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Twenty-Five Years of Botany in Iowa

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TWENTY-FIVE YEARS OF BOTANY IN IOWA.

BY THOMAS H. MACBRIDE.

To tell of Botany in Iowa for twenty-five years, even as presented in the work of members of this Academy, is a task far more difficult than would at first appear. Shall I present a list of all Iowa botany papers for a quarter of a century; such list would mean much indeed, and such list so far as attainable may be found as an appendix to the present paper. But the slightest reflection suggests that such list, long or short, is, as a matter of fact, no measure whatever of either the industry or the achievements of those who make up the botanical membership of this Academy. We have not, I believe, a professional botanist among us. We have doctors, druggists, bankers, gardeners, farmers, teachers, but not a botanist in the sense of single-minded devotion—not an untrammelled student of Botany in Iowa!

Perhaps there are not many in the country; there are some; but apart from gardeners the great majority of the men who work with plants at all study them with the duty of instruction ever dominant, determining the direction if not the extent of effort. Even the beginners of the study have, I suppose, in many instances been subjected to the same atmospheric environment. Young men in the past, as now, have prepared themselves to *teach*; not to *study* or even to understand—in the fine, wide sense of untrammelled comprehensive appreciation. This is America. The atmosphere of *altruism* pervades our entire social and educational life. Our great educational foundations are either matters of private beneficence based on philanthropy, or they are provided each by a generous commonwealth seeking the common weal; regardful of science only as contributing to the happier living of great masses of men; employing *teachers*, therefore, not men of the closet and laboratory; at best *experimenters*, not theorists, not specifically and solely seekers and lovers of the truth.

I think I shall not here be misunderstood. In speaking of my beloved colleagues I would not for a moment imply that we are not seekers after truth, or that we have not studied or followed science for science's sake. Not one of us, I suppose, but has found pre-eminent satisfaction in the pure enjoyment of those rare visions which sometimes are ours by virtue of our more intimate knowledge of the living world; the unbounded, undiminished, heedless profligacy of life's unfailing generations especially in the world of plants. Nor has any one of us failed to find *somewhere*, at least, a tiny field whose contents belong to him and to him alone; a face of nature turned for the first time in all the centuries full upon his enraptured vision. No; we know all of us the strange, compelling fascination of research and her exceeding great reward. But, unfortunately, sadly for our personal joy, such is not the atmosphere in which we are usually called upon to move. Instead of such inspiration, perpetual note-books haunt our wearied vision; routine procedure fain would waste our hours; until I fear sometimes the steps of the tread-wheel show signs of wear, and the landscape, all unfreshened by new visions of new truths, begins to lose

its fairness, dying to the grayness of the common-place, or fading to the twilight indistinctness of forgotten things.

It is worth while then, on occasion to stop for a moment in this unending course of patriotic duty faithfully performed, to sum up some of the *res gestae*, the things really done in the nobler way, even when none of the other things demanded by our day and age have been left undone, or may now go upon the record. As a matter of fact, the science of Iowa, of the world, is abundantly richer today than twenty-five years ago, and this advance is owing in almost every case to the activity of men set by school or college, each in his place, to teach.

Before setting in order, as may be, the history of Iowa botany for the quarter of a century now closing, it may be well to note in a few sentences the general progress of the science in the world. For forty years at least the great trend of science in every field and laboratory has been toward that which is immediately and directly practical. How better to make oil, or gas, or steel; how better to develop and manage the electric current; how more profitably to extract gold and silver from their ores; how better to raise corn or cattle; how to control disease,—these have been ostensibly the triumphant displays of science in all the later decades of our history. The men who pay the taxes, the men who pay a large part of them at least, the men who create great foundations, can see and understand and put to profit all these things, and it is therefore but natural if the children of wisdom have sought thus to be justified.

But after all, our practical triumphs are again only the smaller fraction of scientific accomplishment. Such reckoning leaves out entirely the world of our intellectual living where the influence of science of every sort has been simply omnipotent and universal. The whole world of philosophy, letters, art, is different today,—is different because of science, and all apart from any so-called practical results of scientific research—but even so, all practical triumphs are but the outcome of pure science; pure science somewhere, perchance obscurely but patiently wrought out, has made these visible achievements possible, and did research for its own dear sake but once for a single generation fail, not only would inspiration grow dull indeed but invention itself would fail and even present attainments be forgotten as are the lost arts of other days.

However this may all be, whatever our evident real trend, the most conspicuous change in all science, whether pure or applied, and no less in botany, has come in the direction of differentiation and specialization. We have to-day all sorts of botanists, each pursuing his own particular problems. The mycologist to-day is not presumed to know the number of chromosomes in the nucleus of a lily, nor does the paleobotanist seek the identity of the algal component of the lichens; albeit he is inclined in these later days to search with Chodat the structure of woody stems, a line of simple investigation which forty years ago led Dawson to assign seed plants to the Devonian. Exarch, mesarch, etc., suggest at last an effort to interpret the obscure beginnings of the trees. The bacteriologist smiles at Mendel's law, and though scarce willing to admit temperature as a great factor in the forms of life as in the forms of water, he begs to remark that in his earlier studies he has somewhere heard of the response which plants of every rank make to environmental changes. The taxonomist has found undreamed differentiation to engage his time and toil: oaks and haws, birches and willows, shift and change in kaleidoscopic swiftness.

The man of mutations would even make you new species "while you wait"; all going to show that the entire taxonomy of plants must be recast, and that as much awaits the toil of future students as though Linné had never lived.

Nor is this all: the ecologist has found a place for himself: he takes the field; all forms of vegetation fall into the circles of his pre-established order; plant societies stand all about us, their members stiffly bowing, as if bound in a social code to whose rigorous behests the etiquette of St. James or Hindostan may offer resemblance but surely nothing parallel. To such perfection of adjustment in relationship have the plants thus come, in the mind of the ecologist at any rate, that no doubt presently altruism, socialism, hedonism, not to say hegemony, and all the more special prerogatives of recent sociological science, will trace their beginnings to the masterly attainments of the vegetable world; our courses in political and social science may begin at last in wide chapters in plant ecology, perchance permitting the poor, long-patient, frazzled amoeba and slime-mould to find a much needed rest, for a season.

But in all seriousness, botany may no longer find expression in a single volume; within practically twenty-five years it has broken into many sciences, each of which shows devotees and a literature of its own. The work of this Academy in the period named has touched these several botanical sciences every one. The taxonomist, the lineal descendant of Linnæus, still has a place among us. His work, perhaps earliest undertaken, is still far from finished, and a biologic survey of the state is needed, if for naught else, at least to show how very incomplete is still our knowledge of the kinds of plants that have their home in Iowa. Even a mere census of plants is to-day impossible, because these have not yet been sought out and gathered in herbaria, and so far made accessible to students. The morphologist has begun his problem upon Iowa plants as he has upon those of the world at large; the mycologist and the bacteriologist as well, while the ecologist is almost too late upon the field and is frightened lest the progress of civilization, I mean of human occupancy and trespass, may not presently sweep away his problems forever, or ever he see them fairly stated. The paleobotany of our domain has been scarcely touched, although both the Carboniferous and the Cretaceous, the two great herbaria of the ancient world, are well displayed within our limits. What has been done affects fragmental materials chiefly; scraps along the shores of physiographic drift: the great body of material is yet to be gathered and made to yield its message, ere we shall see again pictures of Iowa's paleozoic, mesozoic, or even neozoic flora.

But it is time perhaps that this paper should assume something of concreteness, take on real historic form, and tell as a matter of fact the doings of Iowa botanists for five and twenty years.

To begin with, I find on close inspection that the number of those upon our rolls expressing preference for our science is just sixty-one. Of these, twenty are entered as fellows, forty-one as members or associates. Of the total number, those concerned in single fields of botanical research are few; nearly all are naturalists in the broader sense; incident partly to the fact already mentioned; all, or nearly all, are teachers.

In the work reported, the taxonomists lead. The moving spectacle of nature, the snapshots of creation which men today name species, have for us all a wonderful fascination, even though more and more convinced that these abide

not. Mendel's law, the rule of mathematical probabilities, the fascination of strange mutations—of old the gardeners called them sports—, as students we cannot let these alone; charmed are we by the very instability which baffles all our scheming. We have now within the state several great collections of flowering plants. The munificence of Hon. O. M. Olsen and the industry of Mr. Somes have brought together a large collection of flowering plants at Ft. Dodge. Mr. and Mrs. Fitzpatrick have amassed a fine collection at Lamoni. They have perhaps an almost complete collection of the flowering plants of Iowa. The great collections of the University and the State College have been brought together in large part during the twenty-five years we celebrate. In the herbarium of the University the work of Professor Shimek and Miss Cavanagh has been most effective. No historic reference to this herbarium would be complete which fails to take account of one or two of its most valuable treasures. In 1893 the University herbarium received as a gift a large set of duplicates from the British Museum, embracing thousands of sheets from various parts of the world. In 1892 the University received a car-load of fossil cycadoidean stems from the Black Hills of South Dakota. To science these old plant remains are simply invaluable. Every Iowan, at least, will take pleasure in the fact that the collection is, as a whole, unrivalled and further that in it is found the most perfect specimen of the sort so far discovered. From this was taken the flower which gives the chief ornament to the monograph recently published by the Carnegie Institute at Washington.

In 1909 the herbarium was by the gift of Mrs. L. V. Morgan, still further enriched in being made the depository of the magnificent herbarium, chiefly mycologic, accumulated during his life by her distinguished husband, Professor A. P. Morgan of Ohio.

These collections taken with the Wingate collection of slime-moulds, secured in 1898, and the myxomycete herbarium of Professor M. F. Peck, also now at the University, make the entire mycologic property of the University certainly as rich as any on this continent.

We have had also collections of other cryptogams. The pteridophytes of the state have been probably all assembled by Professor Shimek, and are also to be found in several collections more or less completely represented. The Lesquereux mosses are at the State University and to these have been added very many representing the Iowa flora. At the State College through the industry of Professor Pammel and his assistants, most of the parasitic forms associated with plant disease, have place. The Fitzpatricks too, have given attention to this field and have at Lamoni a by no means inconsiderable herbarium of fungi with other cryptogamic plants. Professor Fink, now of Oxford, has probably every Iowa species of lichen represented in his collections.

