulbous, glabrous, hollow, commonly colored like the pileus; spores elliptic, .00024-.0003 of an inch long, .00012-.00016 broad.

The oak loving collybia is one of our most common mushrooms. It occurs in woods, groves, open places and pastures and appears at any time from early spring to late autumn, when there is a sufficient degree of warmth and moisture. A favorite place of growth for it is among fallen pine leaves or under pine trees. It also grows on decaying wood. It may be solitary, gregarious or tufted. In dense tufts the caps are usually very irregular on account of mutual

pressure. They are 1-3 inches broad, the stem 1-3 inches long and 1-3 lines thick. The flesh is slightly tough but agreeable to the taste and perfectly harmless.

Russula pusilla Pk.

SMALL RUSSULA

PLATE 110, FIG. 7-14

Pileus very thin, convex or nearly plane, sometimes slightly or umbilicately depressed in the center, glabrous, even or slightly striate on the margin, red, often darker in the center, flesh white, taste mild; lamellae broad, moderately close, subventricose, adnate or slightly rounded behind, white becoming yellowish ochraceous or ochraceous buff with age or in drying; stem stout, solid or spongy within, soft, white; spores globose, slightly tinged with yellow, .0003 of an inch broad.

The small russula is not common but it sometimes occurs in considerable quantity and may be found from July to October. In the typical form the cap is less than an inch broad and the stem less than an inch long, but in specimens sent me by an esteemed correspondent and enthusiastic mycologist, Mr E. B. Sterling, the caps range from 3 lines to 2 inches broad, but the stem is in no case more than an inch long. The color of the caps is dark red or crimson, usually darker or brownish in the center. The coloring matter is soluble in water. If the plants are washed in water, the water becomes red, if stewed in milk without previous washing the milk becomes red, but this does not detract from the flavor and edibility of the mushroom. The pellicle of the pileus is separable and when wet, appears to be viscid, but in the growing condition of the mushroom the viscosity is not apparent. The plants grow on the bare soil or among short grass under pine trees. Mr Sterling writes concerning them that they have been very abundant between October 2 and October 11 and that on the afternoon of the latter date under two pine trees he collected for the table 120 specimens. He says "I consider them without doubt the best of the *Russula* family for eating. They taste good raw and when fried in butter, flavored and served hot, are delicious." Through his kindness I have had the opportunity of testing the edibility of this rare little mushroom and have no hesitation in placing it in the list of our excellent edible species.

Crepidotus malachus B. & C.

SOFT SKINNED CREPIDOTUS

PLATE 112, FIG. 1-4

Pileus fleshy, thin on the margin, thicker at the base, reniform, orbicular, cuneate or flabellate, convex or nearly plane, sometimes depressed behind, sessile or with a very short inconspicuous white tomentose stem, glabrous or slightly tomentose at the base, hygrophanous, watery white or grayish white and striatulate on the thin margin when moist, white when dry, flesh white; lamellae thin, close, rounded behind, white or whitish becoming brownish ferruginous; spores globose, .00025-.0003 of an inch broad.

The soft-skinned crepidotus is a common species and grows on damp decaying wood in woods or shaded places. Much decayed prostrate mossy trunks of trees constitute a favorite habitat for it. It may be scattered, gregarious or imbricated in its mode of growth. It occurs from June to September. The cap is 1-2.5 inches broad and is sessile, or if it has a stem this is so short that the cap appears from above to be sessile. In wet weather or after rain it has a water soaked appearance and slight shadowy striations on the margin. As the moisture escapes, the cap becomes a clearer white and the striations disappear. The moisture disappears from the thickest part of the cap first, the thinnest part last. The species may be separated from our other white and closely allied forms by its more glabrous cap and globose spores.

Stropharia bilamellata Pk.

DOUBLE GILLED STROPHARIA

PLATE 112, FIG. 5-10

Pileus fleshy, convex, becoming nearly plane in large plants, even, obtuse, glabrous, whitish or yellowish, flesh white; lamellae thin, close, adnate, purplish brown in the mature plant; stem commonly short, solid, sometimes hollow in large plants, white, annulate, the annulus thick, white, with lamellae on the upper surface; spores elliptic, .0004-.0005 of an inch long, .0002-.0003 broad.

The double gilled stropharia is a rare species of which the first specimens received were collected in California. A second collection, of which samples were received, was made in Washington, D. C., and a third which enabled me to test its edibility was received

from Newark, Wayne co. where it was found growing in a cultivated field.

The species is well marked by the peculiar character of its collar. On the upper surface are miniature gills which radiate from the stem to the margin of the collar. These are narrow, white and uneven or dentate on the margin. They are sometimes stained by the spores, but these have probably fallen from the true gills above. In some instances the inner extremity of the false gills extends upward on the stem and appears to connect with the gills above. This peculiar character of the collar seems to be shown in *Stropharia coronilla* (Bull.) Fr. and forcibly suggests the thought that our plant is specifically the same as the European. The two correspond in several other characters and were there not several discrepancies between the American plant and the description of the European there could be no doubt of their specific unity. The following comparison shows the differences.

	AMERICAN	EUROPEAN
Pileus	white or yellowish	Tawny, ochraceous
Stem	solid or hollow, equal, or tapering upward	Stuffed, tapering downward
Collar	broad, white, gills on the upper surface	Narrow with radiating violaceous striae or upper surface sulcate plicate
Gills	without cystidia	With cystidia
Spores	10-12 μ x 6-8 μ	10 μ x 5 μ

On account of these differences it has seemed best to consider our plant distinct from the European, though it must be acknowledged that the similarity in the peculiar and unusual character of the gills almost outweighs the discrepancies between our plant and the descriptions of the European.

The cap is white or yellowish, glabrous, obtuse, the flesh is white and our plant, like the European, has a peculiar or radishlike odor. The mature gills are purplish brown with a white edge. The stem is commonly solid, but in large or old specimens it is sometimes clearly hollow. It is equal in diameter or tapering upward.

Boletus niveus Fr.

SNOWY BOLETUS

PLATE II 3, FIG. I-5

Pileus fleshy, convex, becoming broadly convex or nearly plane, glabrous, white or grayish white, flesh white; tubes nearly plane in

the mass, becoming convex with age, depressed around the stem, their mouths minute, whitish when young, becoming brownish with age; stems long, rather slender, equal or tapering upward, solid, scurfy or appressed scaly, grayish; spores oblong-fusiform, .0005-.0008 of an inch long, .0002-.00024 broad.

The snowy boletus is so closely related to the scabrous stemmed boletus that it is treated as a variety of it in *Hymenomyces Europaeae*. But it has recently been raised again to specific rank. It differs from the scabrous stemmed boletus not only in the color of its cap but also in its smaller tube mouths and in the character of its stem which lacks the fibrous black or reddish points which so distinctly mark *B. scaber*. Sometimes the whitish cap becomes tinged with green or bluish green, specially on the margin. The species is rare, having been observed and collected by the writer twice only, and both times in one locality. It occurs in August and is gregarious in its mode of growth. Its cap is 2-4 inches broad, its stem 3-5 inches long and 3-6 lines thick. Its edible qualities are similar to those of the scabrous stemmed boletus.

NEW YORK SPECIES OF PHOLIOTA

Pholiota Fr.

The genus *Pholiota* belongs to the series *Ochrosporae* which is characterized by spores of an ochraceous or subferruginous color. It is not in all cases sharply limited from allied genera because of the varying character of some of its species. It corresponds in structure to *Armillaria* in the white spored series and *Stropharia* in the brown spored series. In the group *Phaeotae* of the terrestrial species the spores are brown enough to cause some difficulty in deciding whether a given species should be placed in *Pholiota* or *Stropharia*. The variability in the development of the veil may also cause some perplexity. Species in which the veil is but slightly developed and very fugacious are liable to be referred to the genus *Flammula* or *Naucoria*. In *Pholiota ornella* Pk. the remains of the slight veil are so conspicuously adherent to the margin of the pileus as to suggest a reference to the genus *Hypholoma* unless the spore color is carefully noted. The prominent characters of the genus are:

Hymenophorum continuous with the stem; lamellae attached to the stem; stem annulate.

