The Spectrum

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A Catalogue of the Flora of North Dakota.

BY PROF. H. L. BOLLEY.

Histories of development are always matters of much concern to one who is interested in educational matters. Here, as in other fields of man's growth, constant modifications and inevitable mutation seem to be the law; but with each change, conservatism, which eventually must bring about a proper semblance of stability, seems almost overthrown. In scarcely any field of thought is the warfare between radical and conservative methods more pronounced than that to be noted within the confines of botanical work. This would seem to follow as but a logical sequence upon present educational activity. Botany as a general enlightener, as a mind polisher and thought developer is actually in the field, contending for a co-ordinate place in the general educational curriculum. The activity of its teachers and investigators as recorded in value of educational results and radical features of evolutionary growth is such for the past decade as has been evidenced in no other branch of knowledge. From its ancient herbalistic glories in which it peacefully rested until a period scarcely a quarter of a century since, when it had reached a stage in which many educators were willing to grant that it was a beautiful and interesting study for girls —it has suddenly emerged into a classified science—possessing a bearing upon human understanding as broad as is the meaning of the existence of plant to animal life.

In every field of botanical investigation there is an activity exhibited, the results of which are constantly beyond the appreciation of any but the energetic specialist. The range of thought about plant life is so rich, extensive, and so open to variation, that there are botanists and botanists. Yet upon points of elementary nature, one might, it seems, expect more uniformity of results and opinions. Flora's lists and catalogs are as ancient as the excursions of the herbalists, and the number is legion—but as to uniformity of method, what may we say? There is no uniformity, perhaps, we may say —because of too rapid change.

North Dakota has, I think, several quite distinct natural floras, but no list, catalog or published Flora of the same. In the publication of one there is thus opportunity either to advertise a wrecked botanical reputation, or to make a most enviable one. In speaking to the teachers of the state concern-

ing the need of such a publicasion, I hardly know what to say. But assuming that the thought is that such a publication is to be an incentive to the study of the plants of the state by the teachers connected with the education of the state, and as an aid to botanical instruction, I think I may not be far wrong in asserting that our teachers need a help to fundamental truths concerning a few plants, rather than any knowledge which might be afforded by any list, catalog or published flora however perfect.

I do not, however, wish to beg the question. North Dakota has no published catalog of its Flora, and for such there is real need, and a fine field for interesting work.

I would not decry the publication of a simple state list, or of local lists of the plants of the state; for despite the usual superficiality of such lists, the associated errors, and unnecessary duplication of work already well done in manuals and larger general Floras such as Gray's North American Flora, Coulter and Gray's Texts and Britton & Brown's Illustrated Flora of North America, the compiler would at least be benefitted, and no list could scarce be so valueless as to fail to aid in the construction of some future work of real merit.

Of state and local floras published in North America previous to 1890, Britton (Contr. Herb. Columbia Col. 1890) lists 791. Of these, 590 had political boundaries for their limit, 142 were floras of geometical areas, and 59 were lists of plants within what may be termed natural topographical areas. This fact shows that the prevailing idea in the past construction of published floras has been that of the collector and lister of novelties. More ought to be demanded of such publications at this time. If one wishes merely to know the name of a plant let him look it up in a manual. If he asks himself the more unanswerable and nearly useless question: How many plant species are there in the state? he may well ponder the question, Why wish you to know? or better, How does this plant at my feet live and grow? So, one may say, that until one can enter quite intimately into the life of some one common plant, a Flora of North Dakota, as botanists now understand the scope of such work, can be of little value. Yet it is scarcely desirable that many of the native plants of the state should be allowed in great part to be obliterated before a proper record of them has been made. Nor are we so much concerned with the number of kinds or varieties of the plants found within the borders of the state as we are concerning the variabilty of individual forms, their topographical ranges and historical conditions. It is, I think, of much more educational worth to study a few of our more common plants which have a wide range of distribution under a great diversity of conditions, and thereby to be able to cite, perhaps, a few reasons or even indications looking toward an explanation of such universality of distribution or slight peculiarities which may be due to variation, than it is