So much for collections and herbaria. But this is only one side of the work of our taxonomists; some of these have been great publishers as well as great collectors. Professor Pammel in his work on poisonous and injurious plants has done a great deal of thorough taxonomic work—his book on poisonous plants is famous, so is his volume on "Weeds of the Farm and Garden." His Grasses of Iowa constitutes so far the most valuable of the Bulletins published by the State Geologic Survey. He has enjoyed the assistance of a long list of helpers, some of whom are enrolled with us and some of whom we name later.

A printed list of publications brought out by the staff of the Botanical Depart-

ment at the State College, entitled "Contributions, Etc., Vol. I," gives a long list of papers down to 1898. This pamphlet is made a part of the present record and its data will be found with other lists in the appendix following. Professor Fitzpatrick sends me a list of thirty-four papers, most of which are on taxonomy. In these researches he has frequently encountered the name of Rafinesque and his fine volume discussing the merits of the eccentric French taxonomist certainly should have mention here.

The late Mr. Frederic Reppert of Muscatine and his long-time friend, the lamented Superintendent F. M. Witter, both well remembered by many here, have ceased from labor; but that story of botany in Iowa will be incomplete indeed that takes not account of these enthusiastic and skillful men. Mr. Reppert was especially a student of the Naiads and Potamogetons, a vexed and difficult group, and Professor Witter especially turned attention in his later years to similar investigations. Both are represented in the published "Flora of Scott and Muscatine counties" by Barnes, Reppert and Miller, and the Reppert herbarium is now in the State University.

Mr. Robert Coombs has published the plants of Cienfuego and the medicinal plants of Cuba for the United States government. Mr. R. I. Cratty has published the sedges of Iowa and the woody plants of Emmet county, and has listed and distributed many sets of the flora of the northwest. Under the direction of the Geological Survey, Professor Pammel, as already stated, has discussed Iowa grasses. Professor Shimek has published much on the flora of Iowa, especially the trees and shrubs. His work will be mentioned again under the head of ecology, but his paper on the Oaks is standard, and his account of the Pteridophyta of Nicaragua is the recognized authority for that part of the world. Professor Fink has published the seed-plants of Fayette county, and Mr. C. R. Ball has made notable contributions to our knowledge of grasses and of American willows; in the latter group he is now the American authority. The Hon. Wesley Greene, our esteemed Secretary of the Iowa Horticultural Society, has published a check list embracing all the plants known to our limits at the time of issue, including cryptogams. In the same line of work, Mr. H. A. Mueller has published lists of the flora of Madison county, notably considering shrubs and trees, and Professor Wylie has recently brought out an account of the more common aquatic plants in the northern lakes.

In the line of cryptogamic botany we have had numerous explorers, investigators, and practical workers. Professor Ross has been long busy with the sanitation of Des Moines, its water-supply, and has published several bacteriological papers. Professor Bates has done a similar work in Cedar Rapids. Dr. Albert has maintained the bacteriological laboratory at the University and has done much work relative to typhoid. He writes upon the problems of immunity and infection as concerns this dreaded fever. Dr. Albert's latest essay has appeared in the Journal of Medical Science as lately as February, 1912. His work is everywhere recognized. Professor Pammel has published much concerning bacterial diseases of plants; he has isolated and identified one or more pathogenic microbes and has stimulated in this field research in every direction. Dr. R. E. Buchanan, formerly of the State College, has done a great deal of bacteriological work, publishing papers especially on root bacteria. He has besides written one of the few volumes on veterinary bacteriology.

When we turn to mycology pure and simple we have abundant material at our disposal. Professor Arthur began by publishing in Iowa his famous researches on the rusts, and during all these years papers on rusts and smuts have been issuing from our State College laboratories in number too great for present citation. He and Mr. Holway have at the same time issued several volumes of exsiccata in the same group. Professor Pammel and Miss King, Dr. Buchanan, Dr. Hume, and others have made applied botany at Ames renowned, and many of the pages of our reports tell of their ever increasing industry. Dr. Buchanan has furthermore placed all students of fresh water algae in Iowa and the entire northwest under obligations by his most convenient descriptive key to these difficult microscopic plants.

Professor G. W. Wilson, now of North Carolina, published from Fayette several important mycological papers, among them those of chief importance are the "Studies of the North American *Peronosporales*." Professor Fink, now of Oxford, Ohio, in a long series of papers, ending in that on the Lichens of Minnesota, as a contribution of the United States National Museum Series, has reviewed not the lichens of Iowa only, but virtually those of the entire country. Mr. J. P. Anderson, formerly of Lamon, has given us a descriptive list of the *Erysiphales* which, within the limits set, is certainly as carefully prepared and as discriminating as anything we have in English; and Dr. Hume, now of Florida, has published a preliminary sketch of the mycologic flora of distant Colorado. Dr. A. S. Beach has given us a book on the diseases of the bean, and Professor Frederick Rolfs a paper on *Corticium vagans*, a new disease of the potato. Mr. F. J. Seaver, now of Bronx Park, New York, has published a book describing all known Iowa Discomycetes, and more recently a second volume on the *Hypocreales of North America*. Your present historian has placed upon the record an account of some of the saprophytes, polypores, mushrooms, puff-balls of the state and has endeavored so far as he might to set in order for the continent the notorious slime-moulds.

Turning now to morphological research we have some thirty titles. When we reflect that all work in this line must perforce take origin in the relatively few laboratories of Iowa, the list is creditable indeed. At the State College, Mr. Stewart, Miss Serrine, and Miss Emma Pammel (the lamented Mrs. Hansen) have considered the structure of leaves; Miss Bigelow, the glands of *Ptelea*; Mr. Weaver, the spores of ferns; Dr. Buchanan and Mr. Faurot, the styles of the composites; Miss Fogel (Mrs. Buchanan), the morphology of roots; and Dr. Pammel and Misses Serrine and Robb, the histology of the coverings of certain seeds.

Professor Conard has published studies in the histology of ferns, and the spore-formation of *Lycopala*; Mr. Hawkins is the author of an article on the sporangium of *Equisetum*, and Professor Wylie on the Morphology of *Elodea*; while Professor Gow has given account of karyokinesis in corn, and has published studies of the aroids; and Mr. Knupp has illustrated for our pages the flowers of *Myriophyllum*. Professor Frye, now of Washington, has a paper on the embryo-sac of *Casuarina*; and Professor Fink an article on the pollination of the tomato. The present writer has described the grosser structure of the Dakota cycads and some features of their histology. He has also given account of a number of fossil stem-fragments gathered from our Iowa drift. Some

carboniferous plant-remains have also been studied and described. In this connection it is proper to mention a report presented some years since before the Academy, descriptive of a wonderful moss-deposit discovered beneath the Kansas clays of Fayette county.

Finally, in ecology, a vast deal of unnoted, even unnoticed work has emanated from the State College. Professor Pammel has published one of the few textbooks on this fascinating but little recognized branch of our beautiful science. The same indefatigable author, assisted by Miss Rolfs, has published an essay on the pollination of the composites, and assisted by Miss Alice Beach, another on the fertilization of the curcubits. During a series of years, Miss Charlotte King has prepared an annual report to the State Horticultural Society on the phenology of Iowa vegetation.

Professor Fink has been a prolific publisher and has many ecological papers to his credit, the latest entitled "*The Composition of a Desert Lichen Flora.*" Professor Shimek has related ecology to geology by his flora of the St. Peter's Sandstone, and flora of the Sioux Quartzite; while by his published discussion of prairie and forest, and especially by his argument that the loess is an ecological problem, he has changed the pleistocene geology of the continent if not of the world. Under the title "*The Staminate Flower of Elodea,*" Professor Wylie presents some remarkable ecological adaptations in the flowers of that interesting plant. Messrs. Fawcett and Dudgeon of Ames have studied the variations in the ray flowers of the composites; Miss Edna Pammel, variations in clover; Professor Pammel, the germination and growth of leguminous seeds; and Mr. F. W. Faurot, the growth and development of *Astragalus caryocarpus*.

Such, members of this Academy, is the briefest outline sketch of our work in botany during the years we name. The details are found in hundreds of papers and pamphlets or volumes; but, as stated in the beginning of this review, even a published list of all published pages, title by title, would tell of only a smallest fraction of the work really done by members of this Academy for science and for the state. I may not better state this than by quoting a few words from one of the most tireless and efficient of men here represented as lately he wrote me, sending a long list of important publications: "My life has been varied; lecturing, teaching, investigating, talking to institutes, farmers' associations, everything; and the years have gone." As stated at the outset, much of the varied employment of our people has been incident to our position as organizers of the educational institutions of our commonwealth and of the country. Hardly one of us but has found himself compelled in these undifferentiated beginnings to teach more than a single subject. At the University since my connection with its honored staff the same men have taught botany, geology, zoology, what was called biology, and a class or two in English or mathematics! Much more has this been true in other colleges. As time passes this situation ameliorates more and more, and the next twenty-five years will bring, we believe, to all our toilers, wider opportunities. Under this greater freedom, methods will change. Since Darwin's time, not here but everywhere, perhaps of necessity, teaching and book-making have been emphasized; notwithstanding the master's oft-repeated injunction, "Try it, try it," like that other master's "prove all things," naturalists have simply indulged their far-inherited tendencies to disputation; argument has been dominant and experiment recessive.