Some of the species grow on the ground, but the greater number grow on dead or decaying wood.

KEY TO THE SPECIES

Plants terrestrial	1
Plants lignatile	12
Plants growing on or among mosses	minima
1 Spores ferruginous	2
1 Spores fuscoferruginous	5
2 Pileus 2 inches or more broad	caperata
2 Pileus less than 2 inches broad	3
3 Pileus hygrophanous	rugosa
3 Pileus not hygrophanous	4
4 Pileus slightly striate on the margin	filaris
4 Pileus even on the margin	togularis
5 Pileus squamulose	angustipes
5 Pileus glabrous	6
6 Pileus viscid when moist	aggricola
6 Pileus not viscid	7
7 Pileus subochraceous	8
7 Pileus not subochraceous	9
8 Annulus persistent, lamellae very broad	temnophylla
8 Annulus fugacious, lamellae narrow	howeana
9 Stem solid	johnsoniana
9 stem hollow	10
10 Pileus white, commonly rimose areolate	vermiflua
10 Pileus not pure white, commonly even	11
11 Spores more than .0003 of an inch long	praecox
11 Spores less than .0003 of an inch long	duroides
12 Pileus and stem squamose or squamulose	13
12 Pileus alone squamose or squamulose	18
12 Pileus neither squamose nor squamulose	21
13 Pileus viscid when moist	14
13 Pileus not viscid	16
14 Pileus with red or purple hues when young	ornella
14 Pileus with no red or purple hues	15
15 Pileus brown or yellowish brown	albocrenulata
15 Pileus bright yellow	adiposa
15 Pileus lemon yellow	limonella
15 Pileus whitish with dense tawny erect scales	squarrosoides
16 Pileus more than 1 inch broad	17
16 Pileus not more than 1 inch broad	erinaccella
17 Pileus with squarrose tawny scales	squarrosa
17 Pileus with superficial pale yellow scales	flammans
18 Pileus viscid when moist	comosa
18 Pileus not viscid	19
19 Annulus well developed, persistent	spectabilis
19 Annulus slight, fugacious	20
20 Stem hollow	curvipes
20 Stem solid	luteofolia
21 Pileus dry	lutea
21 Pileus hygrophanous	22

22	Pileus more than 2 inches broad.....	23
22	Pileus not more than 2 inches broad.....	24
23	Pileus when dry cinnamon or ferruginous.....	cerasina
23	Pileus when dry yellow.....	accricola
24	Pileus viscid when moist.....	discolor
24	Pileus not viscid.....	25
25	Pileus yellow when dry.....	autumnalis
25	Pileus tawny when dry.....	confragosa
25	Pileus whitish or yellowish buff when dry.....	marginella

TERRESTRIAL

Sporcs ferruginous

Pholiota minima Pk.

SMALLEST PHOLIOTA

Pileus membranous, hemispheric or campanulate, umbonate, glabrous, hygrophanous, brown and striatulate on the margin when moist, pale buff or yellowish white when dry; lamellae rather close, subventricose, adnexed, ferruginous; stem slender, glabrous, solid, shining, similar to the pileus in color, annulus near the middle, slight, evanescent; spores elliptic, .0003 of an inch long, .0002 broad.

Pileus 2-4 lines broad; stem 8-12 lines long, .25 line thick.

Among hair cap mosses, *Polytrichum*. Catskill mountains. September. An extremely small species and a very rare one. It was discovered 20 years ago and has not been found since. It is separable from *Pholiota mycenoides* Fr. by its smaller size, paler color, umbonate pileus and solid stem. The umbonate pileus also separates it from *P. pumila* Fr.

Pholiota caperata (Pers.) Fr.

WRINKLED PHOLIOTA

State Mus. Rep't 54. p.182, pl.73, fig.1-5.

Pileus fleshy, firm, thin toward the margin, ovate becoming broadly campanulate or convex, obtuse, glabrous or often whitened in the center by whitish flocci or silky fibrils, generally more or less wrinkled, yellow, flesh white; lamellae moderately close, adnate, often uneven on the edge, whitish becoming ferruginous; stem equal, solid, stout, sometimes bulbous, glabrous or slightly floccose, white or whitish, the membranous annulus white, thick on the edge; spores subelliptic, .0005-.0006 of an inch long, .00025-.0003 broad.

Pileus 2-4 inches broad; stem 2-5 inches long, 5-10 line thick.

Scattered or somewhat gregarious, in woods, mossy swamps and open places. July to October. Common. Edible.

This is a fine large pholiota easily recognized by its peculiar wrinkled pileus and the white pruinosity or floccose covering of the center of the pileus. Sometimes, however, specimens may occur in which neither the wrinkles nor the flocci are present. Occasionally there is the semblance of a volva at the base of the stem. The annulus is usually well developed, white and persistent.

Pholiota rugosa Pk.

RUGOSE PHOLIOTA

Pileus thin, broadly conic or campanulate becoming expanded and often umbonate, hygrophorous, yellowish red or ferruginous and striatulate on the margin when moist, pale yellow or buff and commonly rugose when dry; lamellae close, adnexed, minutely denticulate on the edge, yellowish white becoming ferruginous or brownish ferruginous, the interspaces venose; stem equal or slightly thickened toward the base, straight or flexuous, hollow, fibrillose or squamulose below the annulus, pruinose or mealy above, pallid, the annulus membranous, with radiating ridges or striations on the upper surface, white; spores .0004-.0005 of an inch long, .00024-.00028 broad.

Pileus 6-12 lines broad; stem 1-2 inches long, 1-2 lines thick.

Ground and among decaying chips. Adirondack region. September. The species is closely related to *Pholiota togularis* (Bull.) Fr. from which it is separated by the hygrophorous pileus, the adnexed lamellae and the peculiar striations of the annulus.

Pholiota filaris (Fr.) Pk.

THREAD STEM PHOLIOTA

Pileus submembranous, campanulate becoming broadly convex or nearly plane, obtuse, even, but slightly striate on the margin, ochraceous; lamellae thin, close, adnate, ventricose, yellow becoming pale ferruginous; stem filiform, flexuous, glabrous, pallid, the annulus well developed, distant, white; spores .0003 of an inch long, .0002 broad.

Pileus 4-6 lines broad; stem 1-2 inches long, scarcely half a line thick.

Woods and open places. Adirondack and Catskill mountains. August. This is closely related to the next following species, with which it was united as a variety by the illustrious Fries. It may be separated by its smaller size, and the slightly striate margin of the pileus.

Pholiota togularis (Bull.) Fr.

LITTLE CLOAK PHOLIOTA

Pileus thin, campanulate becoming nearly plane, orbicular, obtuse, glabrous, even, not striate on the margin, pale ochraceous; lamellae thin, close, adrate, ventricose, yellow becoming pale ferruginous; stem equal, hollow, slender, fibrillose, yellow at the top, brownish toward the base; spores .0003 of an inch long. 0002 broad.

Pileus 10-15 lines broad; stem 2-3 inches long, 1-2 lines thick.

Ground in woods. Adirondack mountains. August. This and the two preceding species may yet be found to be varieties of one very variable species. They are closely allied to each other but may be distinguished by the characters given.

Spores fusco-ferruginous

Pholiota angustipes Pk.

NARROW STEM PHOLIOTA

Pileus fleshy, hemispheric becoming convex or nearly plane, slightly viscid when moist, squamulose with minute dotlike appressed scales, brown or grayish brown becoming ochraceous brown or sub-alutaceous, flesh whitish, taste unpleasant; lamellae thin, close, sinuate, whitish or creamy yellow becoming tawny brown; stem equal or tapering downward, flexuous, stuffed or hollow, squamose, whitish or cinereous; spores naviculoid, .0003 of an inch long, .00016-.0002 broad.

Pileus 1-2.5 inches broad; stem 1.5-3 inches long, 2-3 lines thick.

Cespitose. In pastures, commonly near or around old stumps. Otsego and Albany counties. July to October.

This species is related to the European *Pholiota terrigena* Fr. and *Pholiota punctulata* Kalchb. but from both it differs in the darker color of the pileus and in its slight viscosity. By reason of its densely tufted mode of growth the caps are often closely crowded and irregular.