to be able to list numbers of rare and little known plants. The properly constructed flora of North Dakota, would, according to this view, be equivalent to the published results of a botanical, geological and topographical survey, and when accomplished will show, it is believed, several natural floras; that is, plant societies of interrelated plants, influenced by special environments, past and present. Such a catalog of the flora of North Dakota, then, contemplates the unification of the features of several topographical floras or plant societies into one publication. As to the subject matter, the arrangement of the same should follow the natural order of plant relationship as to families, genera and species, about as indicated in Engler and Prantl's "Pflanzenfamilien." At the least, the following points should be considered: Present accepted classification name, together with local common names; synonomy to date of priority of publication, provided that names are not to be considered beyond the date of 1753; a proper bibliography; world distribution, continental range; and local topographical relations. This citation of the features of a published flora may be taken as an index of the importance of a general study of plants in their nativity, a study such as one could think of as being carried out by Charles Darwin, could he have but possessed the special knowledge of Strassburger, Vines, and Le Conte all combined with his own glorious love of nature and of generalized knowledge.

A topographical survey of the state would show several distinct territories in which, though the floras overlap, there are to be found quite marked individual characteristics. Usually these divisions for special study may be quite well limited by the outline of natural drainage basins, amongst which, perhaps, one might indicate; the drainage basin of the Red River, that of Devils Lake and the Sheyenne River, the James River, Missouri River and its Bad Land tributaries, and finally the Mouse River at the North. Each of these areas give quite naturally certain subregions based upon such features of minor importance as, for example, the timbered region of the Red River, its marginal morains or drift ridge bounding the basin, the Turtle Mountains of the Mouse River region, etc. This possibility of breaking up the plant geography of the state into natural areas suggests the field of work open to local systematists and collectors. Botanical work in primary and high schools will probably of necessity, and perhaps quite properly regardless of possible innovations, much to be wished for, yet, in great part, devote the time of the subject to matters of classification regarding local plants. In behalf of this work it may be said that nothing need be of more pleasure and profit to the work of the teacher, or can give greater zest and interest to the purpose of a school than the labor involved in working up some well defined natural local flora. When accomplished, though it may of necessity

represent the conjoint work of several classes, the school will finally possess several well mounted, properly preserved specimens of every available local plant, showing several stages of growth. To add to the interest and to the value to the school, such a collection should be properly catalogued, and ultimately published, with full annotations concerning such points as: the exact location of the collection, mode of growth, and also the name of the collector for each specimen represented, thus making the specimens available, as to use and observation, in the same sense as are books of a library. In such a list no plant name should be registered for which there is not a bona fide specimen. In every such attempted piece of work I think I may be safe in saying that the teachers and pupils of the common schools may quite naturally expect, and be quite certain of receiving, help from the botanical departments of any of the larger colleges and universities, whether in this state or others. Indeed, the size of the local or school herbarium may be very largely increased by the proper exchange of plant specimens. It must be remembered, however, that standard herbariums or, rather, the workers in such establishments have certain definite requirements regarding the qualities which should be exhibited by a properly prepared specimen, and hence amateur workers who wish to exchange their material, or to receive aid in classification must learn to conform to such requirements. This may indicate what aid amateur botanists may give toward the preparation of a properly catalogued flora of the state, a work which may only be accomplished after several years of concerted effort; and consequent upon a very considerable expense, the labor connected with which may only be expected to be met through government or state aid.

Fargo, Dec. 20th, 1896.

Read before the High School Council of the North Dakota Educational Association, Dec. 29th, 1896

The Mechanical Department.

F. O. OLSEN. '99,

This department, although practically the youngest in the College, is fast becoming one of the popular ones of the institution. It is equipped with a spacious two-story brick building; a large supply of electrical apparatus; tools and benches for wood work, forging and machine construction. It is also furnished with a ten horse power engine and boiler for heat and motive power.