But then, there are surely signs of change. Instead of lying easily content—as we are all, more or less inclined to do, content in the dicta of great teachers—the whole world is now once more alert, searching if these things be so. We no longer assert natural selection; we strive to make nature select before our eyes, and so attack the riddle of life's kaleidoscopic panorama. The work of Neilson, De Vries, and even Burbank, discredited as he may be by the peripatetic theorizer—the work of such men is full of suggestion for the richness of future botanical science. Argument shall at length become recessive, and dominant shall be the experimental search for truth; so that when in another twenty-five years many of the members of this Academy now sitting before us, shall again gather here to celebrate the full half-century of our story, the list of published articles may not be longer, but their content shall have helped, at least, to change for intellectual humanity, the face of nature; spring shall return with a newer bloom; the flowers shall shine with an added lustre; new forms and varieties shall adorn our parks and forests; the fungi still shall weave their web of intricacy, but under guidance of man acting in presence of ascertained fact, shall contribute their exhaustless energy to the promotion of utility and beauty; and botany shall begin to show itself, as it really is, the most fascinating, productive, beautiful, and withal, instructive science of this world.

APPENDIX TO
 TWENTY-FIVE YEARS OF BOTANY IN IOWA.

Much difficulty has been experienced in securing the data requisite for complete presentation of this subject. To a letter of inquiry sent to members and associates, but fourteen replies came back. The content of these replies is the basis of what here immediately precedes.

The papers reported have been arranged by topic tentatively as follows:

Bacteriology	9
Ecology	20
Economic	20
Morphology	39
Mycology	16
Paleobotany	4
Taxonomy	130

Here then are the lists as enumerated. Some are mentioned in more than one list, since taxonomy, for instance, may concern mycology, or paleobotany be morphological.

The Bibliography of Iowa Botany for the twenty-five years, 1888-1912, inclusive, may be arranged under several separate heads:

- I. Bacteriology.
- II. Ecology and Physiology.
- III. Economic, not I. or V.
- IV. Morphology.
- V. Mycology.
- VI. Paleobotany.
- VII. Taxonomy; except as in V.

BACTERIOLOGY.

DR. HENRY ALBERT—

Typhoid Bacilli Carriers. *Journal Iowa State Medical Society*, September, 1911, and *American Journal of Public Health*, February, 1908.

Reactions Induced by Antityphoid Vaccination—*American Journal of Medical Sciences*, February, 1912.

Diphtheria; a Statistical Study of Certain Laboratory and Clinical Observations. *The Journal of Infectious Diseases*, Vol. 4, No. 2, April 10, 1907, pp. 210-218.

The Opsonic Index and Vaccine Therapy. *Iowa Medical Journal*, Vol. 14, August 15, 1907, p. 68.

Pseudo-Membraneous Inflammation of the Throat. *Iowa Medical Journal*, Vol. 14, October 15, 1907, No. 4.

PROFESSOR C. O. BATES—

Clear Water for Cedar Rapids and How to Get It.

DR. R. E. BUCHANAN—

Notes on a Thermophilic Bacillus. *Proc. Ia. Acad.*, Vol. XII.

PROFESSOR A. MARSTON—

With Elmina Wilson: Data of Sewage and Sewage Disposal. *I. Eng.*, 1: No. 3.
 With L. H. Pammel et al.: Preliminary Data for the Design of the Proposed Sewage Disposal System, City of Marshalltown. Marshalltown, 1900.

With J. B. Weems and L. H. Pammel: The Iowa State College Sewage Disposal Plant and Investigation. *Bull. Ia. St. Coll.*, 1900.

PROFESSOR L. H. PAMMEL—

Notes on the Bacteriological Analysis of Water. *Proc. Ia. Acad.* Vol. VIII.
 Public Water and Ice Supplies and Disposal of Sewage. *Proc. Ia. Eng. Soc.*, Vol. XV.

Bacteriological Investigations of the Ames Sewage Disposal Plant. *Centralbl. f. Bakt. u. Infektions-Krankheiten. Abt. II.*, 9:89.

- Some Municipal Water Problems. Proc. Ia. Acad., Vol. XIV.
 Bacteriosis of Rutabaga. Bull. Ia. Agr. Exp. Sta. 27.
 An Aromatic Bacillus of Cheese, *Bacillus aromaticus*. Bull. Ia. Agr. Exp. Sta. 21:791, 1 pl.
 Some Bacteriological Work in the Dairy. Bull. Ia. Agr. Exp. Sta. 21:6-13.
 Bacteria, Their Relation to Modern Medicine, the Arts, and Industries. Proc. Ia. Acad. Sci. 1: pt. 4:66-91.
 Notes from the Botanical Laboratory of Iowa Agricultural College. Proc. Ia. Acad. Sci. 1: pt. 4:93-97.
 Nitrification. Vis Medicatrix. February, 1892, separate 5 pp.
 Bacteriological Investigations of the Ames Sewage Disposal Plant. Centralbl. f. Bakt. Parasitenk. und Infektion. Abt. II, 9:89-107, 3 pl.
Beggiatoa alba and the Dying of Fish in Iowa. Proc. Ia. Acad. Sci. 1: pt. I, 90.
 With Robert Combs. Some Notes on Chromogenic Bacteria. Proc. Ia. Acad. Sci. 3:135-140.
 Symbiosis. The Vis Medicatrix. 1:96-99; 159-162.
 Kramer's Bacteriology (and other Notes on Bacteria). 1:99, 163.
 Bacteria of Milk, Cream and Cheese with Exhibition of Cultures. Proc. Ia. Acad. Sci. 1; pt. II:19-20.
 Morphology and Development of *Astasia artemospora* and *Bacillus tumescens*. Brown Rot of Cruciferous Plants. Am. Nat. 32:287-291.
 Characters in Bacteria. Agr. Sci. 1892: 378-380.
 Some Recent Work in Bacteriology as Related to Agriculture. Agr. Sci. 1892: 380, 383.
 Bacterial Diseases of the Sugar Beet. Agr. Sci. 1892:383-385.
 Pigment Microorganism. Agr. Sci. 1892:385-386.
 Recent Bacteriological Work. Agr. Sci. 8:114-119.
 Bacteriosis of Rutabaga. Bull. Ia. Agr. Exp. Sta. 27:130-131, pl. 1. Microscop. Jour. 1895:145-151.
 With Emma Pammel. Contribution on the Gases Produced by Bacteria. Centralbl. f. Bakt. Parasitenk. u. Infektionskrankheiten II Abt., 1896, 2:633-650 pl. 5 Separate Contr. Bot. Dept. Ia. Agr. Coll. 2.
 With J. B. Weems. An Investigation of Some Iowa Sewage Disposal Systems. Centralbl. fur. Bakt. u. Parasitenk. 2 Abt. 13:395-407, 4 f.
 With Estelle D. Fogel. Some Railroad Water Supplies. Proc. Ia. Acad., Vol. XII.
 With R. E. Buchanan and Edna L. King. Some Bacteriological Examinations of Iowa Waters. Proc. Ia. Acad. Sci. 9:111-126.

PROFESSOR L. S. ROSS—

- An Observation on the Number of Bacteria in Des Moines School Buildings, 1906, two pages.
 Apparatus for Plating Out Petri Dishes in the Field, 1905, two pages, one plate.
 A Case of the Isolation of Diphtheria Bacilli From a Post Mortem. 1098 Abstract. No plate.

MR. L. R. WALKER—

- Bacteriological Investigations of the Iowa State College Sewage. Proc. Ia. Acad. Vol. VIII.

ECOLOGY AND PHYSIOLOGY.

WINFIELD DUDGEON—

- A Study of the Variation of the Number of Ray-flowers of Certain Compositae. Proc. Ia. Acad. Vol. XIV.

H. S. FAWCETT—

- Variation in Ray-flowers of *Anthemis*, *cotula* and other composites. Proc. Ia. Acad., Vol. XII.

PROFESSOR BRUCE FINK—

- Ecological Distribution an Incentive to the Study of Lichens, 1902.
 Some Common Types of Lichen Formations, 1903.
 Some Talus Cladonia Formations, 1903.
 A Lichen Society of a Sandstone Rip-rap, 1904.
 The Gynaecocentric Theory and the Sexes in Plants, 1908.

MISS ADA HAYDEN—

- The Algal Flora of the Missouri Botanical Garden. Rept. Mo. Bot. Gard. 21:1-48, pl. 1-5; 1910.

- An Ecological Study of a Prairie Province in Central Iowa, 1911. (Thesis for M. S. Degree at I. S. C. unpublished.)

MR. E. R. HODSON—

Phenological Observations on the Growth of corn. Mo. Riv. Ia. Weath. & Crop Service, Oct. 1898.

CHARLOTTE M. KING—

Phenological Notes for 1901. Trans. St. Hort. Soc. 1901:114-130.

Phenological Notes for 1902. Trans. St. Hort. Soc. 1902:131-147.

Phenological Notes for 1903. Trans. St. Hort. Soc. 1903:113-122.

Observations on the Phenology of Plants at Ames, Trans. St. Hort. Soc. 1904:114-137.

Phenological Notes for 1905. Trans. St. Hort. Soc. 1905:204-212.

Phenology Notes, 1906. Trans. St. Hort. Soc. 1906:203-218.

Phenology Notes, 1907. Trans. St. Hort. Soc. 1907:230-251.

Phenology Notes for 1908. Trans. St. Hort. Soc., 1908:276-297.

Phenological Notes. Blooming dates for Iowa Plants, 1909. Trans. St. Hort. Soc. 1909:239-248.

Notes Phenology, Ames, 1910. Trans. St. Hort. Soc. 1910:211-224.

Notes on the Blooming Time of Iowa Plants, 1911. Trans. St. Hort. Soc. 1911:201-211.

Forest Preservation in Iowa. Trans. St. Hort. Soc. 1902:60-63.

A Summer Outing in Iowa. Plant World 5:222-225.

Nature in Life and Education. Trans. St. Hort. Soc. 1905:90-93.

PROFESSOR L. H. PAMMEL—

The Geographical Distribution of Plants. Trans. Ia. St. Hort. Soc. 2g.

A Comparative Study of the Vegetation of Swamp, Clay and Sandstone Areas in Western Wisconsin, Southeastern Minnesota, Northeastern, Central and South-eastern Iowa. Proc. Dav. Acad. Vol. X.

Quince Fruit With an Immense Number of Seeds. Proc. Ia. Acad. Vol. VII.

Climate as a Factor in the Development of Plants. Ia. Agriculturist, Vol. II.

