

TWELFTH BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES

OF THE

Iowa State Agricultural College

AND FARM,

MADE TO

THE GOVERNOR OF IOWA,

FOR THE YEARS 1886 AND 1887.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

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1887

STATE AGRICULTURAL COLLEGE, }
AMES, IOWA, December 1, 1887. }

To his Excellency, WM. LARRABEE :

In accordance with the statute defining the duties of the Secretary of the Board of Trustees of the Iowa Agricultural College, I have the honor to transmit herewith the Twelfth Biennial Report of said Board.

E. W. STANTON, *Secretary.*

REPORT OF THE PRESIDENT.

To the Honorable Board of Trustees of the Iowa Agricultural College :

GENTLEMEN—It gives me real pleasure to be able to report the Agricultural College as in excellent condition during the period of nearly two college years since I was elected President. There has been harmony in the faculty, good will between faculty and students and exceptionally good deportment among the students. Now and then a student who could not be induced to make quiet and diligent use of the great advantages offered free here by the bounty of State and nation, and whose presence was a hindrance and a damage to his fellow-students, has been quickly sent to his home, with full and courteous explanations to his parents or guardian. But such cases have been extremely rare in so large a number of students of both sexes, nearly all of whom board and room at the College.

The following statement shows the attendance by classes and sexes during the past two years :

1886.

CLASSES.	Gentlemen.	Ladies.	Total.
Post graduates, (second degree).....	6	2	8
Seniors.....	26	2	28
Juniors.....	45	3	48
Sophomores.....	46	15	61
Freshmen.....	80	23	103
Special students (reciting in regular classes).....	6	13	19
Sub-Freshmen (preparatory).....	31	7	38
Totals.....	240	65	305

1887.

CLASSES.	Gentlemen.		Total.
	Ladies.		
Post graduates.....	5	0	5
Seniors.....	37	4	41
Juniors.....	47	9	56
Sophomores.....	51	22	73
Freshmen.....	78	30	108
Special students (reciting in regular classes).....	6	9	15
Sub-Freshmen.....			
Totals.....	219	74	293

It will be noticed that no "sub-freshmen" (or preparatory) students are reported in 1887. That department or class was discontinued by the faculty, for three reasons:

First. Lack of dormitory accommodations for all who would come if a preparatory class or course were advertised.

Second. Lack of recitation rooms and teaching force.

Third. The belief that the graded public schools in many villages of considerable size can do this preparatory work nearer home though perhaps not so well.

The figures given above seem to show a decrease of members in 1887 as compared with 1886. But if we subtract the thirty-eight "sub-freshmen" (preparatory) students from the total for 1886, we get the true comparison, which shows an increase of twenty-six in the regular College classes in 1887. This I believe to be the largest number ever enrolled in the regular freshman, sophomore, junior, senior and post graduate classes in this or any other college or university in the State, with, possibly, one exception. The students classed as "special," are persons of mature age, prepared to enter college, but who take a shorter course by taking certain special lines of study which they are prepared to pursue and reciting with regular College classes, but not in all the studies of any class.

This substantial increase in numbers will make increased accommodations necessary, as will presently be shown; for the increase has occurred almost wholly without advertising, scarcely \$50 all told, aside from the catalogues, having been expended for that purpose during the entire two years.

The increase is specially noticeable in the number of ladies, of

1887.]

whom there is a larger number present in the regular classes than ever before, the increase being mainly in the two lower classes, and occurring since the ladies' course and the domestic economy studies and course were established. This fact is evident from an examination of the number of ladies in each class, as follows: Seniors, 4; Juniors, 9; Sophomores, 22; Freshmen and specials, 39. Total, 74. Two years more of such increase, carried up into the higher classes, will give us considerably over 100 young ladies, *provided we have rooms to accommodate them.*

The class that graduated this year, November 9, 1887, numbered forty-three members, including two gentlemen who took certificates for special work nearly equivalent to the full course, and two who took the second degree. Four were ladies. This is the largest graduating class in the history of the College. The *industrial* character of the course of study, and of the atmosphere of the College, can be seen by the occupations in life already chosen by the members of this graduating class, as follows:

Veterinary medicine.....	12
Agriculture, horticulture and stock breeding.....	9
Civil engineering.....	6
Mechanical engineering.....	3
Practical chemistry.....	2
Pharmacy.....	1
Dental science and practice.....	1
General business management.....	1
Total in strictly agricultural and industrial callings.....	35
Not decided.....	1
Law.....	3
Teaching.....	3
Medicine.....	1
Total in professional callings.....	7

It has been the custom of certain agricultural writers to name the Agricultural Colleges of Michigan, Kansas, Massachusetts and Mississippi as the only ones that have held faithfully to the agricultural and industrial idea of the congressional law that gave them their endowments and prescribed the character of the work to be done. (Clearly, from the above showing, such writers should enlarge the list so as to include the Iowa State College of Agriculture and the Mechanic Arts.

LECTURES AND INSTRUCTION BY THE PRESIDENT.

