The Spectrum

Published by the Students of the North Dakota Agricultural College.

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Lake Agassiz.

The Red River of the North lies in a flat depression in the lowest part of the country between the Mississippi River and the Rocky Mountains. The valley begins at a point somewhat below the forty-sixth parallel, with a width of thirty or forty miles. It extends northward to Lake Winnipeg, where it reaches its maximum width.

This valley, for reasons given afterwards, forms one of the most fertile regions in the world, unsurpassed by the valley of the Nile, or the plains of Lombardy. Now, why should this comparatively small piece of country be so productive, flanked as it is on either side by regions not particularly favored? The causes, so well shown by Upham, will be briefly outlined and described.

Over the surface of the northern U. S. is found a curious mixture of many kinds of soils. These are unstratified, or partially stratified in places. Scattered through this mixture of soils may be found metamorphic, igneous, and stratified rocks. The stratified rocks contain fossils of different ages, thereby showing the different conditions under which these rocks must have been formed. This also proves that the soil of which we speak has been brought here in times past by powerful agencies. In other places, especially in low, level lands, the soil is more homogeneous in character, yet surrounded by soils of the first description. This is due to the fact that the fertility of the level land is not washed away, but rather washed in by erosion from the surrounding land. This mixture of sand, clay, and loam is known as the drift, and varies in depth from a few feet to many hundreds.

Beginning at the city of New York and extending through Pennsylvania to near Lake Erie, then following the Ohio River to the Mississippi, and from the mouth of the Ohio along the south side of the Missouri and parallel with it, to near its source is found the southern limit of the drift, or the terminal moraine, as it is largely known. This drift, as is well known, is due to the formation of an ice cap over the northern part of North America within a recent age. This was probably similar to the one which covers Greenland at the present time.

The cause of this continental glacier has not been determined with certainty. First--because of our ignorance in regard to the influence of the sun upon the earth in times past, when the two were under different relations from now, and second, because of the scarcity of facts collected in regard to the phenomena of glaciers.

Within recent years it has

been determined that besides the original or first ice cap, there was formed at least another one by the re-advance of the first, or by a new formation, whose terminal moraine was continuous with the moraine of the first one, perhaps as far west as western Pennsylvania, and thence westward in lobate form north of the first terminal moraine.

We have, then, as an epoch of the geological history of the world, a large portion of our country covered to a depth of many hundreds of feet by a vast ocean of ice continually deepened by the falling of snow and its surface cut and channelled in a thousand forms by the irregular meltings of the sun, and moving slowly but with powerful energy to a lower level. The cutting, scoring, and transporting power of the glacier is beyond imagination.

The duration of the glacier was great, and the length of time of the melting of the glacier was, perhaps, greater; for the melting of the glacier waited upon the change to conditions resembling the present, which, from the very nature of the case, was very slow.

By the process of melting, the ice seemed to creep backward, and by this creeping back, great barriers were thrown across the natural drainage channels which caused large portions of country to be drained to different river systems. The most notable example of this is the ice barrier which held the waters of this region from draining to the north.

About eighty miles south from Fargo are found two long, narrow lakes, which lie on the line between Dakota and Minnesota. The outlet of the south one, Big Stone Lake, is the Minnesota River, which flows southeast, then north and empties into the Mississippi River near St. Paul. The drainage of Lake Traverse is north to the Red River of the North through the Bois des Sioux. These lakes are but four or five miles apart and the divide between them is but three feet higher than Lake Traverse.

It is evident when the ice retreated beyond the divide, water was left standing between the divide and the ice. We have a lake, then, Lake Agassiz, which, at its greatest size, was larger than any lake now existing. It had a length of nearly six hundred miles, with a width of two hundred and fifty miles; shallow at the southern end and becoming deeper at the rate of one foot per mile north. It had dwindled to its present size, Lake Winnipeg, at about the time the ice barrier was removed.

As before mentioned, the outlet of this lake was south into the channel of the present Minnesota. The bed of the river was at first on the surface of the drift, but the huge volume of water which it carried soon eroded the bed about 150 feet below the surrounding country. The width of this ancient river was from one to two miles, as evinced by the old channel. This old channel, in which flows the Minnesota of to-day, is called River Warren, in

honor of its investigator, Gen. G. K. Warren.