Preliminary Notes on the Flora of Western Iowa, especially from the Physiographical-ecological Standpoint. Proc. Ia. Acad. Vol. IX.

Climate and Plants. Monthly Review of Ia. Weather & Crop Service. 2:6-12, Oct. 1891.

Phenological Notes for 1892. Proc. Ia. Acad. Sci. 1:46-61: Separate 1-15.

Climate and its Effect on the Quality of Apple. Trans. Ia. St. Hort. Soc. 27:132-138.

Phenological Notes. Bull. Torrey Bot. Club. 19:375-382.

Old Lake Vegetation in Hamilton Co., Iowa. Plant World, 2:42-45, 1 f.

Some Ecological Notes on the Muscatine Flora. Plant World. 2:181-186, 2 f.

Some Changed Conditions of Our Flora Incident to the Settlement of the State. Proc. Soc. Prom. Agr. Sci. 1901:107-112, Separate 6 p.

Rare Plants and Their Disappearance. Plant World 5:151-152.

Our Vanishing Wild Flowers. Plant World. 5:173-175, pl. 16-20.

Some Ecological Notes on the Vegetation of the Uintah Mountains. Proc. Ia. Acad. Sci. 10:57-68, pl. 15-22. Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts. 22.

Phenological Notes. Proc. Ia. Acad. Sci. 1: Pt. II:12-13.

A Trip Among the Rockies. Trans. Ia. St. Hort. Soc. 1901:333-335.

With F. G. Miller. A Study on the Germination and Growth of *Leguminosae*, especially with reference to large and small seed. Bull. Ia. Agr. Exp. Sta. 62.

Flower Ecology. 157, 56 f. Carroll, 1893.

Ecology, 364, 181 f. Carroll, 1903.

Notes on the Pollination of Rhus. Science 21:331.

With Charlotte M. King. Pollination of Clover. Proc. Ia. Acad. Sci. 18:35-45, 3 f.

With Alice M. Beach. Pollination of Cucurbits. Proc. Ia. Acad. Sci. 2:146-152, pl. 11-13.

A Lecture on the Pollination of Flowers, Delivered at the State Horticultural Soc. Jan. 1892. Cross and Self-Fertilization in Plants, a Paper read at the Meeting of Eastern Iowa Hort. Soc., Dec. 1891, and The Effects of Cross Fertilization in Plants, read at the Meeting of the Northern Ia. Hort. Soc. Rep. Ia. St. Hort. So. 27:439, Dec. 1891. Separate 57 pages, 45 f.

Some Results Obtained in Crossing Cucurbits. Trans. Ia. St. Hort. Soc. 28:320-322.

On the Crossing of Cucurbits. Bull. Ia. Agr. Exp. Sta. 19:597-600.

Results of Crossing Cucurbits. Bull. Ia. Agr. Exp. Sta. 23:906-917.

EDNA C. PAMMEL and CLARISSA CLARK—

Studies in Variation of Red Clover. Proc. Ia. Acad. Vol. XVIII.

F. A. SIRRINE—

Notes on Methods of Cross-Pollination. Bull. Ia. Agr. Exp. Sta. 13:87-92.

PROFESSOR B. SHIMEK—

The Flora of the St. Peter Sandstone, 1904. Bull. Lab. Nat. Hist. Ia. Vol. V.

The Prairies, 1911. Bull. Lab. Nat. Hist. Ia. Vol. VI.

The Flora of the Sioux Quartzite, 1897, 1898. Proc. Ia. Acad. Vols. IV & V.

The Distribution of Forest Trees in Iowa, 1900. Proc. Ia. Acad. Vol. VII.

Living Plants as Geological Factors, 1903. Proc. Ia. Acad. Vol. X.

The Genesis of the Loess in Plant Ecology, 1909. Proc. Ia. Acad. Vol. XV.

Prairie Openings in the Forest, 1912. Proc. Ia. Acad. Vol. XVII.

Flora of Winneshiek Co., 1906. Rep. Ia. Geol. Surv. Vol. XVI.

Botany of Harrison and Monona Counties, 1910. Rep. Ia. Geol. Surv. Vol. XX.

ECONOMICS OR APPLIED BOTANY.

C. R. BALL—

Seed-testing; Its Importance, History, and Some of its Results. Contr. Ia. St. Coll. 9.

Seed-testing. Bull. Ia. St. Coll. 36.

The Purity and Vitality of Grass-seeds. Bull. Ia. Geol. Surv. 1:164.

ROBERT COMBS—

Sugar-producing Grasses. Bull. Ia. Geol. Surv. 1:233.

H. S. FAWCETT—

The Viability of Weed-seeds under Different Conditions of Treatment and a Study of their Dormant Periods. Proc. Ia. Acad. Vol. XV.

PROFESSOR B. FINK—

What Our Schools May do for Forestry. Ia. State Register Dec. 2, 1904.

The Pruning of our Ornamental Trees. Proc. Ia. Pk. & For. Assoc. 1904.

Lichens, Their Economic Role. The Plant World. Vol. IX. 1906.

HARRIETTE S. KELLOGG—

Economic Fiber Plants of Iowa. Trans. Ia. Hort. Soc. 38:124-127.

Folk-use of Medicinal Plants. Trans. Ia. St. Hort. Soc. 39:143-148.

PROFESSOR T. H. MACBRIDE—

Present Status of Iowa Parks. Proc. Ia. Park and For. Assoc. Vol. II, p. 1.

Plan and Plant. Proc. Ia. Park and For. Assoc. Vol. III, p. 3.

Civic Improvement in Iowa. Proc. Ia. Park and For. Assoc., Vol. IV, p. 3.

The Farmstead; its Landscape Architecture. Proc. Ia. Park and Forest Assoc. Vol. V, p. 81.

The Fauna of Town and Park. Proc. Ia. Park and For. Assoc. Vol. V, 119.

County Parks. Proc. Ia. Acad. Vol. III, p. 91, 1895.

Forestry Notes for Humboldt Co., An. Rep. Ia. Geol. Surv. XI, p. 150.

Forestry Notes for Clay and O'Brien Co.'s, Rep. Ia. Geol. Surv. XI, p. 499.

Forestry Notes for Dickinson and Osceola Co.'s, Rep. Ia. Geol. Surv. XVIII, 228.

Forestry Notes for Sac and Ida Co.'s, Rep. Ia. Geol. Surv. XVI, p. 549.

Forestry Notes for Cherokee and Buena Vista Co.'s, Rep. Ia. Geol. Surv. XII, p. 344.

Forestry Notes for Dubuque Co. Rep. Ia. Geol. Surv. Vol. X, p. 623.

Forestry Notes for Johnson Co. Rep. Ia. Geol. Surv. Vol. XII, p. 105.

Forestry Notes for Emmet and Palo Alto Co.'s, with R. I. Cratty. Rep. Ia. Geol. Surv. Vol. XV.

The Okoboji Lakeside Laboratory. Proc. Ia. Acad. Vol. — p. —

Forest Distribution in Iowa. Proc. Ia. Acad. Vol. III, p. 96.

PROFESSOR L. H. PAMMEL—

Present Conditions of Iowa Forests. Proc. Ia. Pk. & Forestry Assoc. 3:53-75.

What the College Has Done for Park and Forestry During the Last Thirty Years. Proc. Ia. Pk. and For. Assoc. 4: 51-70.

Present View-point of Forestry and Civic Improvement. President's Address Meeting Ia. Pk. & Forestry Assoc. Trans. Ia. Pk. & Forestry Assoc. 5:25-44.

President's Address 6th Annual Meeting Ia. Pk. & Forestry Assoc. Proc. Ia. Pk. & Forestry Assoc. 6:19-38.

With Estelle D. Fogel. A Catalogue of the Poisonous Plants of Iowa. Proc. Ia. Acad. Sci. 14:147-176, 4 f. Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts. 37.

With Robert Combs. Some Botanical Notes on Corn. Bull. Ia. Agr. Exp. Sta. 36:849-855, 8 f.