The building contains ten large and cheery rooms, conveniently arranged for the work of the department; one room for wood work, two rooms for machine work, three offices, one physical laboratory, one drawing room, one recitation room, and the engine room, most of which are heated by steam.

In the machine room are lathes for the turning of both wood and iron, planers. drills, grinders and polishing machines for the finishing of metals.

Benches and vises with appropriate tools for finishing and constructing such machines as are manufactured by the students. A large case of finely finished and tempered tools for miscellaneous work completes the list of machine shop tools. The room also contains appliances for the standardizing of steam guages, a dynamo electric machine and various other appliances for work in physics. During the past two years students in the machine shops have built two model one horse power steam engines, a small dynamo, an electric motor, besides numerous smaller pieces of machinery, and several pieces of physical apparatus. At the present time a four horse power reversible marine engine is undergoing construction. The different parts all come in the rough castings, and are being turned and fitted for their respective positions. The guides and cylinder have been finished; the cross-head, the steam chest and the eccentric strap are ready for their places.

One ½-horse power dynamo is being made by one of the students. To wind the fields and coils carefully with small insulated wire and fit together the armature requires very skillful workmanship, and necessarily will take some time to finish it.

The woodwork room is supplied with tools and benches sufficient to accommodate ten students. Numerous articles, such as desks, shelves, cabinets, cases, stands, and miscellaneous articles are constructed.

The blacksmith shop is equipped with forges; anvils, hammers, and other tools for smithing purposes. The forging and tempering of iron and steel are the main objects of this department.

The physical laboratory occupies a room in the Mechanical building, and is provided with apparatus for illustrating the subjects of mechanics, pneumatics, optics and electricity, which furnish facilities to students for performing experiments of precision, by which theories of science may be tested. Numerous experiments have been performed in skiography, the results from which have been highly satisfactory. Plates have been produced showing the bones of a mouse, bones of birds, etc., with great distinction. An especially large induction coil has been secured by means of which not only x-rays are produced, but many valuable experiments requiring high tension currents may be performed by aid of vacuum tubes.

The aim of the Mechanical department is to prepare students to design, construct and arrange machinery, to fit them for positions of trust and responsibility in engineering work. It aims to give the students a clear understanding of mechanical principles and their application.

A new species of giraffe has been discovered in Somauli Land which is distinguished by a complete body covering of rich, bright chestnut, hardly separable by very fine, almost invisible lines of creamy white.

The Herbarium.

In taking a survey of the Biological Department of our College, the general observer would undoubtedly be most attracted by the extensive collection of plants, the classification of which is now being worked up, and the process of mounting begun by Messrs. Merton Field and Lawrence Waldron.

The completion of an herbarium was the first undertaking of the department in the early days of the institution. Extensive collections were made during three years, with the purpose in view not only of finding all plants native of the state, their distribution and the influencing conditions, but also to obtain specimens from other states or localities by means of exchange.

During the past few years, the state collection has been constantly enlarged, and put in shape for classification, and now contains, of flowering plants, two hundred and sixty-eight genera, six hundred and one species and seventy families. Special cases being made for the different groups, they are systematically arranged. A person interested in the subject could profitably spend many hours here.

Also, in addition to the flowering plants, there is a large collection of cryptogamic plants, especially those causing diseases of plants, such as rusts, smuts, etc., and these not only show the infecting plant, but also its effect upon the host plant in its different stages, the whole plant being collected to show its general effect.

The collection of grasses is now comparatively complete. All the native grasses of the state are represented in wide range and good value. The following is a statement from an Exposition number of the Botanical Gazette, concerning the collection of grasses which was exhibited at the World's Fair, ('93), and to which a prize was awarded.

"The collection of North Dakota grasses contained, in all, three hundred and ninety-three specimens: Aside from the sedges, grass-like plants, there were represented forty-nine genera of true grasses. Of these true grasses there were one hundred and twenty-four species, of which eighty-eight were native wild ones, and thirty-five were introduced by or with cultivation; twenty-one, however, of the latter grow wild together with the native plants."