Silt was deposited in the bed of the lake to a depth of but a few feet. This deposit in the central part of the lake was of fine silt, while that nearer the margins is made up, as we should expect, of coarser materials—sand and gravel.

At the time of the highest water of the drift, or before the outlet had worn a deep channel in the drift, the lake deposited a beach. This furnishes the most absolute proof of the presence of the lake. The surveys of it begin at Lake Traverse and extend north ward to Maple Lake, twenty miles east of Crookston, the total distance being 175 miles. North of this the ridge passes through trackless swamp, and has not been surveyed. On the Dakota side the beach is of the same character, and runs nearly parallel with the one first mentioned, but extends further northward in nearly a straight line to as far north as the present Lake Winnipeg.

The appearance of this beach is characteristic. It is a deposit of beach sand and gravel, containing pebbles up to a diameter of four inches. The side of the beach away from the ancient lake is from three to ten feet high. The side nearest to the lake is from ten to twenty feet above the land which the lake covered.

This gives the beach the appearance of a smoothly rounded ridge from ten to thirty rods in width, which is occasionally interrupted by breaks, which form, perhaps, one-twentieth of the whole course, These interruptions are not unlike the ones found in the beaches of the modern lakes caused by change in shore line which produces a change in direction of currents, thus preventing deposits.

At the end of the first epoch when the upper, or Herman, beach was formed, the Minnesota, or rather, Warren River, began its erosion through the drift and cut its channel twenty-five feet deeper. This lowered the outlet of the lake to 1,025 feet above the level of the sea. The lake then remained stationary until the second, or Norcross, beach had been formed. The Warren River then cut its channel fifty feet deeper which lowered the lake to 975 feet above the sea when the third, or Campbell, beach was deposited. The fourth and lowest beach of Lake Agassiz was formed when the river had cut its channel fifteen feet lower, thus lowering the lake to nearly the same level of the present Lake Traverse. Lake Agassiz was then reduced to practically its present size, Lake Winnipeg.

The stratified silt and clay which are found in the central depression of the valley were deposited by rivers flowing along the valley after the glacial lake had disappeared. If the lake had deposited them they would have been spread more evenly over the entire surface.

To sum up, we have 1st, The mixture of different kinds of soil spread over the northern U. S., known as the drift;

2nd, The formation of this soil by a great ice cap or glacier in another age; 3rd, The formation of a second smaller ice cap; 4th, The scoring and carrying power of the glacier; 5th, The formation of ice barriers across natural drainage channels; 6th, The appearance of a large barrier causing the formation of a large lake extending from here north; 7th, The deposit of beaches followed by the erosion of the lake's outlet, and 8th, The filling in of the Red River's bed when the lake had been drained. L. R. WALDRON.

The Genus Chara.

The student who declares that he "hates botany" must have a very narrow idea of the subject. Because the dainty forms and figures of flowers have no power of appealing to his sympathetic sensibilities, is no proof that he cannot find, beneath the outward appearance, other themes which are capable of interesting, entertaining, and educating the roughest, strongest, or most practical mind.

Take, for example, the genus Chara, a fine, delicate, fresh-water Alga, which appears so plain and unprepossessing that, at first sight, it would scarely strike a chord of interest in any but the most æsthetic mind. To know that it is classed down somewhere among the lower orders of plants is sufficient satisfaction to some, while they would delve into the dustiest volumes of ancient history to find written there the birth, ordinary deeds and inglorious death of some unworthy monarch. If they would but take up the little plant, examine its beautiful feathery branches, and the conditions under which it lives and grows, they would read there a history which dates back even farther than the time of their lauded heroes and might explain some of the apparently unfathomable mysteries of history, Then would the subject of botany not only interest but charm them.

The Characeæ of the second lowest subkingdom of plants, though belonging to the class Green Algæ, so far distinguishes its order that it is readily separated from any other groups, either higher or lower. The members of the genus Chara are called the "Stone-worts," from the deposits of calcium carbonate found in them. Each plant consists of a slender green filament; at each joint is a whorl of cylindrical leaves, themselves jointed, i. e., composed of nodes and internodes. The fruiting bodies, unnoticed unless the plant be closely examined, are borne on the inner side of the joints of the leaves and consist of small rounded bodies of two kinds, the one, antheridia, are globular and colored bright scarlet, while the other, oogonium, are oval and darker red. The whole, when examined with a low power lens, presents a very regular form of construction. The stem, or axis,

is striated and somewhat rough due to its coating of lime, and the circles of leaves grow smaller and smaller toward the tip of the stem which ends in a delicately closed leaf bud.