- Loco Weeds. *The Vis Medicatrix*. 1:40-42.
- A Manual of Poisonous Plants Chiefly of Eastern North America, with Brief Notes on Economic and Medicinal Plants and Numerous Illustrations. 977+14 475 f., and 16 pl. The Torch Press, Cedar Rapids, 1911.
- With G. M. Lummis. The Germination of Weed Seeds. *Proc. Soc. Prom. Agr. Sci.* 24:89-100.
- Quack and Wheat Grasses. *Bull. Ia. Agr. Exp. Sta.* 83:397-421. Popular Edition, W. H. Ogilvie, 397-402.
- Exterminating Quack Grass. *Pres. Bull. Ia. St. Coll. Exp. Sta.* 11:1-4. 2 f.
- An Address on Weeds. *Proc. St. Assoc. County Supervisors.* 13:4-9.
- The Weeds of Roadsides. *Proc. Ia. Good Roads Assoc.* 1905:30-35.
- The Canada Thistle and Dandelion. *Bull. Ia. Agr. Coll. Exp. Sta.* 61:143-148. f. 2-6.
- With Charlotte M. King. A few Troublesome Weeds. *Press Bull. Ia. Agr. Exp. Sta.* 23:1-4, f. 1-5.
- The Use of Our Wild Flowers for the Garden. *Ia. Horticulture*, 1:210-220, 2 f. 1908.
- Holding Railway Banks with Brass. *Railroad Age Gazette.* 54:743, 2 f.
- Canada Thistle. *Press Bull. Ia. St. Coll. Exp. Sta.* 12:1-2, 1 f.
- Vergiftungen durch Wasserscheierling. *Pharm. Rundschau.* 13:102-103, f. 1-5. . .
- Weeds of Corn Fields. *Bull. Ia. Agr. Exp. Sta.* 33:23-52, 22 f. *Rep. Ia. St. Agr. Soc.* 44:467-491, 22 f.
- Some Weeds of Iowa. *Bull. Ia. Agr. Exp. Sta.* 70:294-545, 169 f.
- Popular edition of the same, 293-372, 62 f.
- Distribution of Some Weeds in the United States, especially *Iva Vanthilifolia*, *Lactuca Scariola*, *Solanum carolinense* and *Solanum rostratum*. *Proc. Ia. Acad. of Sci.* 2:103-127.
- The Weedy Plants of Iowa. *Proc. Soc. Prom. Agr. Sci.* 1900. Separate 5 p.
- The Methods for Exterminating Milkweed, Horse Nettle, Dropseed Grass, Fox-tail, Squirrel-tail, Mustard, Butter-print, and Morning Glory. *Press Bull. Ia. Agr. Exp. Sta.* 13:1-5, 1 f.
- The Problem of Weeds in the West. *Proc. Ia. Acad. Sci.* 15:34-46, 8 pl. *Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts.* 44.
- Two Noxious Weeds in Iowa. *Bull. Ia. Agr. Exp. Sta.* 28:199-228, 6 f.
- Notes on Some Introduced Plants in Iowa. *Proc. Ia. Acad. Sci.* 4:110-118.
- Some Troublesome Weeds of the Mustard Family. *Bull. Ia. Agr. Exp. Sta.* 34:656-686, 15 f.
- Some Troublesome Weeds. *Rep. Iowa St. Agr. Soc.* 1894:523-539. 7f., 2 pl.
- Some Obnoxious Weeds of Iowa. *Rep. Ia. St. Agr. Soc.* 1893:436-450, 6 f.
- Report of the Dept. of Botany. *Biennial Rept. Ia. Agr. Coll.* 1889:42-48.
- The Russian Thistle. *Bull. Ia. Agr. Exp. Sta.* 38:1-24, 15 f.
- Botany of Russian Thistle. *Bull. Ia. Agr. Exp. Sta.* 26:8-25, 20 f.
- Squirrel-tail Grass or Wild Barley. *Bull. Ia. Agr. Exp. Sta.* 30:302-319, 6 f.
- Two Noxious Weeds. *Bull. Ia. Agr. Exp. Sta.* 28:199-214, 8 f.
- Poisoning from Cowbane, *Cicuta Maculata* L. *Bull. Ia. Agr. Exp. Sta.* 28:215-218, 6 f.
- Weeds of the Farm and Garden. 281. 161 f., 1 pl. New York, Orange Judd Co., 1911.
- A Talk on Weeds. An Address delivered before the County Road School, Clinton County, Iowa, 1910, with an appendix describing a few weeds. 55, 31 f. Ames, 1910.
- A Few Lessons on Weeds. Prepared especially for the Dallas County School's. Carolyn E. Forgrave Supt, 21, 13 f., Adel, 1912.
- Poisonous and Medical Plants of Missouri. *Bull. Mo. St. Board of Hort.* 14:1-46, f. 1-26.
- With Charlotte M. King. Notes on the Eradication of Weeds with Experiments Made in 1907 and 1908. *Bull. Exp. Sta. Ia. St. Coll. of Agr. & Mech. Arts.* 105:261-300, 39 f.
- Some Desirable Shrubs for the Lawn. *Trans. Ia. St. Hort. Soc.* 35:194-196.
- Division of Agrostology U. S. Dept. of Agr. *The Gentleman Farmer.* June 1897: 509-514, 13 f.
- What the United States Government is Doing for Forestry. *Proc. Ia. Pk. and Forestry Assoc.* 1:57-70, 16 pl.
- Progress of Forestry in the United States During the Past Year. *Proc. Ia. Pk. and Forestry Assoc.* 2:18-30.
- Lines of Investigation Inviting Open to Botanists. *Proc. Am. Assoc. Agr. Coll. and Exp. Sta.* 16:115-116.
- Botanical Papers Presented at the New Orleans Meeting of the Amer. Assoc. of Agr. Coll. & Exp. Sta. 18:25-28.

Botany in the Agricultural Colleges. Proc. Assoc. Agr. Coll. & Exp. Sta. 17:168-179.

The Use of our Wild Flowers for the Garden. Trans. Ia. St. Hort. Soc. 1901. 168-175, 5 pl.

SEEDS.

Seed Legislation, Its Uses and Abuses. Proc. Amer. Seed Trade Assoc. 27:60-65. Some Seed Studies. Proc. Soc. Prom. Agr. Sci. 28:168-172, Separate 5 p.

With Charlotte M. King. Delayed Germination. Proc. Ia. Acad. Sci. 15:20-32. 1 pl. Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts. 45.

With Charlotte M. King. Results of Seed Investigations for 1908-1909. Bull. Ia. Agr. Exp. Sta. 115:152-177. 1 f.

With Charlotte M. King. Results of Seed Investigations for 1907. Bull. Ia. Agr. Exp. Sta. 99:71-91. Popular Edition C. V. Gregory, 14 p. 1 f.

The Histology of the Caryopsis and Endosperm of Some Grasses. Trans. Acad. Sci. St. Louis. 8:199-220, pl. 17-19. Published also as Contr. Shaw School of Bot. Wash. Univ.

With R. E. Buchanan & Charlotte M. King. The Vitality, Adulteration and Impurities of Clover, Alfalfa, and Timothy Seed for Sale in Iowa in 1906. Bull. Exp. Sta. Ia. Coll. Agr. & Mech. Arts. 88-69. 19 f.

PROFESSOR B. SHIMEK—

Forestry in Iowa. Proc. Ia. Acad. Vol. IX, 1902.

Botany in its Relationship to Good Citizenship, Presidential Address, Proc. Ia. Acad. Vol. XII, 1905.

Wood-preservation. Woodcraft, Vol. VI, Mar. 1907.

The Relation of Forestry to Engineering. Proc. Ia. Eng. Soc. 1909.

The Conservation of our Woodlands. Rep. Ia. Dr. Waterways & Conserv. Com. 1909.

The Pioneer and the Forest. Proc. Miss. Vall. Assoc. 1910.

Forestry Bill. Proc. Ia. Pk. & For. Assoc. Vol. I, 1902.

Sod and Sodding. Rep. Ia. Hort. Soc. Vol. XLIII, 1909.

Conservation. Rep. Ia. Hort. Soc. Vol. XLV, 1911.

Future Use of Soft-wood Groves. Iowa State Register, Dec. 2, 1904.

MORPHOLOGY.

C. R. BALL—

An Anatomical Study of the Leaves of *Eragrostis*. Proc. Ia. Acad. Vol. IV.

CASSIE M. BIGELOW—

Study of the Blands of the Hop Tree. Proc. Ia. Acad. Vol. XII, 1904.

R. E. BUCHANAN—

A contribution to our Knowledge of the Development of *Prunus americana*. Proc. Ia. Acad. Vol. VI. 1903.

ROBERT COMBS—

Histology of the Corn Leaf. Proc. Ia. Acad. Vol. V.

PROFESSOR H. S. CONARD—

Homology of the Tissues in Ferns. Proc. Ia. Acad. Vol. XIV, 1907.

Spore-Formation of *Lycogala exiguum*. Proc. Ia. Acad. XVII, 1910.

Structure and Life-history of the Hay-scented Fern. Car. Bull. 94, 1907.

F. W. FAUROT—

Notes on the Early Development of *Astragalus caryocaryus*. Proc. Ia. Acad. Vol. VIII, 1900.

PROFESSOR BRUCE FINK—

Contributions to the Life History of *Rumex*. Minn. Bot. Studies, 1899.

Pollination and Reproduction of *Lycopersicon esculentum*. Minn. Bot. Studies, 1896.

PROFESSOR T. C. FRYE—

The Embryo-sac of *Casuarina stricta*. Bot. Gaz. Vol. 36, 1908.

PROFESSOR JAMES E. GOW—

Studies in Karyo Kinesis. Proc. Ia. Acad. Vol. XIV, 1907.

L. H. HAWKINS—

The Development of the Sporangium of *Equisetum hiemale*. Ohio Naturalist, 1907.

N. D. KNAPP—

The Flowers of *Myriophyllum spicatum*. Proc. Ia. Acad. Vol. XVIII, 1911.

PROFESSOR L. H. PAMMEL—

On the Seed Coats of the Genus Euphorbia. Trans. Acad. Sci. St. Louis, 5:543-568, pl. 12-13. Contr. Shaw School of Bot. 8. Proc. Am. Assoc. Adv. of Sci. 39: 328-329.

J. R. Burnap and Hannah Thomas. Some Studies on the Seeds and Fruits of Berberidaceae. Proc. Ia. Acad. Sci. 5:11-25, pl. 12-16.

On the Seeds and Tests of Some Cruciferae. Separate from Amer. Mo. Mic. Jour. Contr. Bot. Dept., Ia. St. Coll. of Agr. & Mech. Arts 6, including 4 full page plates, pagged, 1 pl.

Some Methods in the Study of Mature Seed. Jour. Applied Microscopy, 1 No. 3: 3, 6 f.

Comparative Anatomy of the Corn Caryopsis. Proc. Ia. Acad. Sci. 5. Contr. Ia. Agr. College. No. 10, 5 p., 10 f.

With Luella Robb. Notes on the Histological Structure and Specific Gravity of the Seeds of the Genus Pyrus. Proc. Ia. Acad. Sci. 15:47-55 incl. Pl. I & II.

The Histology of the Caryopsis and Endosperm of Some Grass. Trans. Acad. Sci. St. Louis 8:199-220, pl. 17-19. Contr. Shaw School of Bot. 12.

Anatomical Characters of the Seeds of Leguminosae, Chiefly Genera of Gray's Manual. Trans. of the Acad. Sci. of St. Louis, 9:90-273, pl. 7-35; also Washington Univ. Thesis for the Degree of Doctor of Philosophy. 5. same paging.

With Estelle D. Fogel. The Underground Organs of a Few Weeds. Proc. Ia. Acad. Sci. 16:31-40, including 5 pl.

Definite Annual Growth and Its Relation to Hardiness. Trans. Ia. St. Hort. Soc. 28:104-113, 1 pl.

Laboratory Guide in Plant Histology. 30 pages.