Pholiota aggericola Pk.

BROWN PHOLIOTA

Pileus fleshy, convex becoming nearly plane or slightly depressed in the center by the upcurving of the margin, glabrous, viscid when moist and slightly striatulate on the margin, brown or blackish brown, sometimes darker in the center; lamellae subdistant, sinuate, decurrent with a tooth, pallid or grayish becoming rusty brown; stem equal or slightly tapering upward, fibrous, solid, colored like or a little paler than the pileus, whitish above the membranous annulus; spores elliptic, .0004-.0005 of an inch long, .00024 broad.

Pileus 1-2 inches broad; stem 1.5-3 inches long, 2-4 lines thick.

Banks by roadsides and among fallen leaves in woods. Albany county and Adirondack mountains. July to October. The pileus sometimes fades to a rusty brown hue.

P. aggericola retirugis Pk. Pileus rugosely reticulated.

Pholiota indecens Pk. is probably not distinct from this species, it differing in its dry pileus. This possibly was due to its being collected in a dry time. It has been collected but once.

Pholiota temnophylla Pk.

CUT GILLED PHOLIOTA

Pileus fleshy, hemispheric becoming convex, smooth, ochraceous yellow; lamellae very broad, adnexed, obliquely truncate at the inner extremity, brownish ferruginous; stem equal, glabrous, hollow, white, the annulus well developed, membranous, white; spores brownish ferruginous, broadly elliptic, .0004-.0005 of an inch long, .0003-.00035 broad.

Pileus 1-2 inches broad; stem 2-4 inches long, 2-4 lines thick.

Grassy ground by roadsides. Rensselaer county. June.

In color this species resembles *Naucoria semiorbicularis* (Bull.) Fr. but its annulus at once separates it from that. It also approaches *Pholiota praecox* (Pers.) Fr. in some respects, but its large size and peculiar broad lamellae are distinguishing characters. It has been found but once.

Pholiota howeana Pk.

HOWE PHOLIOTA

Pileus convex becoming nearly plane, fragile, smooth, subumbonate, yellowish, sometimes darker in the center; lamellae thin, close, rounded behind, eroded on the edge, whitish becoming ferruginous brown; stem equal or slightly thickened at the base, glabrous, hollow, colored like the pileus; spores .0003-.0004 of an inch long, .0002-.00024 broad.

Pileus 1-3 inches broad; stem 2-4 inches long, 2-4 lines thick.

Ground in woods and bushy places. Adirondack mountains, Albany and Sullivan counties. June, July and August. This species was formerly referred doubtfully to the genus *Stropharia*, but it now seems better to put it in *Pholiota*.

Pholiota johnsoniana Pk.

JOHNSON PHOLIOTA

Pileus fleshy, soft, brittle, broadly convex or nearly plane, glabrous, thin on the margin and sometimes striatulate when moist, yellowish in the center, whitish on the margin, sometimes wholly yellowish, flesh white, flavor agreeable; lamellae thin, close, rounded behind, slightly adnexed, whitish becoming rusty brown; stem equal, glabrous, solid, slightly striate at the top, the annulus thick, white; spores brown with a slight ferruginous tint, .00024-.0003 of an inch long, .00016-.0002 broad.

Pileus 2-4 inches broad; stem 1.5-3 inches long, 3-5 lines thick.

Grassy ground in pastures. Not common. Albany and Essex counties. September.

The spores of this species have such a decidedly brown hue that the species was thought to belong to the genus *Stropharia*. But in a good light a slight rusty tint can be detected. It is therefore placed with the brownish ferruginous spored species of *Pholiota*.

Pholiota vermiflua Pk.

WORMY PHOLIOTA

State Mus. Bul. 75. p.32, pl.86, fig.12-20.

Pileus convex or nearly plane, glabrous or sometimes floccose on the margin, commonly rimose areolate, specially in the center, white,

sometimes slightly tinged with yellow, flesh white; lamellae close, adnexed, white becoming ferruginous brown, generally minutely eroded on the edge; stem equal, hollow, striate at the top, white, the white annulus more or less floccose on the lower surface, lacerated, often evanescent; spores .0005 of an inch long, .0003 broad.

Pileus 2-4 inches broad; stem 2-3 inches long, 3-5 lines thick.

Rich soil in grain fields, waste places and about manure heaps. Albany, Essex and Monroe counties. June, July and August. Edible.

From the early pholiota, to which it is related, it may be separated by its larger size, thicker flesh, stouter stem, whiter color and by the greater tendency of the surface of the pileus to crack into areas.

Pholiota praecox (Pers.) Fr.

EARLY PHOLIOTA

State Mus. Mem. 4. p.159, pl.57, fig.1-5.

Pileus convex or nearly plane, soft, glabrous, whitish, often tinged with yellow or tan color, flesh white; lamellae thin, close, adnexed, whitish becoming brownish or rusty brown; stem slender, equal, glabrous or slightly mealy when young, stuffed or hollow, whitish, the annulus white, entire, sometimes fugacious; spores .0004-.0005 of an inch long, .00024-.0003 broad.

Pileus 1-2 inches broad; stem 1.5-3 inches long, 2-2.5 lines thick.

Grassy ground, lawns, etc. Common. May to July. Edible.

Pholiota praecox minor (Batt.) Pileus scarcely more than 1 inch broad, its margin appendiculate with the remains of the veil, annulus generally wanting. Grassy places. State Mus. Mem. 4, p. 160, pl.57, fig. 6-8.

Pholiota praecox sylvestris Pk. Pileus convex, glabrous, whitish, brown or rusty brown in the center. In thin woods. State Mus. Mem. 4, p. 160, pl. 57, fig. 9-11.

Pholiota duroides n. sp.

HARDISH PHOLIOTA

Pileus thin, convex becoming nearly plane, glabrous or slightly rimose squamose in the center, varying in color from creamy white to ochraceous buff either wholly or in the center only, flesh white, taste mild; lamellae thin, close, narrow, adnexed, sometimes broadly

sinuate and having a decurrent tooth, whitish becoming brown or rusty brown; stem equal or nearly so, stuffed or hollow, glabrous, whitish, the annulus thick and cottony, often lacerated and evanescent, white; spores broadly elliptic, .00024-.00028 of an inch long, .00016-.0002 broad.

Pileus 1-2 inches broad; stem 1-2 inches long, 2-4 lines thick.

Rocky ground near Syracuse. August and September. G. E. Morris, who has found it both in the locality given and in Massachusetts.

It is similar to *Pholiota dura* (Bolt.) Fr. but may be separated from it by its different colors, softer substance and specially by its smaller spores. These are more brown than the spores of *Pholiota praecox* Pers. and make it doubtful whether the species would not better be placed in the genus *Stropharia*.

LIGNATILE

Pileus viscid or dry, not hygrophaneous

Pholiota albocrenulata Pk.

CRENULATE PHOLIOTA

Pileus fleshy, firm, convex or campanulate, obtuse or umbonate, viscid, squamose, yellowish brown, the scales brown or blackish, floccose, easily separable; lamellae broad, subdistant, sinuate, white crenulate on the edge, grayish becoming ferruginous; stem firm, equal or slightly tapering upward, stuffed or hollow, squamose, pallid or brownish below the slight fugacious annulus, white and furfuraceous above; spores subelliptic, pointed at the ends, .0004-.0005 of an inch long, .00024-.0003 broad.

Pileus 1-3 inches broad; stem 2-4 inches long, 2-5 lines thick.

Base of trees or on prostrate trunks and decaying wood, specially of sugar maple, *Acer saccharum* L. Essex and Otsego counties. July and August.

This species is rare and somewhat variable. It is never abundant and often solitary in its mode of growth. The scales of the pileus sometimes disappear leaving the surface of the cap mottled with brown spots. Under a lens the edge of the lamellae appear as if beaded with minute white globules. The margin of the pileus is sometimes adorned by the adhering fragments of the veil.

Pholiota adiposa Fr.

FAT PHOLIOTA

State Mus. Mem. 4. p. 160, pl. 57, fig. 12-17.