These beautiful little plants are quite common, being found in ponds and small streams, and differ in size according to the conditions of growth. They are peculiar, not only in their structure, but in their growth. The plant furnishes very satisfactory results in physiological experiments; the action of light upon it is decidedly marked. Though it responds to the starch test when growing in the sunlight, if set in darkness for less than an hour all trace of starch disappears from it, but a short time in the sunlight will restore the action of Photosynthesis.

Its behavior in nutrient solutions shows another peculiarity. The plant thrives well for some time in the iron-free nutrient solution containing sodium, chlorine, potassium nitrate, calcium, sulphur, magnesium and phosphorus, but dies in a few days in one having sodium, chlorine and calcium absent, or iron in excess, while in the water culture experiment with the pea-vines, the solution having an absence of sodium and chlorine in which the Alga does not live, proves a perfect solution for the pea, the plant growing to the height of four feet and producing blossoms.

The fact that Chara, which takes it food throughout the whole plant body, having no roots proper, grew in the solution under natural conditions, while the pea, (whose nature is to grow in soil) was under unnatural conditions, suggests another point for study of life conditions and, if well carried out, by taking into comparison other plants of various habits, would furnish almost inexhaustible material for thoughtful investigation.

The internal metabolism of the Chara is exceedingly active, and the plant, under proper conditions of light and temperature is a rapid grower. When a number of filaments are grown in water in a glass cylinder set in warm sunlight, they soon grow up along the sides of the cylinder, producing an ornamental spiral effect.

This is an illustration of the interesting facts to be gained by even a careless observer on botanical subjects. C. B. B.

The Student's Error.

The March number of *The Student* (State University) devotes considerable space to strictures on the judgment of the last Legislative Assembly for discriminating unfairly (it alleges) against the University and in favor of the Agricultural College in the matter of appropriations.

Were it not for the misleading statements it contains, no notice would be paid to it.

According to *The Student*, the Agricultural College enjoyed "a really liberal appro-

priation by the state," while the University was compelled to run for two years on popular subscription. This is not so. For the two years mentioned, the University received from the state $15,980, and the Agricultural College, $10,250.

The Student fails to take into consideration the fact that $15,000 of the government appropriation is for the Experiment Station, and only $23.000 for the College. Deducting the $12,000 appropriated last winter for permanent improvements and deficit, leaves the Agricultural College $33,000 per annum for operating expenses, as against $25,000 per annum for the University. Of these amounts the state furnishes the entire amount for the University and only $10,000 for the Agricultural College.

The Student should not take the amount appropriated by the government with so much seriousness, for it requires a very large amount of special work done for the money it gives and also requires laboratory supplies not contemplated in any ordinary institution of learning.

Neither is it fair to compare North Dakota Agricultural College with that of Idaho—perhaps the weakest institution of its kind in America.

It is not simply a question of *getting* the federal funds, but that of building up a reputable College of its kind; and that of the state honestly co-operating with the general government, and not scheming to get the government money, and to give as little in return as possible. Certainly for the amount of money appropriated by the state since the Agricultural College was started, no institution in the state can show so much in the way of permanent improvements.

The University has received in the way of state appropriations about $430,000, and the Agricultural College about $122,000. For this the Agricultural College has a fine College building, Mechanical building, Dormitory, Farm House, Dairy building, Heating plant, Green house, Poultry buildings, and perhaps the largest barn in the state. All these buildings are admirably equipped, and about all the money for the buildings was paid by the state.

No one will question but that, for the money expended by the state, it receives quite as ample returns from this school as from that.

It costs more money to operate our Agricultural College than it does your University. Our College is in fact about what the University is, but has in addition all the agricultural features required by the government. If the University had a medical department in addition to what it now has (except its normal department) it would be a medical college in about the sense as we are an Agricultural College.

The farmer is entitled to as liberal an education as the doctor, and gets it here as the doctor would there, provided the University were to add a department of medicine, and in that case they would un-

derstand the cause of the additional expense.

The University has about ten instructors to the Agricultural College's fifteen, not counting any in either the instructors in music.