Plans are now being discussed for enlarging the Botanical Laboratories, one special room (the present physiological class room) to be assigned to the herbarium alone. This will make ample room for those specimens used for class study.

The Phænogamic plants from North Dakota, as listed, are a very good representation of the various orders, genera, and species in the state. As classified and mounted, the plants are:

Seventy families, 268 genera, 601 species.

Compositæ—34 genera, 95 species, of which 15 are asters, 10 golden rod, 6 sunflowers and

6 worm-wood.

Ranunculaceae—7 genera, 19 species, of which we have 1 clematis, 5 anemone, 2 meadow Rue, 8 Ranunculus and 2 Lark -spur.

Rosaceae — 11 genera, 30 species, 5 true roses, R. Blanda, R. Engelmanni. R. Arkansana, R. Woodsii, and R. Carolina, 4 Geum, 8 Potentilla, and 5 Prunus, of which three are cherries and two are plums.

Leguminosae—16 genera, 42 species, Astragalus the largest, 12 species, 3 peas, and 2 Vetches.

Labiatae—10 genera, 13 species.

Onagraceae—4 genera, with 5 true evening Primroses. In the Primrose proper there are 5 genera and 7 species.

Gentianaceae— 1 genus, 5 species.

Plantaginaceae—1 genus, 4 species,

Liliaceae — 13 genera, 14 species, 1 true lily, the common field lily, L. umbellatum, in Gray, Philadelphicum.

Scrophulariaceae—11 genera, 15 species.

Utricaceae—To which belong the elm and hop, 5 genera 5 species.

Polygonaceae—3 genera, 14 species.

Chenopodiaceae—6 genera, 3 species.

Cruciferae—12 genera, 17 species.

Gramineae—49 genera, 124 species, 88 native, 35 introduced, of which 21 grow wild.

Cyperaceae — 4 genera, 20 species.

Coniferae— 1 genus, 2 species.

Exchanges.

Johns Hopkins is to have a dramatic organization called the "Sock and Buskin Club." —Ex.

If hard work is not a synonym of talent, it is the best possible substitute for it.—J. A. Garfield.

Lafayette College faculty, of Easton, Pa., at a recent meeting suspended Sophs. Hern and Brown for hazing freshmen.—Ex.

The new catalogue of Vassar College shows a total attendance of 537. There are 11 graduate students, 103 seniors, 90 juniors, 137 sophomores, 186 freshmen and ten students taking special courses. There are 56 instructors, and 15 non-resident lecturers.—Ex.

During the past few days we have received a number of exchanges, and all indications are in favor of a large exchange list in the near future. Among those received are: The Wahpetonian, The Student, Red and Blue, The Fourth Estate, Western Womanhood, The Exponent and Sheldon Enterprise.

A chemical discovery, potassium, iodide and sulphur, under slight pressure give exceedingly interesting results, as follows: K I 2S—Kiss. The experiment is dangerous, as the above result may not be accomplished, and instead the action be very violent. Therefore, this experiment should be attempted in the absence of light and when few (usually two) are present.—Ex.

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During the holiday vacation most of the students were away from college for nearly two weeks. This made the time short for the different editors to prepare their material, which accounts for the paper being a few days late from the press. We hope that hereafter we shall not have to make any excuses, and the paper will appear promptly the fifteenth of each month.

Each member of the Junior and Senior classes is expected to deliver an oration during the fall, and another during the winter term of each year. These orations are to be delivered in chapel. Those taking part in the oratorical contest have been excnsed from one chapel oration; but as none of the members of either class reported ready to give their oration last term, they will be required to deliver two this term. Therefore, Juniors and Seniors, get ready to orate.

Mr. Bryan, since election, seems to have lost considerable of his popularity, but reports come that he is still active. The G. A. R. of Albany county, New York, have made the proposition that he should lecture in Albany, giving him for his services 75 per cent. of the gross receipts, guaranteed to be at least $3,500. Whether or no he will accept this offer is not known. At any rate, Mr. Bryan has a good voice for a large hall, and has been advertised enough to draw a large crowd.