Pileus fleshy, firm, hemispheric or broadly conic becoming convex, viscid or glutinous, squamose, yellow, flesh whitish; lamellae close, adnate, yellow or yellowish becoming ferruginous; stem equal or slightly thickened at the base, solid or stuffed, squamose, yellow or sometimes reddish or tawny toward the base, the annulus slight, floccose, fugacious; spores elliptic, .0003 of an inch long, .0002 broad.

Pileus 1-4 inches broad; stem 2-4 inches long, 3-6 lines thick.

Single or cespitose. Stumps and dead trunks of trees in or near woods. Not rare. September to November. Edible.

The scales of the pileus are easily separable and sometimes disappear with age. They are generally more highly colored than the pileus. The annulus is often absent in mature specimens and by no means conspicuous in young ones.

Pholiota limonella Pk.

LEMON COLORED PHOLIOTA

Pileus thin, convex or nearly plane, sometimes umbonate, viscid, squamose, lemon yellow; lamellae narrow, close, rounded behind, adnexed, whitish becoming ferruginous; stem equal, solid, squamose with recurved scales, smooth above the lacerated annulus, colored like or a little paler than the pileus; spores elliptic, .0003-.00035 of an inch long, .0002-.00024 broad.

Pileus 1-2 inches broad; stem 1.5-2.5 inches long, 2-3 lines thick.

Cespitose, Prostrate trunks of beech, *Fagus americana* Sweet, in woods. Delaware county. September. This is a very beautiful species of pholiota, but it is as rare as it is beautiful. It has been found but once. It is easily distinguished from its allies by its bright lemon yellow color.

Pholiota squarrosoides Pk.

SHARP SCALE PHOLIOTA

State Mus. Mem. 54. p. 183, pl. 73, fig. 6-15.

Pileus fleshy, firm, subglobose when young, then convex, viscid, squamose, the scales terete, erect, pointed, tawny, densely crowded in the center, scattered toward the margin, there revealing the whitish

color of the pileus, flesh white; lamellae close, sinuate, whitish becoming brownish ferruginous; stem equal, firm, solid or stuffed, rough with numerous recurved tawny scales below the floccose or lacerated annulus, smooth and white above; spores elliptic, .0002 of an inch long, .00016 broad.

Pileus 1-4 inches broad; stem 2-4 inches long, 3-5 lines thick.

Single or cespitose. Old stumps and prostrate trunks of deciduous trees. Edible. Of excellent flavor.

P. squarrosoides faginea Pk. Plant smaller than in the type and scales more scattered. On dead trunks of beech, *Fagus americana* Sweet.

The sharp scale pholiota may be distinguished from *Pholiota squarrosa* Müll. by its viscid pileus, its compact, erect, pointed scales, its sinuate lamellae and its smaller brownish ferruginous spores.

Pholiota ornella Pk.

ORNATE PHOLIOTA

Agaricus (Hypholoma) ornellus Pk. State Mus. Rep't 34. p. 42.
Pholiota appendiculata Pk. State Mus. Bul. 94. p.33, pl. P, fig.8-17.

Pileus fleshy, firm, convex or nearly plane, viscid when moist, shining, squamose with appressed spotlike scales, appendiculate with fragments of the veil, dark red when young, soon fading to pink, finally becoming yellowish brown or grayish brown, flesh at first purplish red, specially in the lower part, whitish or pale yellow when mature; lamellae thin, close, rounded behind, adnexed or decurrent with a tooth, pale yellow or almost white becoming brownish ferruginous; stem short, firm, solid or with a small cavity, white above, brownish and squamose below the slight fugacious annulus, white within, the veil white or pale yellow, at first concealing the young lamellae, soon breaking into fragments and adhering partly to the margin of the pileus and partly to the stem; spores .00024-.0003 of an inch long, .00016-.0002 broad.

Pileus 1-3 inches broad; stem 1-1.5 inches long, 2-4 lines thick.

Single or in tufts. Decaying wood and sawdust. Adirondack region, Saratoga and Tompkins counties. July to October.

This is a rare species with us and a very perplexing one. The annulus in its best development consists of a mere circle of scales around the upper part of the stem. The greater part of the veil usually adheres to the margin of the pileus. The species has some characters suggestive of *Flammula polychroa* Berk. from which, however, it may be separated by its squamose pileus

without any umbo, its more fully developed and white or yellowish veil and its differently colored and adnexed lamellae. From the appendiculate margin it was referred to the genus *Hypholoma*. Specimens collected later and having a better developed annulus were described as a *Pholiota*. The viscid pileus with its spotlike scales and appendiculate margin and red, pink or purplish hues, fading with age to grayish brown or yellow brown, are characteristic of the species.

Pholiota erinaceella Pk.

BRISTLY PHOLIOTA

Agaricus deterrentis Pk. State Mus. Rep't 28. Bot. ed. p. 49.

Pileus thin, hemispheric or convex, dry, densely coated with small erect separable pyramidal or spinelike scales, tawny brown; lamellae broad, close, adnexed, pallid becoming cinnamon brown; stem equal, stuffed or hollow, densely squamulose below the slight annulus, often curved, colored like the pileus; spores naviculoid, .0003-.00035 of an inch long, .00016-.0002 broad.

Pileus 6-12 lines broad; stem 6-12 lines long, 1 line thick.

Dead and decaying trunks of deciduous trees in woods. Adirondack mountains, Schoharie and Oneida counties. June to September.

The small soft crowded scales of the pileus, which are easily rubbed away, constitute a prominent character of this species. The annulus is little more than the abrupt termination of the scaly coating of the stem. The name under which the species was first described was found to be preoccupied. This made it necessary to give it another name, and the one here given was chosen.

Pholiota squarrosa Müll.

SCALY PHOLIOTA

Pileus fleshy, firm, broadly conic becoming convex or nearly plane, dry, covered with tawny squarrose scales, yellowish or yellowish brown; lamellae narrow, close, adnate or slightly decurrent, pallid becoming ferruginous; stem equal or nearly so, often flexuous, solid or stuffed, adorned with recurved scales, pallid or tawny brown; spores .0003 of an inch long, .00016 broad.

Pileus 1-3 inches broad; stem 3-5 inches long, 3-5 lines thick.

Prostrate trunks of trees in woods. Adirondack mountains and Rensselaer county. August.

A variable and showy species growing chiefly in dense tufts. The scales of the pileus give it a very rough appearance, specially in the young plant.

Pholiota flammans Fr.

YELLOW SCALE PHOLIOTA

Pileus fleshy, thin, convex becoming nearly plane, dry, sometimes umbonate, yellow or tawny yellow, adorned with paler yellow superficial scales, flesh yellowish; lamellae thin, close, rounded behind, adnexed, yellow becoming ferruginous; stem equal, straight or flexuous, squamulose, stuffed or hollow, yellow; spores minute, elliptic, .00016-.0002 of an inch long, .00012-.00015 broad.

Pileus 1-2 inches broad; stem 2-3 inches long, 2-3 lines thick.

Decaying wood and prostrate trunks of trees in woods. Adirondack mountains. August and September.

The yellow scale pholiota is one of our most beautiful species. Its deep yellow or tawny pileus adorned with the paler sulfur colored delicate scales is an attractive sight. The plants grow singly or in tufts.

Pholiota comosa Fr.

HAIRY PHOLIOTA

Pileus fleshy, firm, convex, obtuse, viscid, squamose with hairy or floccose superficial separable white scales, tawny, flesh compact, white; lamellae broad, slightly decurrent, white becoming brownish clay color; stem somewhat bulbous at first, becoming elongated with age, often curved, solid, fibrillose, whitish, the annulus floccose, soon disappearing; spores brownish ferruginous, elliptic, .0003-.0004 of an inch long, .0002-.00024 broad.

Pileus 3-4 inches broad; stem 2-4 inches long, 6-12 lines thick.

Decaying wood of deciduous trees. Monroe county.

The hairy pholiota is a rare species in our State. The locality given is the only one in which the species has been found in our limits. It is doubtful if the variety *alb a* Pk. [*State Mus. Rept* 38, p. 86] belongs to it. It neither agrees in color nor in the size of the spores with the typical form. The specimen from Pittsford, Monroe co. is paler than the European plant but in other respects it shows the specific characters. The bulbous base of the stem is a prominent and peculiar character, tapering gradually into the stem above and having an abrupt short radicating point below.