Now, the Agricultural College has only friendship for the University, but as there is a a general disposition among certain educational circles to under-rate the mission of our College, The Spectrum will take pleasure in asserting its position from time to time as may seem necessary.

Exchanges.

The first college paper published in the United States was at Dartmouth college, with Daniel Webster as editor-in-chief; now there are almost three hundred college and university papers published by students. Students of the following colleges send out daily publications: Harvard, Yale, Cornell, Princeton, Brown, Stanford, Tulane, University of Pennsylvania, University of Wisconsin and University of Michigan. The first of these to reach our table is the Daily Palo Alto, of Stanford University, Cal., and is an excellent paper.

The legislature of California turned down by a large majority a resolution to cede the Yosemite Valley to the United.

A North Dakota farmer is said to have discovered that strips of newspaper soaked in sour milk and fed to hens, which they readily eat, greatly increases their laying qualities. A new use for old exchanges. We now look for a wonderful increase in our subscription list.—Ex.

The latest literary production is the translation of "Hamlet" into Russian by the Grand Duke Constantinovitch, to be acted with His Imperial highness in the title role.

Up to the present time Constantinople has been besieged about twenty-three times, and if the nations attend to their own affairs, the Greeks will make it twenty-four before our next issue.

In the production of college presidents, we may safely say that Yale leads with a record of 92, while out of 35 college graduates in the house of representatives Yale claims nine, University of Michigan nine, Harvard seven, Columbia and the University of Pennsylvania three each.

Teacher—"Tommy, express the following sentence in fewer words: When Mr. Flood, accompanied by his wife and children, stnpped before the house, he threw down the reins and alighted." Tommy — "The reins descended and the Floods came."—Ex.

The sophomores of Rutgers College were scolded three quarters of an hour by Pres. Scott for hazing two freshmen. If there had been two more freshmen it probably would have cut lessons short for theremainder of the day.

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The University of Amsterdam has recently awarded to a doctor of Utrecht a gold medal for his work in the Physiology of Smell. This medal was founded by the late Professor Tilanns and is given every five years in the interest of medicine or natural science.

The board of directors of Cornell University have recently appropriated an amount of money sufficient for the erection of a naphtha launch which is to be used for the transportation of students studying paleontology.

Phrenology, evidently, has mastered a Minnesota legislator, as a bill has been introduced in their legislature providing for the appointment of a State Phrenologist. He must examine at least two thousand Minnesota heads annually.

Considerable comment is being made of late in scientific journals and magazines devoted to the cause of education, on the recent tariff bill now before Congress, providing for a tax of 45 per cent. ad valorem on scientific apparatus imported for colleges and other institutions; also a tax of 25 per cent. on books imported for public libraries; on books printed in languages other than English; on books printed more than twenty years; on books devoted to scientific research, and on works of art. The Ways and Means Committee of the House, probably convinced by argument, have recalled the duty on scientific apparatus and books imported for institutions in cases in which the apparatus and books are not manufactured in the United States. It is certainly a relief to know that the committee has shown its willingness to retrace its steps in the ill-advised action and at least partially correct its blunders. Such a provision is ambiguous on the very face of it and would cause endless confusion. Simply because microscopes are manufactured in America, will importation from Germany be prevented? Surely our legislators have only the best wishes for the country, and if it is brought to their attention that books and scientific apparatus are the very essentials of science, education, and civilization, and that such a bill is conducive to the suppression of science, literature, and art, they will not be desirous of legislating farther in that direction.

Athletics at N. D. A. C.

What is to be more desired than a systematically developed human being? Every normal human has a soul, a strong mind and a healthy body.

The ideal college training is that which developes and strengthens these three systematically to the full limit of their power.

In order to have the best developement of mind, we must have developement of body. Many minds do not have the support of a strong body, but work by means of a broken constitution, and look out through a pallid face.

Our college should be equipped with a good gymnasium, in charge of a trained physical director, so that every student could devote a certain amount of time every day to physical exercise. The student before entering gymnasium work should be thoroughly examined as to his physical condition, and should have work assigned him according to his needs. He should also be examined at least three times a year so that he could change the nature and vigor of work, looking forward to an "all round developement."