The third bi-ennial report of the Board of Trustees of the College to the Governor of the state has just been received from the press. It contains many proposed valuable changes, providing a sufficient amount is appropriated by the state. One of the most important of these changes is a chemical laboratory. This certainly is needed very badly as the increase of students has been so large that the classes in chemistry can hardly be accommodated in the present crowded quarters. The laboratory being situated where it is now, in the basement of the main building, affords no means of ventilation. The fumes and poisonous gases, besides

being very hurtful to those who have to remain there a good share ot the day, penetrate to all parts of the building, and are rapidly destroying the bindings of many of the books of the library. It is proposed that the botanical and zoological laboratory add to its present quarters in the main building the twe rooms now occupied by the veterinary department, and one room of the basement now used by the classes in mathematics. The veterinary department will occupy the rooms of the present chemical laboratory. It is hoped that an appropriation will be received for these changes, as it will be a great aid in the work of the college.

About a year ago the advisability of organizing a Western League of Oratory was agitated among the different colleges of North and South Dakota, and finally resulted in the formation of such an organization comprising at present, North and South Dakota, with probabilities of Montana and Iowa joining. According to the regulations of this organization, each state has its oratorical league, having a state oratorical contest preceding the Western contest. Also, each college taking part in such work has its local oratorical league, which sends delegates to the state contest. The date of our local contest has not been decided upon, as yet, but will undoubtedly be some time in February, which means that those taking part must begin to do some hard work, if they expect to stand any show in the state contest.

We were very much disappointed when we learned that Major Murphy was ill and unable to deliver his lecture at the College. Mr. Murphy has the reputation of being an eloquent speaker, and we hope we may yet have the pleasure of hearing him.

The annual meeting of the North Dakota Educational Association was held in Fargo Dec. 29, 30 and 31. A large number of teachers from all over the state was present, and very interesting as well as instructive programs were rendered. A joint meeting of the college and high school sections was decided upon for next winter's meeting. It is proposed to discuss at that meeting the purposes and feasibility of undertaking a natural history survey of the state.

Any one who wishes to aid in this work should confer with Prof. Bolley, of Fargo, or Prof. Brannon, of the U. N. D. For every good and properly mounted specimen sent in an exchange specimen can be had. Thus the teachers of high schools or local collectors can gradually make for themselves a good and authentic herbarium for reference.

Mr. John Corbin, assistant in English at Harvard, has resigned to accept an editorial position on Harpers Magazine.—Ex.

Yale has established a symphony orchestra, and it is intended to make the organization permanent.—Ex.

Local Happenings.

F. G. BENN, '98. A. E. SMALL, '98.

Try The Spectrum for a year.

Dr. Hinebauch has been at work preparing Bulletin No. 26. It is a record of experiments and results obtained in feeding millet hay.

Prof. Keene delivered a lecture before a very large audience at the Y. M. C. A. building Friday evening, Jan. 8th, on that most interesting subject, "Electricity."

The college Y. M. C. A. have decorated the hall of the main building with a very neat and attactive bulletin board on which are posted the names of the officers of the local association and the program for each week.

At the high school declamation contest, Dickinson, Casselton, Grand Forks, Park River, Larimore and Forest City were represented by contestants. Miss Montague, of Dickinson, was awarded first prize and Miss Grace South, of Casselton, second.

The strong wind of the recent blizzard broke one of the large lights of a window in the museum, and the specimens as well as the walls were beautifully decorated with snowy crystals. The snow was removed at once, and, fortunately no specimens were damaged.

Several of the students spent the holidays at the college, and an enjoyable vacation was reported. Those remaining were Misses Berry and Morgan, and Messrs. Follett, McGuigan and Waldron. They attended the State Teachers' Association, and during spare time worked on back studies.

The following apparatus was recently added to the chemical department: Burettes and pipettes, together with chemicals for the work in volumetric analysis. The mechanical department received some apparatus for physics. Among numerous articles were: Tangent galvanometer, Wheatstone's bridge, and other pieces for experiments in static electricity, a fine university spectrascope, polariscope, and a Portlumiere for experiments in light, and a large mercury air pump.