Pholiota spectabilis Fr.

ORANGE PHOLIOTA. SHOWY PHOLIOTA

Pileus fleshy, compact, convex becoming nearly plane, dry, the cuticle rupturing and forming silky or fibrillose scales, yellow or tawny orange, flesh pale yellow, taste bitter; lamellae close, narrow, adnate or slightly decurrent, yellow becoming ferruginous; stem ventricose or slightly thickened downward, solid, slightly radicate, peronate, mealy above the annulus, fibrillose toward the base; spores elliptic, .0008-.0009 of an inch long, .0002-.00024 broad.

Pileus 2-4 inches broad; stem 2-4 inches long, 6-10 lines thick.

Single or caespitose. Decaying wood and stumps. Queens county. Very rare.

Pholiota curvipes Fr.

CURVE STEM PHOLIOTA

Pileus fleshy but thin, convex becoming nearly plane, obtuse, dry squamulose with minute appressed floccose scales, tawny yellow; lamellae thin, close, adnate, yellow becoming tawny; stem equal or rarely thickened at the base, slender, commonly curved, stuffed or hollow, fibrillose with a slight radiately floccose annulus, yellow; spores naviculoid, .0003-.0004 of an inch long, .0002-.00024 broad.

Pileus 10-18 lines broad; stem about 1 inch long, 1-2 lines thick.

Decaying wood. Adirondack region and Oneida county. July to September.

Our specimens vary in the color of the stem, it being in some cases ferruginous toward the base. The spores also are a little larger than the dimensions given in *Sylloge*, but the general agreement with the characters of the species is so good that it does not seem best to separate our plant.

Pholiota luteofolia Pk.

YELLOW GILLED PHOLIOTA

Pileus fleshy, firm, convex, dry, squamulose, fibrillose on the margin, pale red or yellowish; lamellae broad, subdistant, sinuate, serrate on the edge, yellow becoming bright ferruginous; stem firm, fibrillose, solid, often curved from its place of growth, annulus slight, fugacious; spores bright ferruginous, .00028 of an inch long, .00016 broad.

Pileus 1-2 inches broad; stem 1-2.5 inches long, 3-5 lines thick.

Subcespitose. Dead trunks of birch trees, *Betula lutea* Mx. Sullivan county. September. The reddish color of the pileus often fades with age. The species is rare and has not been collected recently. In some of its characters it shows a close relationship to *Pholiota tuberculosa* Fr. from which it may be separated by the absence of a bulbous base to the stem.

Pholiota lutea Pk.

YELLOW PHOLIOTA

Pileus fleshy, firm, convex, dry, slightly silky and sometimes minutely floccose squamulose in the center, buff yellow, often a little darker in the center, the thin incurved margin slightly surpassing the lamellae, flesh pale yellow, odor pleasant, taste bitter; lamellae thin, close, rounded behind, adnexed, pale yellow becoming dark ferruginous; stem firm, solid, thickened at the base, fibrillose, colored like the pileus, the annulus superior, slight, fugacious; spores ferruginous, .0003 of an inch long, .0002 broad.

Pileus 2-4 inches broad; stem 2-3 inches long, 3-5 lines thick.

Decaying wood and trunks of trees in woods. Essex county. August.

Pileus hygrophanus

Pholiota cerasina Pk.

CHERRY PHOLIOTA

Pileus fleshy, firm, broadly convex, glabrous, hygrophanus, cinnamon color when moist, yellow when dry, odor amygdaline, flesh yellow; lamellae close, sinuate, yellow becoming cinnamon or ferruginous; stem equal, solid, sometimes curved, furfuraceous above the annulus, which is slight and fugacious; spores elliptic, minutely rough, .0003 of an inch long, .0002 broad.

Pileus 2-4 inches broad; stem 2-4 inches long, 2-4 lines thick.

Commonly cespitose. Old prostrate trunks of trees in woods. Cayuga county. August.

A rare species. The amygdaline or cherry odor suggests the specific name.

Pholiota acericola Pk.

MAPLE PHOLIOTA

Pileus fleshy but thin, broadly convex or nearly plane, glabrous, often rugosely reticulate or corrugated, hygrophanus, yellow or

sometimes smoky yellow with the center or umbo brownish; lamellae close, sinuate, commonly longitudinally wrinkled when dry, grayish becoming brownish ferruginous; stem equal or thickened at the base, hollow, fibrillose striate, white or whitish with a large membranous, persistent, deflexed, white annulus; spores elliptic, .00035 of an inch long, .00024 broad.

Pileus 1-3 inches broad; stem 2-4 inches long, 3-5 lines thick.

Mossy trunks of maple trees in woods. Essex, Lewis, Otsego and Schoharie counties. July to September.

This species may be easily recognized by its well developed annulus, its rugosely reticulate or pitted pileus and the rugosely wrinkled lamellae of the dried plant. The reticulations of the surface of the pileus usually disappear in drying. When growing in much decayed wood white strings of mycelium develop in the wood.

Pholiota discolor Pk.

FADING PHOLIOTA

Pileus thin, convex becoming nearly plane or slightly depressed, glabrous, viscid, hygrophanous, cinnamon rufous and striatulate on the margin when moist, bright ochraceous yellow when dry; lamellae narrow, close, pallid or whitish becoming ferruginous; stem equal, hollow, fibrillose, whitish or pallid, sometimes with a white mycelioid tomentum at the base, the annulus distinct, persistent; spores elliptic, .0003 of an inch long, .0002 broad.

Pileus 8-16 lines broad; stem 1.5-3 inches long, about 1 line thick.

Single or caespitose. Decaying wood and prostrate trunks of trees in woods. Not rare. July to October.

The change of color from the moist to the dry state is well marked. The color of the pileus is similar to that of the next following species but the viscid pileus separates it. *Pholiota discolor caespitosa* Pk. is a mere form, unworthy of being considered a variety.

Pholiota autumnalis Pk.

AUTUMN PHOLIOTA

Agaricus (Naucoria) autumnalis Pk. State Cab. Rep't 23. p. 92.

Pileus fleshy but thin, convex, hygrophanous, cinnamon rufous and striatulate on the margin when moist, dingy yellow when dry;

lamellae thin, close, slightly sinuate, adnate or slightly decurrent, yellowish becoming subferruginous; stem slender, equal, hollow, fibrillose, colored like but paler than the pileus or sometimes brownish toward the base; spores .0003-.0004 of an inch long, .0002-.00024 broad.

Pileus 6-16 lines broad; stem 1-2 inches long, 1-2 lines thick.

Single or cespitose. Decaying wood in woods. Albany, Rensselaer and Essex counties. September to November. The annulus is sometimes but slightly developed, and such specimens are liable to be mistakenly referred to the genus *Naucoria*.

Pholiota confragosa Fr.

ROUGH PHOLIOTA

Pileus fleshy but thin; convex becoming nearly plane, fragile, obtuse, floccose squamulose becoming naked, hygrophanous, cinnamon rufous and striate on the margin when moist, tawny when dry; lamellae thin, close, adnate, very narrow, rufous; stem equal, hollow, fibrillose below the spreading membranous annulus, striate above, pallid or pale ferruginous; spores .00028-.0003 of an inch long, .0002-.00024 broad.

Pileus 1-2 inches broad; stem 1-2.5 inches long, 2-3 lines thick.

Single or cespitose. Decaying wood and prostrate mossy trunks in woods. Adirondack mountains. September.

The scales of the pileus are generally so minute that they are easily overlooked. The whole plant is nearly of one color. It is quite fragile and should be handled carefully. The dimensions of the spores are taken from the American plant, as the publications of the European authors do not agree in respect to this character.

Pholiota marginella Pk.

SLIGHTLY MARGINED PHOLIOTA

Pileus fleshy, convex becoming nearly plane, glabrous, hygrophanous, yellowish red or subferruginous and usually striatulate on the margin when young or moist, whitish or yellowish buff when dry, the young margin slightly silky with whitish fibrils; lamellae thin, close, adnexed, minutely eroded on the edge, whitish becoming dark ferruginous; stem equal or nearly so, flexuous, fibrillose below the slight fugacious annulus, mealy or pruinose above, stuffed or hollow, whitish or pallid, sometimes with a white mycelioid tomentum at

the base; spores elliptic, .00024-.0003 of an inch long, .00016-.0002 broad.