Training is not all pleasure, for it means regular hours, simple diet, good habits and hard work; but are not the results worth the efforts? Our bodies are transformed from a weak, soft, sluggish mechanism, into a strong, wiry, energetic organism,

As a result of this physical transformation we come into the possession of a good digestion, sound, useful sleep, and a clear mind.

Moreover, the kind of athletic work must be determined by the individual's temperament or needs. If he wants to win for the sake of winning honors for himself and for the college, let him choose those features in which he is most proficient and for which he is especially adapted. The different features are varied enough that almost every young man may find something in which he may excel.

Those who enter the contests for the good they may obtain must make a careful and honest examination of themselves and choose accordingly. Each one's physical ability and time for practice should govern the the number of features he trains for. What he does he should do well. If he intends to enter for one event he should train to excel in that one. Better enter for one and win it than enter for all and fail.

If one thinks he cannot compete in a creditable manner this year, let him train notwithstanding and thus gain ability for next year. His enthusiasm will excite an athletic spirit among others and thus help the College carry off the championship banner this spring at Wahpeton.

The Athletic Association has sufficient apparatus for the training in the different features, and it will be placed in position on the field as soon as

the weather permits. Every one who expects to enter should see to it that the apparatus he needs is put up, and he should also take an interest in the preparation of the track. The athletic ground is fast drying and the lateness of the spring necessitates an immediate preparation for training.

PURL BOTTENFIELD.

Additional Locals.

Mr. Milnor called at the college Wednesday, March 14.

The enrollment this term is considerably less than last term.

"See the hair cut" is continually heard since spring has come.

Company A drilled on the Campus this week for the first time.

The Athletic Association organized a base ball department and elected Dor E. Tucker as manager of the team. Play ball, boys!

The Athenian Society now hold their business meetings directly after the regular weekly program instead of on Wednesday.

The "Amazons" will renew their drill in physical culture next week under the supervision of Miss Senn, not Lieutenant French.

Notwithstanding the fact that Purl Bottenfield is an expert bicyclist, he arrived at the college Tuesday morning in rather a delapitated condition.

The post office has been moved from the library to room H., and office hours will now be 9:30 to 10:00 and 11;30 to 12. Students are requested to observe these hours.

The department of Mathamatics just received a new verner compass-leveling rod, chains, etc., for the class in surveying. The work in trigonometry was completed last week, and as soon as the ground is dry the new surveyors will be at work.

The declamation contest for the Worst-Hinebauch medals was held in the college chapel on March 25th with nine contestants, representing both the Philomathian and Athenian societies. The eloquence seemed to be centered in the Athenian society, as they took both medals. The first was won by Miss Angie Gibson, and the second by Mr. Purl Bottenfield. All of the declamations were well prepared and their deliverance certainly did credit to the societies.

For the benefit of those students who are weak and can not walk long (sometimes short) distances without frequent rests, a box, the dimensions of which are 18x12 inches, was placed between the College and the Girls' Cottage This is especially advantageous in the evening when one is both physically and mentally worn out with toil and care. he Tlocation of this useful article must be definitely pointed out, because few as yet know of this improvement.

Resolutions.

Owing to lack of space in the last issue of THE SPECTRUM, the following resolutions, which were adopted by the Athenian Literary Society and Class of '98, were crowded out.

CLASS RESOLUTIONS.

Whereas, Almighty God, in His infinite wisdom, has seen fit to call home our beloved class-mate, Ida Maud Bottenfield, and

Whereas, the friendly relations existing among the members of the class, it becomes appropriate that we tender our sympathy to the bereaved parents, brothers, and sisters, and all to whom she may have been related, therefore,

Resolved, that the death of our class-mate, Ida Maud Bottenfield, leaves a vacancy and casts a gloom which will be most deeply realized by the family of the deceased, and will be an irreparable loss, not only to them, but to the North Dakota Agricultural College, and especially the Class of '98 where she was loved by all; to the community, and every one with whom she was acquainted: That her Christian character, sweet and loving disposition and kindness to every living creature is an ideal example and highly laudable by all, and in the memory of the loving ones that are left the beauty of her noble life will ever be remembered and fondly cherished, and will do much in helping them to bear their overwhelming sorrow.

That these resolutions be spread upon our class record; published in THE SPECTRUM; and that a copy be presented to the grief stricken parents.

Signed:

CARRIE BRONSON,
F. G. BENN,
ANNIE SMALL,
Committee.