At the recent meeting of the North Dakota Educational Association Professors Bolley and McArdle and President Worst delivered papers before the association. The subjects of their papers being respectively as follows: The Flora of North Dakota, College Government by College Students, Political Conservatism a Part of Education. Prof. Bottenfield was re-elected secretary of the college and normal school section. Nearly all the members of the faculty attended the Association, and on Tuesday evening assisted in giving a reception to the visiting teachers. The reception was held in Masonic Hall, and about four hundred people were present. The "Tyrolean" male quartette assisted in the music. All present passed a happy evening.

Juniors—physics.

Happy New Year.

Subscribe for The Spectrum.

Bashfulness seems to be an epidemic among the mechanics.

The oratorical contest will be held at the college about February first. All students, as well as their friends, are cordially invited to attend, and hear the "farmers'" eloquence.

W. C. Albrant, formerly of the class of '98, paid us a visit about New Years. Since leaving school he has been engaged in architecture, in partnership with J. Friedlander of Wahpeton.

An interesting lecture on the Intimations of Immortality was delivered in the chapel by Rev. S. B. Mahaney, of Larimore, Dec. 23, '96. Mr. Mahaney is considered one of the ablest lecturers in the state.

The Philomathian Literary Society has elected officers for the next three months as follows: Carrie B. Bronson, president; Charles Foley, vice president; Jno. W. Murphy, secretary; F. G. Benn, treasurer.

The chemical laboratory is far from being a healthful resort since the sophomores began qualitative analysis. The air of that vicinity besides containing the usual elements, oxygen and nitrogen, is completely saturated with H^2S.

Miss Perrine, instructor in the sciences at the Valley City Normal, was at the college a few days during the holiday vacation. The object of her visit being the identification of some specimens in her herbarium by Prof. Bolley.

The beginning of the term has brought many new students, and the rooms, both at the girls' and boys' dormitory, are all occupied. President Worst, however, has made arrangements for board and lodging in the city for students desiring such.

Mr. Meinecke was taken ill with a heart trouble the latter part of last term, and consequently had to leave for home without taking any of his examinations, which are the most interesting part of the college course. But we are glad to see him back ready to take up his studies for the winter term.

On account of the increase of students this term, it was necessary to enlarge the seating capacity of the chapel and room E. Some of the classes are so large that we are compelled to use the chapel for a recitation room, in fact all of the rooms are crowded, and some of the classes had to be divided into sections in order to be accommodated.

In our last issue we announced that President Worst had arranged for a military detail and for cadet rifles. Notice has just been received that Lieut. C. G, French. of the Fifteenth infantry, U. S. Army has been detailed to take charge of the military department of the College. Since the drill hall in the mechanical building has been fitted up for class rooms, it becomes necessary to omit drill for this term, and extra time will be given it in the spring, when the company will meet three days each week instead of two.

The Alumni.

Mr. R. B. Reed, '95, was in Fargo for a few days during the holidays visiting Mr. Hall and other friends.

Mr. Olaf P. Nordby, '96, has been engaged as assistant in the mechanical department for the winter term. He is to conduct the class in shop practice.

Former Students,

Mr. Robert H. Bosard, with '95, has been studying law with his father in Grand Forks, but is now studying in the law department at Columbia Law School, Washington, D. C.

Mr. Andrew Sinclair, attended the meeting of the North Dakota Educational Association, and renewed acquaintances with college friends

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Aluminun has the property, when used as a pencil, of leaving an indelible mark on glass or any other subtance having a siliceous base. A deposition of the metal takes place, and, while this may be removed by acid, the mark itself can not be removed by rubbing or washing. Magnesium, zinc and cadmium have a similar property, but the mark of magnesium is easily removed. The application of zinc requires a wheel, and zinc and cadmium tarnish, while aluminum is a permanent and remains bright,

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The accepted areas of some of the older states is of uncertain authority, and there is room for a great deal of interesting geographical work by the various state authorities.