Pileus 1-2 inches broad; stem 2-4 inches long, 2-4 lines thick.

Single or cespitose. Decaying wood. Essex county. June. Found but once. The species is apparently related to *Pholiotamarginata* (Batsch) from which it may be distinguished by its even fibrillose margin, adnexed lamellae and paler uniformly colored stem. In drying, the moisture, as usual in hygrophaneous species, first disappears from the center of the pileus.

LATIN DESCRIPTIONS OF NEW SPECIES OF PLANTS

Crataegus verrucalis

Frutex vel arbor parva, 2-4 m alta, trunci diametro 2.5-5 cm; ramis longis, tenuibus, divergentibus, erectisve, trunci ramorumque magnorum cortice verrucoso, spinis leviter curvatis rectisve, castaneis, nitidis, 2.5-4 cm long.

Folia ovata vel subovata, acuta acuminatave, basi rotundata vel cuneata, pullulantia tincta fusco-rubro et superiore pubescentia, matura flava-viridia, nitida, glabra, 4-4.5 cm long. 2.5-3 cm lat., in ramis robustis late ovata vel suborbiculata, basi rotundata.

Flores 4-10 in quoque corymbo, 1.2-1.4 cm lat. pediculis leviter villosis, calycis lobis extus glabris, intus hirtellis, staminibus 5-10, antheris rubris, stylis 2-4, plerumque 3.

Poma subglobosa ovaliave, 1-1.2 cm long. 8-10 mm lat., vivida rubra, persistentiora, seminibus plerumque 3, 6.5-7 mm long. 3.5-4 lat.

In locis montanis.

Clitocybe subcyathiformis

Pileo carnoso, tenui, late convexo, demum subplano vel centro depresso, glabro, hygrophano, madido albido striatolatoque margine, sicco albo vel centro leviter flavido, carne alba, sapore miti; lamellis tenuibus, subconfertis, adnato-decurrentibus, albidis; stipite subaequale, farcto, fibrilloso-reticulato, albido, saepe basi albo tomentoso; sporis ellipsoideis, 6-8 x 4-5 μ .

Pileus 2.5-5 cm lat.; stipes 2.5-4 cm long., 4-8 mm. lat.

In locis humidis sub alnis betulisque.

Hygrophorus coloratus

Pileo carnoso, convexo subplanove, saepe umbonato, levi, viscoso, luteo, aurantiaco vel cinnabarino, carne alba, sub pellicula flava; lamellis inaequalibus, distantibus, arcuatis, adnato-decurrentibus, albis flavescentibusve; stipite aequale, subinde deorsum incrassato, glutinoso, farcto cavove, albo vel leviter flavo, in juventute subinde velo floccoso ad apicem; sporis 8-10 x 5-6 μ .

Pileus 2.5-6.5 cm lat.; stipes 5-7.5 cm long., 4-8 mm lat.

In locis humidis sub arboribus laricinis abietinisque.

Clitopilus subplanus

Pileo tenui, late convexo, demum subplano, centro leviter depresso aut distincte umbilicato, glabro, albido, carne alba; lamellis tenuibus, confertis, adnato-decurrentibus, sordide incarnatis; stipite tenui, glabro, tereti compressove, farcto, demum cavo, albido; sporis incarnatis, angulosis, uninucleatis, 10-12 x 6-8 μ .

Pileus 2.5-4 cm lat.; stipes 2.5-4 cm long., 2-4 mm lat.

Inter folia putrescentia in silvis.

Nolanea suaveolens

Pileo submembrano, convexo, umbilicato, obscure fibrilloso impolitove, margine indistincte striato, fumoso; lamellis tenuibus, inaequalibus, confertis, adnatis, albidis, demum sordide rosaceis; stipite tenue, glabro, cavo, fusco; sporis angulosis, uninucleatis, 10-12 x 6-8 μ .

Pileus 1.5-4 cm lat.; stipes 3-5 cm long., 1 mm lat.

In silvis. Specimina exsiccata odorem gratum, *Lactarii glyciosmi* et *L. camphorati* illum simulantem enittunt.

Pholiota duroides

Pileo tenui, convexo, demum subplano, glabro, subinde centro leviter rimoso-squamoso, ex albo ochraceoluteo; carne alba, sapore miti; lamellis tenuibus, confertis, angustis, adnexis, subinde late sinuatis et dente decurrentibus, albidis, demum fusco-ferrugineis; stipite aequale, farcto cavove, glabro, albido, annulo crasso, lanuginoso, saepe lacerato evanescenteque, albo; sporis late ellipticis, 6-8 x 4-5 μ .

Pileus 2.5-5 cm lat.; stipes 2.5-5 cm long., 4-8 mm lat.

In silvis. E *Pholiota dura* (Bolt.) Fr. in colore, carne molliore sporisque minoribus differit. Inter *Pholiotam* et *Strophariam* ambigua.

Flammula pulchrifolia

Pileo carneo, tenui, hemisphaerico, deinde convexo, viscidulo, hygrophano, fibrilloso, subinde centro squamuloso, margine fibrilloso, rosaceo, subinde pallido; carne alba, amara; lamellis tenuibus, confertis, adnatis, subinde leviter sinuatis, albidis, mox nitide luteis vel fulvo-ochraceis; stipite aequale, farcto cavove, pallido, saepe basi flavo, apice fibrilloso e velo; sporis in strato tenui fulvo-ochraceis, in strato crasso ochraceo-luteis, $7.5-8 \times 5-6 \mu$.

Pileus 2.5-5 cm lat.; stipes 2.5-4 cm long., 3-4 mm lat.

Ad lignum *Tsuga canadensis* Carr.

Clavaria ornatipes

Gregaria, 2.5-5 cm alta, sparse ramosa; stipite gracile, hirsuto, fusco; ramulis paucis, irregularibus, teretibus, albidis griseis vel cinereis, acutis obtusisve; sporis late ellipticis vel subglobosis, $8-11 \times 6-8 \mu$.

Inter muscos in locis humidis silvarum.

Clavaria trichopus Pers. *New York State Museum Report* 24, page 82. Noster fungus est distinctus in colore, habitate paucitateque ramorum.

Myxosporium necans

Acervuli in lineis longis sub epidermide nidulantes, erumpentes, intus albidii; conidiis oblongo-ellipticis in massas albas cirrosve flavido-albos expulsis, saepe binucleatis, $6-10 \times 2-3 \mu$.

In cortice *Pruni virginianae* L. vivae. Fungus fruticem mox necat.

EXPLANATION OF PLATES

PLATE IIG

161

Clitocybe subcyathiformis Pk.

SAUCER CLITOCYBE

- 1 Immature plant with moist pileus
- 2 Immature plant with dry pileus
- 3 Mature plant with center of pileus slightly colored
- 4 Two mature plants united at the base
- 5 Vertical section of the upper part of a mature plant
- 6 Four spores, x 400

Russula pusilla Pk.