The President is also Professor of Ethics and Lecturer on Practical Agriculture. In ethics a text-book is used and is supplemented by lectures, the main object of the whole being to impress upon the minds of the students the belief that this world is, for man, a moral world, that is, created and ruled by a Moral Being for moral ends. That in no narrow sense "honesty is the best policy;" that is, that right conduct morally is wisest as a settled principle of action. That our environment here, on the whole, favors right conduct. That there is "a Power not ourselves that makes for righteousness," and that it is, in the highest sense, wise to work in harmony with, and not in antagonism toward, that Power. And finally, that the Christian scriptures, apprehended by our reason, are, on the whole, our best means of learning the mind and will of that Power, and of receiving an impulse toward right conduct. The brief daily chapel exercises, usually conducted by the President, tend in the same direction as do the Sabbath exercises, usually conducted by Professor Barrows. The purpose is to gain the assent of mind, heart and conduct to the universally accepted principles of Christian morality, and thus train worthy citizens of a Christian commonwealth.

The lectures in practical agriculture are designed to supplement the theoretical and scientific instruction given by the Professor of Agriculture. They cover the ground of farm platting and fencing, drainage, tillage, fertilizers, buildings, and the general business management of the farm, and are based on many years' experience of actual farm management.

PRESSING NEEDS OF THE COLLEGE—NEW BUILDINGS.

We need more room. Even without advertising, and with no preparatory department, our dormitory accommodations are practically full. With thorough advertising and with the establishment of a full preparatory course, it would be easy to double our present numbers had we the necessary accommodations. It should be distinctly borne in mind that we are so far from Ames, itself a small village, that students must board and room at the College in order to do satisfactory work. Even with our present average numbers we are overcrowded in many directions. Most of our public rooms in the main building must be used for three and even four different and partly conflicting purposes; for example, four different rooms, carpeted and

partly furnished by the students of our literary societies, must be used all day long each college day, for recitations and for piano or vocal lessons and practice, and then, on society evenings, canvas must be removed from the carpets, and furniture be removed, exchanged and rearranged to make the rooms cheerful and inviting for society exercises. Nearly all other colleges furnish free rooms for the exclusive use of their literary societies, which are elegantly fitted up by the latter.

Our chapel is used daily for brief religious exercises, and then, inconspicuously, as some think, for music room for lessons and practice on the grand piano and the pipe organ, and at certain hours for social recreation and quiet amusement. These are but samples of our over-crowded condition. The fact is simply this, that in spite of our commodious buildings and large facilities, which have cost the State over \$300,000, the growth of the State and of the College have brought most urgent need of enlarged accommodations in several directions, and the increasing wealth of the State seems to make their longer postponement unnecessary and unwise.

The first three items and the last named below, I must, after carefully weighing all our needs, consider as most immediately pressing. Two of them were distinctly named by my predecessor, President Leigh Hunt, in the biennial report two years ago, and the third was referred to before the College Board and the State Board of Health, by Dr. Fairchild.

First. A Ladies' Hall and Domestic Economy Building, well planned, with reception rooms, music rooms, model dining-room and kitchen and rooms for teachers, and for about one hundred young ladies. The building, especially the culinary department, should be well adapted to instruction in domestic economy. The great importance of instruction in this department is becoming more clearly recognized. Such a building would greatly increase the value of this instruction, relieve the crowded condition of our main building, and permit an increase in the number of ladies in attendance, already larger than ever before, and rapidly increasing. During the past year every room suitably located and otherwise suitable for ladies, was occupied, three guest chambers were pressed into service, and some of the larger rooms were made to accommodate three and even four young ladies each. We know not how to provide for the increase in the number of young ladies sure to come next year, and we do not believe the State has a right to close the doors of this College

against any of its daughters so long as their proper accommodation is a mere question of the expenditure of a few thousand dollars.

A ladies' hall to accommodate a hundred young ladies, with teachers' rooms and other rooms noted above, would cost, complete, from fifty to seventy thousand dollars. In my opinion your honorable body should not consent to a refusal by the Legislature, or a diminution of the above estimates for a building that is now an urgent necessity. Your committee, composed of Secretary Stanton and myself, as instructed at your May meeting, has already submitted at your November meeting, architects perspective and ground plans for a building that will meet the requirements. The plans though definite are suggestive and preliminary, and are voluntarily submitted by the architect. When the appropriations for this and other buildings are obtained, I advise that competition be invited among architects for the best design, and when that is accepted that the fullest competition among builders for the contract be drawn out by the most thorough advertising. Also that diligent attention be paid to sources of material and to railway freights and switching facilities directly at the College, so that the State may erect these buildings at as low a figure and in as thorough and substantial a manner as the most enterprising and economical private individual could do the same work.