LITERARY SOCIETY RESOLUTIONS.

Whereas, Death has removed from our society one of our beloved and cherished members, therefore be it

Resolved, that in the death of Ida Maud Bottenfield, the Athenian Society loses a faithful, true, and noble member, who was ever zealous for its highest welfare, and whose rare ability added greatly to the society's worth and standing.

Resolved, that the society tender its heartfelt sympathy to the family and relatives of our deceased member in this, their sad affliction.

Resolved, that a copy of these resolutions be spread upon the records of the society and that a copy be sent to Prof. and Mrs. Bottenfield.

Severe Mental Strain—"Old man, you seem worried."

"Worried is no name for it! Brown is coming round at 4 o'clock to pay me $15."

"Think he may not come?"

"Oh, he'll come all right, but Jones is due at 4:15 to try to collect $10 I owe him. Suppose he should get here just as I was being paid by Brown."
—Ex.

Local Happenings.

Library hours are now 8 to 12 and 1 to 5.

The appearance of the library has been materially improved by the removal of the post office.

Messrs. Andrews and Paulson have been duly elected and have become members of the Athenian Literary Society.

Among those who have been on the sick list are Professors Bottenfield and Waldron and Misses McEwan and Peck. All are out again.

Prof. Marie B. Senn has returned from her home in Entreprize, Kansas. We are glad ton ote that Miss Lydia is rapidly improving.

Prof. Waldron has changed his location from room H. to room E., and Prof. McArdle has moved from room E. to the mechanical building.

The coming oratorical contest in June is going to be one of especial interest, because it is the first contest of the Northwestern League of Oratory.

Blue printing is used to quite an advantage by some of the students. By this method one can, in a few hours, copy the lectures taken for the entire course.

The Y. M. C. A. has elected the following officers for the ensuing year. President, C. E. Lee, '97; vice-president, I. D. McBain, '01; secretary, E. D. Tucker, '01; treasurer, B. F. Meinecke, '98.

Through hypnotism one of the students forgot his name, but when told it was Jones, the following was heard: "O, sure, Jones; certainly, Jones, that's it. Jingo! man alive! Say, by golly, I nearly forgot it."

On account of the high water in the vicinity of the college, and the unfavorable condition of the roads caused thereby, the faculty deemed it advisable to adjourn the school from Tuesday, March 6, to Monday, March 12.

At the March board meeting Mrs. E. McVeety was appointed librarian. She has complete charge of all the affairs in the library, while Mrs. Evans, who has acted as librarian heretofore, will remain as stenographer.

The arrangement of the program of studies for this term has caused considerable trouble because there are so many special students, and it is difficult to arrange a program that will accommodate both the regular and special students.

The Political Economy class presented theses upon the following subjects in lieu of a final examination: "Progress of Manufactures," B. F. Meinecke; "Labor," C. E. Lee; "Taxation," H. McGuigan; "Protection *vs.* Free Trade," Helen Jewett.

On Friday, March 26, Mrs. Holderman entertained a number of the students at the dormitory. Progressive fishing was the order of the evening, after which a delicious lunch was served. The party dispersed at an early hour, and all

pronounced Mrs. Holderman a capital hostess.

Cadet Company A must hereafter appear in full uniform every Tuesday and Thursday at 3:30 p. m., as well as on Wednesday and Friday, much to the interest of its members. Two hours will be spent in theoretical drill and the other two hours in practically demonstrating the theories.

The present condition of Fargo and vicinity practically demonstrates that the Red River Valley is an old lake bed. One will get a clear understanding of this ancient lake in reading the article in this issue on Lake Agassiz, written by L. R. Waldron, '99, and which is certainly interesting and appropriate at this time.

One of the saddest accidents that happened durina the high water, was the drowning of Clarence A. Lyon, who attended the College for two years. He was a member of the Class of '97 until the winter of '96, when he retired from college life because of sickness. The Spectrum extends sympathy to the bereaved family.

Gus F. Wichman, '01, died of tvphoid fever on Monday, March 22, after an illness of about two weeks. Mr. Wichman was an honest and faithful worker as a student and his friends were numerous. Many floral gifts were presented and appropriate resolutions adopted by the class and sent to the bereaved parents of the deceased. The remains were taken to Leonard, N. D., for interment.