With Emma Pammel. Some Anatomical Studies of the Leaves of Sporobolus and Panicum. Proc. Ia. Acad. Sci. 3:148-159, 1 pl. Contr. Bot. Dept. Ia. Agr. Coll. 1.

EMMA SIRRINE—

A Study of the Leaf Anatomy of Some Species of the Genus Bromus. Proc. Ia. Acad. Sci. 4:119-125, pl. 4-8. Contr. Bot. Dept. Ia. St. Coll. of Agr. & Mech. Arts. 4.

C. B. WEAVER—

An Anatomical Study of the Leaves of Some Species of the Genus Andropogon. Proc. Ia. Acad. Sci. 4:132-137, pl. 12-15. Contr. Bot. Dept., Ia. St. Coll. of Agr. & Mech. Arts. 4.

A Comparative Study of the Spores of N. A. Ferns. Proc. Ia. Acad. Vol. III.

MYCOLOGY.

J. P. ANDERSON—

Iowa *Erysiphaceae*. Proc. Ia. Acad. Vol. XIV.

R. E. BUCHANAN—

Monascus purpureus. Mycologia 2. pp. 99-106.

ROBERT COMBS—

Alfalfa Leaf-spot Disease, *Pseudopeziza medicaginis*. Contr. Bot. Dept. Ia. St. Coll. Agr. No. 9.

JOHN CRAIG—

A Destructive Disease Affecting the Native Plum. Ottawa Naturalist, Vol. VI.

PROFESSOR B. FINK—

Blights at Fayette, Iowa, Upper Iowa Univ. 1894.

ALICE W. HESS—

A Few Common Fungi of Ames. Bull. Ia. Agr. Exp. Sta. No. 61.

With Harriet Vandivert. Bacidiomycetes of Central Iowa. Proc. Ia. Acad. Sci. Vol. VII.

A. S. HITCHCOCK—

Partial List of Iowa Powdery Mildews. Bull. Ia. Agr. Coll. 48. 1887.

Provisional List of Fungi. Bull. Ia. Agr. Coll. 102, 1888.

With T. H. Macbride. *Peronosporae* of Iowa. Bull. Lab. Nat. Hist. Vol. I.

E. R. HODSON—

A New Species of Neovossia. Bot. Gaz. Vol. XXX.

H. H. HUME—

Fungi Collected in Colorado, etc. Proc. Dav. Acad. Vol. VII.

Some Peculiarities in Puccinia teleutospores. Bot. Gaz. Vol. XXVIII.

PROFESSOR T. H. MACBRIDE—

- Saprophytic Fungi of Eastern Iowa. Bull. Lab. Nat. Hist. Vol. 1, p. 30.
 The *Peronosporae* of Iowa, (with A. S. Hitchcock). Bull. Lab. Nat. Hist. Vol. I, p. 45.
 Saprophytic Fungi of Eastern Iowa. Bull. Lab. Nat. Hist. Vol. I, p. 181.
 Common Species of Edible Fungi. Bull. Lab. Nat. Hist. Vol. I, p. 196.
 Myxomycetes of Eastern Iowa. Bull. Lab. Nat. Hist. Vol. II, p. 98.
 The Nicaragua Myxomycetes. Bull. Lab. Nat. Hist. Vol. II, p. 377.
 The Myxomycetes of Eastern Iowa, cont'd. Bull. Lab. Nat. Hist. Vol. II, p. 384.
 A New Slime Mould from Colorado. Bull. Lab. Nat. Hist. Vol. II, p. 390.
 Saprophytic Fungi of Eastern Iowa, Polypores. Bull. Lab. Nat. Hist. Vol. III, No. 3, p. 1.
 The Nicaragua Hymenomycetes, (with J. B. Ellis). Bull. Lab. Nat. Hist. Vol. III, No. 4, p. 190.
 An Interesting Nicaragua Puff-ball. Bull. Lab. Nat. Hist.
 Saprophytic Fungi of Eastern Iowa; the Puff-balls, (with Nora Allin). Bull. Lab. Nat. Hist. Vol. IV, 33.
 Nicaraguan Myxomycetes (with C. L. Smith). Bull. Lab. Nat. Hist. Vol. IV, 73.
 North American Slime Moulds. MacMillan Co., N. Y. and London, 1900.
 Fungi. Pop. Sci. Monthly Vol. XXXV, p. 187 and p. 350, 1899.
 Myxomycetes of the Black Hills. Proc. Ia. Acad. Vol. X, p. 23.
 The Slime Moulds of New Mexico. Proc. Ia. Acad. Vol. XII, p. 33.
 Notes on Iowa Saprophytes. Proc. Ia. Acad. Vol. XVIII, p. 57.
 The Slime Moulds. Rhodora Vol. II, p. 75.
 A New Genus of Myxomycetes? Mycologia Vol. III, p. 39.
 Geustis minimus and its Relatives. Mycologia Vol. IV, p. 84.
 The Nomenclature Question Among Slime Moulds. Proc. Ia. Acad. III, p. 101.

PROFESSOR L. H. PAMMEL—

- Libertiana*, Fuckel, with a Bibliography of Fungus Root Rot Diseases. Trans. Acad. Sci. St. Louis. 6:192-232, *pl. I, II*, 1893.
 Fungus Diseases of the Sugar Beet. Bull. Ia. Agr. Exp. Sta. 15:234-252, including 6 *pl. & 2 f.*, 1891. Also separate.
 Treatment of Some Fungus Diseases, Experiments made in 1891. Bull. Ia. Agr. Exp. Sta. 17:419-442, inclu. 5 *pl.* 1892, also separate.
 Diseases of Plants Common to Iowa Cereals. Bull. Ia. Agr. Exp. Sta. 18:488-503, separate, Some Diseases of Plants Common to Iowa Cereals.
 New Fungus Diseases of Iowa. Jour. Myc. 7:95-103, 1892.
 Root Rot of Cotton or Cotton Blight. Bull. Texas Agr. Exp. Sta. 4:1-18, 1889.
 Cotton Root-Rot. Bull. Texas Agr. Exp. Sta. 7:1-30, 5 *pl.*, 1890.
 The Most Important Factor in the Development of Rust. Agr. Sci. 8:287-291, 1894.
 The Effect of Fungicides on the Development of Corn. Agr. Sci. 6, p. 217, 1892.
 Notes on Some Fungi Common During the Season of 1892, at Ames, Iowa. Agr. Sci. 7:20-27.
 Diseases of Plants at Ames, 1894. Proc. Ia. Acad. of Sci. 30:201-208.
 Potato Scab and Prevention. Bull. Ia. Agr. Exp. Sta. 27:120-129.
 Some Fungus Diseases of Fruit Trees in Iowa. Proc. Ia. Acad. Sci. 1887-1889: 91-94.
 Notes on a Few Common Fungus Diseases. Bull. Ia. Agr. Exp. Sta. 23:918-924.
 With G. W. Carver. Fungus Diseases of Plants at Ames, Iowa, 1895. Proc. Ia. Acad. Sci. 3:140-148, Contr. Bot. Dept. Ia. Agr. Coll. No. 1.
 Some Fungus Diseases of Iowa Forage Plants. Proc. Ia. Acad. Sci. 1: Pt. II: 18-19; 93-94.
 Corn Smut. Proc. Ia. Acad. Sci. 1; Pt. II: 95-96.
 Recent Contributions to Mycology. Agr. Sci. 8:183-191.
 Versuche uber die Bekampfung der Pilzkrankheiten mit Bordeauxmischung und Ammoniak-Kupferlosung Zeitschrift fur Pflanzenkrankheiten. 1:258-260. Separate.
 With Herbert Osborn. Machinery and Methods of Spraying. Bull. Ia. Agr. Exp. Sta. 20:706-712, separate.
 Experiments with Fungicides. Bull. Ia. Agr. Exp. Sta. 24:985-990. rants, Bull. Ia. Agr. Exp. Sta. 20:716-719.
 Experiments to Prevent Certain Leaf Spot Diseases of the Potato. Bull. Ia. Agr. Exp. Sta. 20:719-720, 1893.
 With F. C. Stewart. Prevention of Corn (and) Oats Smut. Bull. Ia. Agr. Exp. Sta. 20:721-728.
 Experiments with Fungicides. Bull. Ia. Agr. Exp. Sta. 24:985-990.