SMALL RUSSULA

- 7, 8 Two immature plants showing the upper surface of the pileus
- 9, 10 Two larger immature plants showing color of the lamellae
- 11 Large mature plant showing color of the lamellae
- 12 Vertical section of an immature plant
- 13 Vertical section of a mature plant
- 14 Four spores, x 400

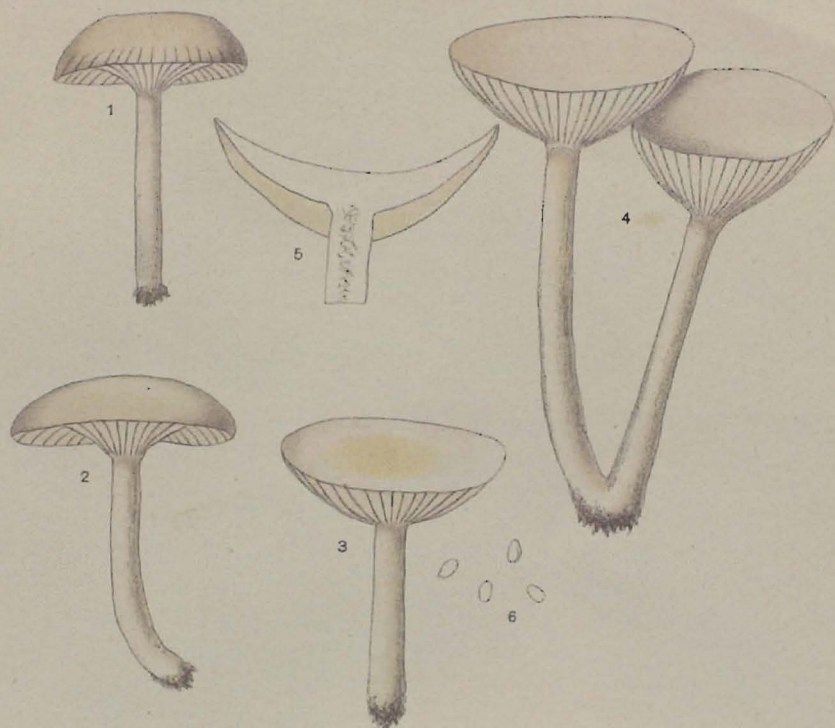


FIG. 1-6.

CLITOCYBE SUBCYATHIFORMIS PK.
SAUCER CLITOCYBE

FIG. 7-14.

RUSSULA PUSILLA PK.
SMALL RUSSULA

PLATE III

163

Collybia dryophila (Bull.) Fr.

OAK LOVING COLLYBIA

- 1 Immature plant
- 2 Cluster of three plants, two of them immature
- 3, 4 Two plants with the pileus more highly colored
- 5 Mature plant with the pileus fully expanded
- 6 Immature plant with pileus highly colored and stem bulbous
- 7 Mature plant with pileus highly colored and stem bulbous
- 8 Vertical section of the upper part of an immature plant
- 9 Vertical section of the upper part of a mature plant with expanded pileus
- 10 Transverse section of a stem
- 11 Four spores, x 400



COLLYBIA DRYOPHILA (BULL.) FR.
OAK LOVING COLLYBIA

PLATE 112

165

Crepidotus malachus B. & C.

SOFT SKINNED CREPIDOTUS

- 1 Mature plant showing the upper surface of the pileus
- 2 Mature plant showing the lower surface of the pileus
- 3 Vertical section of a mature plant
- 4 Four spores, x 400

Stropharia bilamellata Pk.

DOUBLE GILLED STROPHARIA

- 5 Immature plant with pileus convex
- 6 Mature plant with pileus expanded
- 7 Vertical section of the upper part of an immature plant
- 8 Vertical section of the upper part of a mature plant
- 9 Transverse section of a stem
- 10 Four spores, x 400