- Diseases of Foliage and Fruit. Trans. Ia. St. Hort. Soc. 1893: 467-474.
 Fungus Diseases. Bull. Ia. Agr. Exp. Sta. 13:32-71, 28 f.
 Fungus Diseases of the Strawberry. Rep. Ia. St. Agr. Soc. 1897:510-516.
 Diseases of the Cherry. Trans. Ia. St. Hort. Soc. 28:248-253.
 Diseases of the Potato. Rep. Ia. St. Agr. Soc. 1895:495-506.
 Mycosis. Vis Medicatrix. April 1892. Separate.
 Some Mildews of Illinois. Jour. of Mycology. 4:36-38.
 Fungus Diseases. Experiments in Their Prevention. Trans. Ia. Hort. Soc. 25:201-202.
 Some Fungus Diseases of the Orchard and Garden. Trans. Ia. St. Hort. Soc. 25:129-134.
 Leaf Spot Disease of the Cherry. Trans. Ia. St. Hort. Soc. 27:448-450.
 Fungus Diseases of the Grape. Trans. Ia. St. Hort. Soc. 27:487-492.
 Fungus Diseases of Iowa Forage Plants. Separate from Mo. Review of the Ia. Weather & Crop Service. 33, 26 f.
 Fruit Rots and Their Prevention. Trans. Ia. St. Hort. Soc. 27:422-426.
 Fungus Diseases of Plants and Their Remedies. Trans. Ia. St. Hort. Soc. 38:440-444, 3 pl.
 With Charlotte M. King. Some Plant Diseases of 1908. Bull. Exp. Sta. Ia. St. Coll. Agr. & Mech. Arts. 104:236-259, 17 f.
 Fungus Poisoning in Animals. Amer. Jour. Vet. Medicine. 6:373-378.
 Recent Contributions to Mycology. Agr. Sci. 8:183-191.
 With Charlotte M. King. Notes on Factors in Fungus Diseases of Plants with Records of Occurrences of Plant Diseases at Ames for a Period of Twenty-five Years. Proc. Ia. Acad. Sci. 16:41. Separate. Contr. Bot. Dept. Ia. St. Coll. 41:1-55. This contains a corrected map on p. 55.
 Some Unusual Fungus Diseases in Iowa During the Summer of 1903. Proc. Soc. Prom. Agr. Sci. 1904:147-154, 2 pl. Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts. 23.
 Miscellaneous Notes on Fungus Diseases. Bull. Ia. Agr. Exp. Sta. 61:139-142, 1 f.
 With J. H. McNeill. The Danger from Feeding Hay that Contains Ergot. Press. Bull. Ia. Agr. Exp. Sta. June 1908, 8, 3 f.
 With E. R. Hodson. The Asparagus Rust in Iowa. Bull. Ia. Agr. Exp. Sta. 53:58-67.
 With Charlotte M. King, and A. L. Bakke. Two Barley Blights, with Comparison of Species of *Helminthosporium* upon Cereals. Bull. Ia. Agr. Exp. Sta. 116:175-190, 4 pl.
 Powdery Mildew of the Apple. Proc. Ia. Acad. Sci. 7:177-182, pl. 33-35.
 Some Diseases of Rocky Mountain Plants. Proc. Ia. Acad. Sci. 13:89-114, pl. 7-12.
 Some Fungus Diseases Common in Iowa During the Season of 1904. Proc. Soc. Prom. Agr. Sci. 1905:69-82. Separate, 16 p.
 Cedar Apple Fungi and Apple Rust in Iowa. Bull. Ia. Agr. Exp. Sta. 84:1-36, 11 f. Popular Edition by W. H. Ogilvie, 1-8, f. 1-4.
 Some Phytopathological Problems. Proc. Soc. Prom. Agr. Sci. 27:76-81. Separate 6 p.
 Fungus Diseases During 1908. Ia. Horticulture 1:376-381, 4 f., 1908.
 Some Fungus Diseases of Trees. Proc. Ia. Acad. Sci. 18:25-33, 3 pl. & 2 f.
 Some Recent Work on Fungus Diseases of Plants. Trans. Ia. St. Hort. Soc. 46:188-198.
 Fungus Diseases in Iowa for the Year 1911. Trans. Ia. St. Hort. Soc. 46:172-179. 1 pl., 10 f.
- MRS. F. W. PATTERSON—
 A Study of the N. A. Exoasceae. Bull. Lab. Nat. Hist. Vol. III, No. 3, p. 89.
- FRED J. SEAVER—
 The Discomycetes of Eastern Iowa. Bull. Lab. Nat. Hist. Vol. V, p. 335.
- CHARLES L. SMITH—
 Some Central American Pyrenomycetes. Bull. Lab. Nat. Hist. Vol. III, p. 394.
- PROFESSOR GUY WEST WILSON—
 Studies in N. Am. Peronosporales, III. New or Noteworthy Species. Bull. Torr. Bot. Club. 35, p. 361.
 Mycological Notes. Midland Nat. Vol. I, p. 50.
 Studies in N. Am. Peronosporales IV. Bull. Torr. Bot. Club. 35, p. 543.
 A New European Species of Peronospora. Ann. Myc. Vol. VIII, p. 185.
 Notes on Peronosporales for 1907. Proc. Ia. Acad. XV, 169.
 The Polyporaceæ of Fayette, Iowa. Proc. Ia. Acad. XVI.

Preliminary List of the Parasitic Fungi of Fayette Co., Ia. Proc. Ia. Acad. Vol. XVII, p. 47.

With F. J. Seaver; Ascomycetes and Lower Fungi. Mycologia Vol. I, p. 121.

With F. J. Seaver; Ascomycetes and Lower Fungi. Mycologia Vol. 1, p. 268.

PALEOBOTANY.

PAUL BARTSCH—

Notes on the Cretaceous Flora of Western Iowa. Bull. Lab. Nat. Hist. Vol. III, No. 4. 178.

PROFESSOR THOMAS H. MACBRIDE—

A New Cycad. Bull. Lab. Nat. Hist. Vol. II, p. 391.

A New Cycad. *Bennettites dacotensis*. Cactr. Am. Geol. Oct. 1893.

A Pre-Kansan Peat Bed. Proc. Ia. Acad. Vol. IV, p. 65.

On Certain Fossil Plant Remains in the Iowa Herbarium. Proc. Dav. Acad. Vol. X, p. 153.

North American Cycads. Proc. Ia. Acad. Vol. 1, pt. 4, p. 62. 1894.

C. R. BALL—

The Genus *Salix* in Iowa. Proc. Ia. Acad. Vol. VII.

R. I. CRATTY—

The Iowa Sedges. Bull. Lab. Nat. Hist., Vol. IV, p. 313.

Notes on the Aquatic Phenogams of Iowa. Bull. Lab. Nat. Hist. Vol. III, No. 4, p. 136.

Forestry Notes for Emmet County, Ia. Rep. Ia. Geol. Surv. Vol. XV, p. 260.

Flora of Emmet County. Proc. Ia. Acad. Vol. XI, 1904.

PROFESSOR B. FINK—

Some Additions to the Flora of Iowa. Proc. Iowa Acad. Sci. 1:103-104. 1894.

The Lichens of Iowa. Bull. Nat. Hist. Univ. Iowa, 3:70-88. 1895.

Lichens collected by Dr. C. C. Parry in Wisconsin and Minnesota in 1848. Proc. Iowa Acad. Sci. 2:137. 1895.

Contributions to a Knowledge of the Lichens of Minnesota, I. Lichens of the Lake of the Woods. Minn. Bot. Stud. 1:693-701. 1896.

Contributions to a Knowledge of the Lichens of Minneapolis and Vicinity—II. Minn. Bot. Stud. 1:703-725. 1897.

Spermaphyta of the Flora of Fayette, Iowa. Proc. Iowa Acad. Sci. 4:81-107. 1897.

Contributions to a Knowledge of the Lichens of Minnesota, III. The Rock Lichens of Taylor's Falls. Minn. Bot. Stud. 2:1-18. 1898.

Notes concerning Iowa Lichens. Proc. Acad. Sci. 5:174-187. 1898.

Contributions to a Knowledge of the Lichens of Minnesota, IV. Lichens of the Lake Superior Region. Minn. Bot. Stud. 2:215-276. 1899.

Contributions to a Knowledge of the Lichens of Minnesota, V. Lichens of the Minnesota Valley and Southwestern Minnesota. Minn. Bot. Stud. 2:277-329. 1899.

Notes on the Lichen Distribution in the Upper Mississippi Valley. Mem. Torr. Bot. Club, 6:285-307. 1899.

Additions to Lichen Distribution in the Mississippi Valley. Proc. Ia. Acad. Sci. 7:173-177. 1899.

Additions to the Bibliography of North American Lichens. Proc. Iowa Acad. Sci. 6:165-173. 1899.

Contributions to a Knowledge of the Lichens of Minnesota, VI. Minn. Bot. Stud. 2:657-709. 1902.

Notes on certain Cladonias. The Bryologist, 6:21-27, pl. 7. 1903. (In collaboration with Mabel A. Husband.)

Contributions to a Knowledge of the Lichens of Minnesota, VII. Lichens of the Northern Boundary. Minn. Bot. Stud. 3:167-236. 1903.

Further Notes on Cladonias. *Cladonia fimbriata*. The Bryologist, 7:21-27, pl. 3, f. 7. 1904.

Further Notes on Cladonias, III. *Cladonia furcata* and *Cladonia crispata*. The Bryologist, 7:53-58, pl. 7, f. 1-2. 1904.

Further Notes on Cladonias, IV. *Cladonia verticillata*. The Bryologist, 7:85-88, pl. 11. 1904.

Two Centuries of North American Lichenology. Proc. Iowa Acad. Sci. 2:11-38. 1904.

How to Collect and Study Lichens. The Bryologist, 8:22-27. 1905.

Further Notes on Cladonias, V. *Cladonia gracilis*. The Bryologist, 8:37-41, pl. 4. 1905.

- What to Note in the Microscopic Study of Lichens. The Bryologist, 8: 73-76 and 86-90, 1905.
- Notes on American Cladonias. Proc. Iowa Acad. Sci. 12: 15-20, pl. 6, 7, 1905.
- Some Notes on Certain Iowa Algæ. Iowa Acad. Sci. 12: 21-27, 1905.
- Edward Tuckerman, A Brief Summary of His Work. The Bryologist, Vol. IX, p. 1, 1906.
- Further Notes on Cladonias, VI. *Cladonia cariosa*. The Bryologist, 9: 21-24. Figure unnumbered, 1906.
- Further Notes on Cladonias, VII. *Cladonia subcariosa*, *Cladonia mitrula* and *Cladonia leptophylla*. The Bryologist, 9: 57-60, pl. 4, 1906.
- Further Notes on Cladonias, VIII. *Cladonia delicata*. The Bryologist, 9: 87-91, pl. 8, 1906.
- Lichens and Recent Conceptions of Species. Proc. Ia. Acad. Vol. XIII, p. 65.