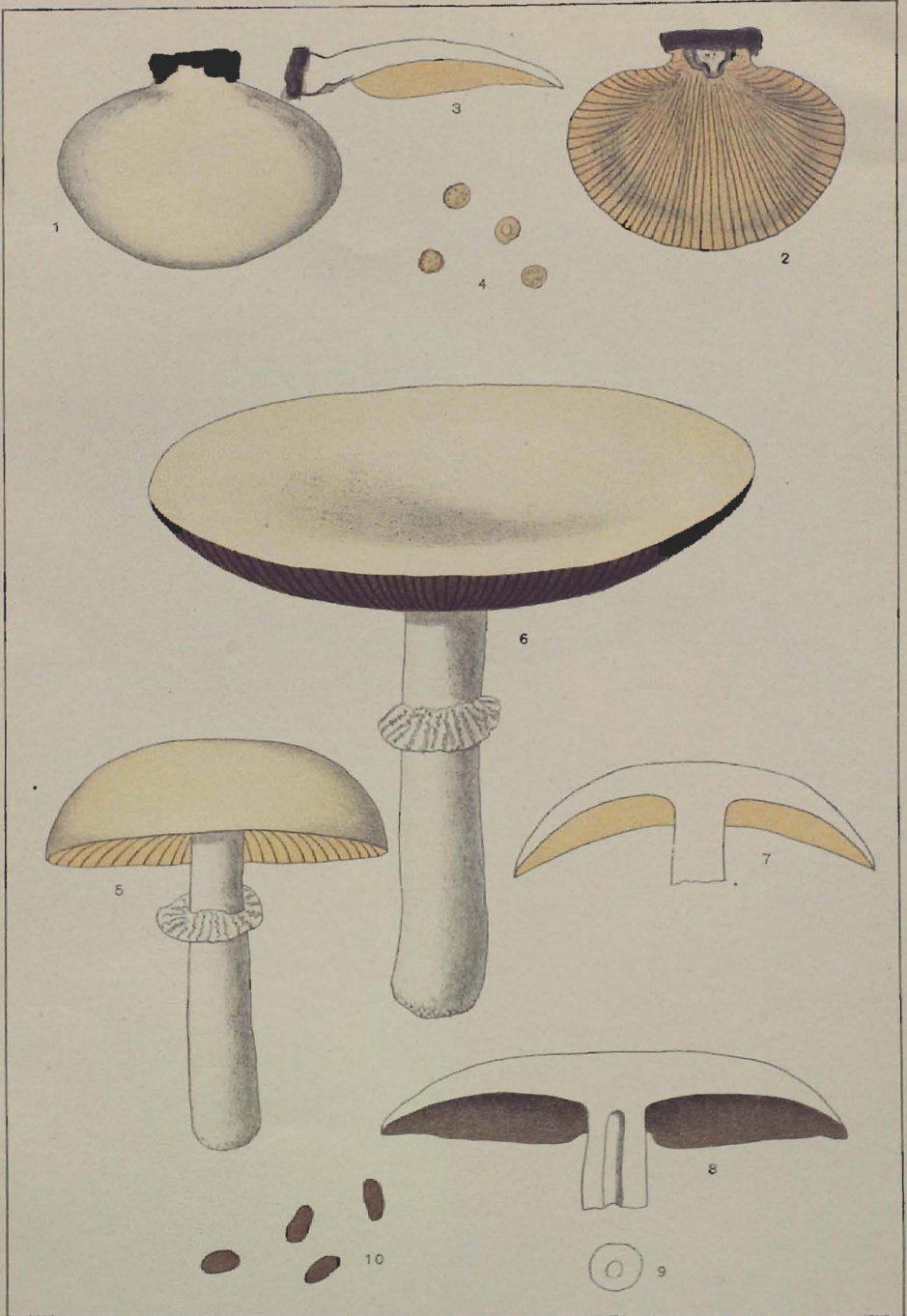


FIG. 1-4.
 CREPIDOTUS MALACHIUS B. & C.
 SOFT SKINNED CREPIDOTUS

FIG. 5-10.
 STROPHARIA BILAMELLATA Pk.
 DOUBLE GILLED STROPHARIA

Followed p. 110

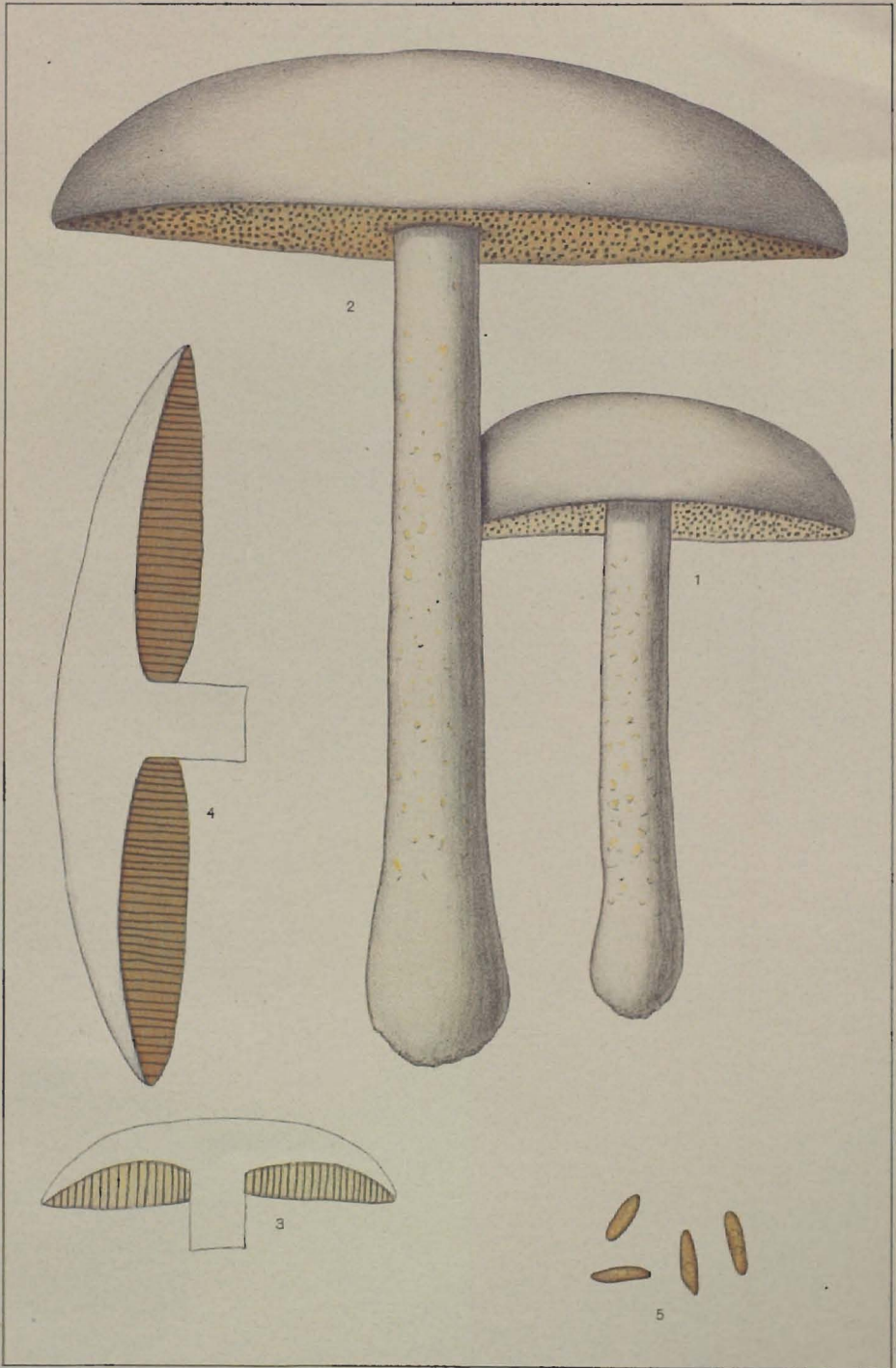
PLATE 113

167

Boletus niveus Fr.

SNOWY BOLETUS

- 1 Immature plant
- 2 Mature plant
- 3 Vertical section of the upper part of an immature plant
- 4 Vertical section of the upper part of a mature plant
- 5 Four spores, x 400



BOLETUS NIVEUS FR.
SNOWY BOLETUS

PLATE II4

169

Lycoperdon subincarnatum Pk.

PINKISH PUFFBALL

- 1 Cluster of three plants
- 2 Plant darker colored
- 3 Mature plant showing pitted peridium
- 4 Vertical section of an immature plant
- 5 Vertical section of a mature plant
- 6 Four spores, x 400

Lycoperdon gemmatum Batsch

STUDDED PUFFBALL

- 7 Immature plant of usual size and shape
- 8 Immature plant showing an umbo
- 9 Sessile plant showing reticulated surface from which the larger warts have fallen
- 10 Long stemmed plant showing plicate base of peridium and upper part of stem, also reticulated place from which the larger warts have fallen
- 11 Long stemmed plant with larger warts closely placed and upper part of stem coarsely pitted
- 12 Vertical section of a small immature plant
- 13 Vertical section of a mature plant with stem tapering downward
- 14 An old denuded discolored plant
- 15 Four spores, x 400

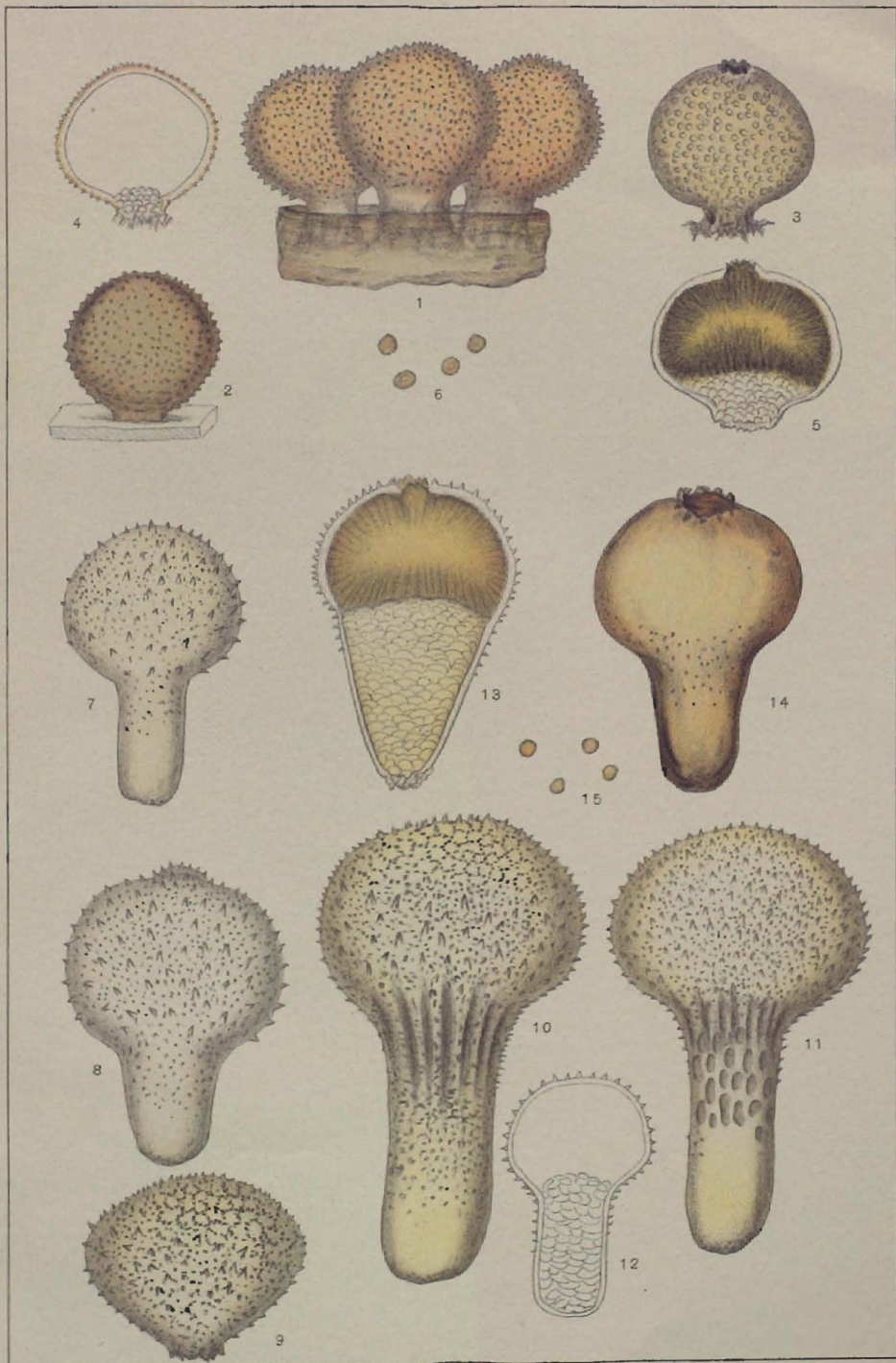


FIG. 1-6.
 LYCOPERDON SUBINCARNATUM P.K.
 PINKISH PUFF BALL

FIG. 7-15.
 LYCOPERDON GEMMATUM BATSCH
 STUDDEN PUFF BALL

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