PROFESSOR T. J. FITZPATRICK—

- The Ferns and Their Allies of Iowa. 1896, pp. 14.
- New or Little Known Plants of Iowa. Proc. Ia. Acad. Sciences, vol. iv, p. 108, 1896.
- Notes on the Flora of Northeastern Iowa. Proc. Ia. Acad. Sciences, vol. v, pp. 107-133, 1897.
- Notes on the Flora of Southern Iowa. Proc. Ia. Acad. of Sciences, vol. v, pp. 134-173, 1897.
- The Flora of Southern Iowa, II. Proc. Iowa Acad. of Sciences, vol. vi, pp. 173-202, 1898.
- The Orchidaceæ of Iowa. Proc. Iowa Acad. of Sciences, vol. vii, pp. 187-199, 1899.
- The Genus *Viburnum* in Iowa. Proc. Iowa Acad. of Sciences, vol. vii, pp. 177-199, 1899.
- Betulaceæ of Iowa. Proc. Iowa Acad. Sci., vol. viii, pp. 169-177, 1900.
- The Fagaceæ of Iowa. Proc. Iowa Acad. Sciences, vol. viii, pp. 177-196, 1900.
- The Juglandaceæ of Iowa. Proc. Ia. Acad. Sciences, vol. viii, pp. 160-169, 1900.
- The Ranunculaceæ of Iowa. Bull. Lab. Nat. Hist. S. U. I., vol. v, pp. 87-137, 1901.
- Asclepias meadii* Torrey. The Plant World, vol. ii, p. 107.
- The Forest Trees and Shrubs of Decatur County. Iowa Geol. Surv., vol. viii, pp. 309-314, 1897.
- The Native Oak Groves of Iowa. The Plant World, vol. iv, pp. 69-71, April, 1901.
- Veratrum woodii* in Iowa. The Plant World, vol. iv, pp. 192-193, October, 1901.
- A Study of the Island Flora of the Mississippi River near Sabula, Iowa. The Plant World, vol. v, pp. 198-201, October, 1902.
- The Scrophulariaceæ of Iowa. Proc. Iowa Acad. of Sciences, vol. x, pp. 136-176, 1902.
- The Fern Flora of Iowa. The Fern Bulletin, vol. xi, pp. 65-71, July, 1903.
- The Pasque Flower. The Gamophyllous, vol. i, p. 29.
- A Visit to a Mountain Meadow. The Gamophyllous, vol. iii, pp. 1-2, 1902.
- Manual of the Flowering Plants of Iowa, part 1, Polypetalæ; part 2, Gamopetalæ, pp. 1-150, 1899-1900.
- The June Flora of the Ocheidan Mound. The Plant World, vol. vii, pp. 220-223, 1904.
- The Fern Flora of Montana. The Fern Bulletin, vol. xii, pp. 97-101, October, 1904.
- Notes on Ferns of Washington. The Fern Bulletin, vol. xii, pp. 108-110, October, 1904.
- Plants New or Little Known to the Flora of Iowa. The Iowa Naturalist, vol. i, pp. 22-24, 1905.
- Solanum nigrum* Seems to be Perennial. The Iowa Naturalist, vol. i, p. 25, 1905.
- The Iowa Bladderworts. The Iowa Naturalist, vol. 1, pp. 30-33, April, 1905.
- Cassia medeolæ* in Iowa. The Iowa Naturalist, vol. i, pp. 61-62, July, 1905.
- The Melanthaceæ of Iowa. The Iowa Naturalist, vol. i, pp. 75-81, October, 1905.
- The Iowa Gentians. The Iowa Naturalist, vol. ii, pp. 11-19, January, 1906.
- A Proposed New Species of *Lilium*. The Iowa Naturalist, vol. ii, pp. 30-31, April, 1907.
- An Unusual *Clitocybe illudens*. The Iowa Naturalist, vol. ii, pp. 62, October, 1909.
- The Pyrolaceæ of Flathead Valley, Montana. The Iowa Naturalist, vol. iii, p. 3, January, 1911.
- The Orchids of Flathead Valley, Montana. The Iowa Naturalist, vol. iii, pp. 8-10, January, 1911.
- The Liliales of Iowa. Proc. Iowa Acad. Sci. vol. xiii, pp. 115-160, 1906.

WESLEY GREENE—

A Check List of Iowa Plants.

PROFESSOR A. S. HITCHCOCK—

Our Goldenrods. Aurora p. 209, 1887.

Catalog Anthophyta and Pteridophyta of Ames, Trans. Acad. St. Louis, 5:547. 1891.

Notes on Iowa Flora. Bot. Gaz. 1889.

Story County Flora. Aurora. 1886.

PROFESSOR T. H. MACBRIDE—

Lessons in Botany, With Key to the More Common Native Plants. (With Professor B. Shimek). Allyn and Bacon. Boston.

H. A. MUELLER—

A Preliminary List of the Flowering Plants of Madison County. Proc. Ia. Acad. vol. xi, p. 261, 1903.

Trees and Shrubs of Madison Co. Proc. Ia. Acad. vol. viii, p. 191, 1904.

Trees and Shrubs of Hamilton Co. Proc. Ia. Acad. vol. vii, p. 204, 1899.

OLSEN AND SOMES—

Flora of Webster County. Proc. Ia. Acad. 1904.

PROFESSOR L. H. PAMMEL—

Rocky Mountain Rambles. Plant World. 13:155-163; 181-190, f. 1-5, f. 1-3. Published originally in Horticulture. rearranged and extended.

Comb's Flora of Santa Clara Province, Cuba. Am. Nat. 32:369-370.

Flora of Northern Iowa Peat Bogs. Rep. Ia. Geol. Survey 19:739-784, f. 106-117; Contr. Bot. Dept. Ia. St. Coll. of Agr. & Mech. Arts. 40.

Notes on the Flora, especially the Forest Flora of the Bitter Root Mountains. Proc. Ia. Acad. Sci. 12:87-100 pl. 22-27. Contr. Bot. Dept. Ia. St. Coll. Agr. & Mech. Arts. 31.

The Forest Trees and Shrubs of Monroe County. Rep. Ia. Geol. Survey. 13:423-433.

Notes on Some Plants of Northeastern Iowa. Plant World, 1905.

Notes on Grasses of Nebraska, South Dakota, and Wyoming. Proc. Davenport Acad. of Nat. Sci. 7:229-245, pl. 10-16.

Notes on Some Introduced Plants in Iowa. Proc. Ia. Acad. Sci. 4:110-118. Contr. Bot. Dept. Ia. St. Coll. of Agr. & Mech. Arts. 4.

The Thistles of Iowa with Notes on a Few Other Species. Proc. Ia. Acad. Sci. 3:214-233, pl. 12-31, f. 9-14. Separate Contr. Bot. Dept. Ia. St. Coll. of Agr. & Mech. Arts. 19:1-26, pl. 12-31, f. 9-14.

Distribution of Plants. Trans. Ia. St. Hort. Soc. 36:344-35, 4 f.

With F. Lamson-Scribner, and J. B. Weams. Grasses of Iowa. Bull. Ia. Geol. Survey. 1:525.

With Carleton R. Ball, F. Lamson-Scribner. The Grasses of Iowa. The Descriptive and Geographical Study of the Grasses of Iowa. Supplementary Rept. 1903:436. 270 f. 1 pl.

With Charlotte M. King. The Vascular Cryptogams of Iowa and the Adjoining Parts of Southeastern Minnesota and Western Wisconsin. Proc. Ia. Acad. vol. ix.

Notes on the Grasses and Forage Plants of Iowa, Nebraska, and Colorado. Bull. Div. of Agros. U. S. Dept. Agr. 9:1-47, 12 f.

Some Notes on Grasses Collected in 1895, between Jefferson, Iowa, and Denver, Colorado. Proc. Soc. Prom. Agr. Sci. 17:94-104. Contr. Bot. Dept. Ia. Agr. Coll. 3.

Notes on the Flora of Western Iowa. Proc. Ia. Acad. Sci. 3:106:135. Contr. Bot. Dept. I. S. C. No. 1.

Woody Plants of Western Wisconsin. Proc. Ia. Acad. Sci. 1: Pt. II:76-80.

Forest Vegetation of the Upper Mississippi. Proc. Ia. Acad. Sci. 1: Pt. II. p. 5-11; Reprint from Garden & Forest. 4:460, 472, 531.

Report of Committee on State Flora. Proc. Ia. Acad. Sci. 1: Pt. II:13-17.

Notes on the Flora of Texas. Proc. Ia. Acad. I. pp. 62-76.

PROFESSOR M. E. PECK—

List of Hardin County Plants. Proc. Ia. Acad. 1905.

PROFESSOR G. B. RIGG—

Notes on the Flora of Calhoun Co., Iowa. Hahn and Rule. Iowa City.

PROFESSOR T. E. SAVAGE—

Preliminary Report on the Mosses of Iowa. Proc. Ia. Acad. vol. — p. —

PROFESSOR B. SHIMEK—

- A Botanical Expedition to Nicaragua. Vol. II, part 4, pp. 345-376, 1893.
Notes on the Flora of Iowa. Vol. III, part 4, pp. 195-215, 1896.
The Ferns of Nicaragua. Vol. IV, pp. 116-224, 1897. 20 plates.
The Iowa Pteridophyta. Vol. V, pp. 145-170, 1901.
The Iowa Pteridophyta. Vol. V, pp. 213-215, 1901. (Continuation of preceding.)

PROCEEDINGS OF THE IOWA ACADEMY OF SCIENCES—

- Notes on Aquatic Plants from Northern Iowa. Vol. IV, pp. 77-81, 1897.
The Iowa Liverworts. Vol. VI, pp. 113-116, 1899.
Forestry in Iowa. Vol. IX, pp. 53-61, 1902.
Botany in its Relationship to Good Citizenship. Presidential Address, Vol. XII.
Pl. II, VII.
Flora of Lyon County. Report of the Iowa Geological Survey, Vol. X, pp. 157-184, 1900.
Addenda to Flora of Lyon County, published in Bull. Lab. Nat. Hist. S. U. I.
The Iowa Oaks. Report of the Iowa State Horticultural Society, Vol. XXXVII,
pp. 228-232. Plates I-X. Reprinted in Proceedings of the Iowa Park and For-
estry Ass'n, without the plates, in the 2d Annual Report, pp. 93-100, 1902.
Iowa Medicinal Plants. The Middletonian, Vol. V, pp. 17-22, 1905.
Notes on Some Iowa Plants. Proceedings of the Davenport Academy of Sciences,
1904, pp. 1-5.
Review of the American Tree Book. The Dial, June, 1906, pp. 358-359.
Macbride Lessons in Botany. Part.

PROFESSOR R. B. WYLIE—

- The Aquatic Gardens of Lake Okoboji. Bull. Okob. Prol. Assoc. No. 6, 1912.