Second.—Our second pressing need is for three or four more dwelling houses for members of the faculty. The College is two miles from Ames, with only omnibus connection. No houses can be rented nearer, and few suitable ones even in the village. Professors who live at such a distance, with *no means of transportation at the right times of day*, and only mud or gravel roads to walk upon, cannot live in comfort or do good work and best help build up the College. Those who board and room in the main building, as several professors do, exclude just as many students, and cannot even then have the comforts of home and family life. It is *sojourning not living*, for they have not even an abiding place during our long winter vacation, and shorter one in summer, and are thus practically compelled to leave town, and leave all College interests behind during the vacations. This breaks up the continuity of work and of home, and greatly injures the College. In short, our location so far from town, for which the State is responsible, and not the present professors, while it has many advantages for students in the way of seclusion from interruption to study, and from temptation, yet it seems to me to make additional houses on the College grounds for the use of pro-

fessors an absolute and urgent necessity. The State has in the past recognized that necessity by furnishing dwelling houses for eight professors. It seems to me it should at once provide for the other four members of the faculty who now just as urgently need houses. The entire cost would be from twelve to fifteen thousand dollars.

Third.—Our third pressing need is for certain changes in the water-closet system of the main building, by means of separate towers. The plan was fully explained to your honorable board and to the State Board of Health some two years ago by our physician, Dr. Fairchild. It seems to be demanded in the interests of health. The health in the College is now excellent, but where so large a number of students and professors live in a single building, every possible precaution should be taken to guard against the possibility of typhoid fever, diphtheria and the like diseases. The estimated cost of this improvement is about thirty-five hundred dollars.

Fourth.—A building is needed suitably planned for museum and lecture rooms for the department of entomology, zoology, botany, and for lecture room for horticulture. By combining these departments in the matter of room and still retaining the full use of north hall, sufficient accommodation may be obtained for all at less expense than otherwise. Such a building would considerably relieve the main building, which now poorly accommodates the zoological and geological museums, and would give more room there for students. The needs of these departments are clearly set forth by Professors Budd and Osborn in their reports in this and previous biennial volumes to which reports you are respectfully referred. The cost of such a building worthy of the State and suited to the needs of the departments would be from twelve to sixteen thousand dollars.

Fifth.—Certain enlargements needed in veterinary, mechanical, physical and chemical departments, or in their permanent apparatus and fixtures. These needs are clearly explained in the reports of Professors Stalker, Bassett, Hainer and Bennett, to all of which you are respectfully referred. For these four departments the needed improvements are estimated at an aggregate of about eleven thousand dollars.

Sixth.—A small addition to the general office building, much needed for the accommodation of the Trustees at their meetings, which occur when the College is crowded. The cost would be about three hundred to five hundred dollars. Also certain improvements

in the water supply for the sanitary building, and for several of the professors' houses, at a total cost of about six hundred dollars.

Seventh.—An armory, to be used also as a gymnasium, and on commencement, junior exhibitions and similar occasions as an assembly room, instead of our chapel in the main building, small and overcrowded. Military tactics and drill are by law required in this College as a part of our course of study. To make the instruction most valuable mentally, and the drill most effective physically, daily practice is needed, which is impossible in severe and stormy weather without a suitable armory. This building can be utilized as above indicated for other valuable purposes. Most of the "land grant" agricultural colleges in other States have excellent armories or are building them; as, for example, Nebraska is now building one at Lincoln, for its Agricultural College or University, at a cost of over \$20,000, as a "Grant Memorial." A building, 60x100 feet, of brick, with self-supporting roof and asphalt or cement floor, and sufficient for our needs, can be built for about ten thousand dollars. I can see no good reason why the State should not provide one, since it is essential to giving properly the instruction required of us by our organic law both State and Nation.

Eighth.—*Annual Repairs.*—A wise and provident economy on the part of the State will keep its buildings in thoroughly good repair. Its buildings at this College have cost the State all told something like \$800,000. There is much roof surface and much painted surface that need frequent attention. If these buildings are kept promptly repaired, the expense is less, the comfort and general effect are better and the property is far better preserved. "A stitch in time saves nine." On buildings of this nature no prudent business man or firm would think of expending less than one per cent of the original cost in annual repairs. That would in this case be from \$2,500 to \$3,000 per year. I therefore recommend that the Legislature be urged to establish the regular annual appropriation for repairs and improvements on the buildings at \$2,500 or \$3,000, instead of the present insufficient sum.

I have deemed it to be my duty, gentlemen of the Board of Trustees, to summarize for you, as above, all the principal needs of the College, as brought to my notice by constant residence and work here, and as stated to me by the various professors and officers. Some of these needs might otherwise fail to attract your attention, engrossed as you necessarily are with your own private business in-

terests, and visiting the College as you usually do only twice or three times a year, for two or three days, and mostly confined to routine office work.

While all the above items are important, I must regard the first three and the last (annual repairs) as absolute and immediate necessities. In my opinion it will greatly retard the growth and lessen the future usefulness of the College if the general assembly shall fail to make adequate provision for these four items at its biennial session this winter.

I therefore urge that your honorable body will unite as one man in presenting to the General Assembly the needs and claims of the College in their true light. The facts are: First, that the State is the only source from which funds can be legally obtained for buildings, permanent fixtures connected therewith, and repairs thereon. Funds for such purposes cannot come from the "land grant" funds derived from Congress, nor from the interest thereon. The organic law of 1862 passed by Congress, that gave the College its endowment, is most explicit on these points. Section 5 of that law provides that the funds derived from the land grant "*shall remain forever undiminished;*" and the second part of the same section declares that "no portion of said fund nor the interest thereon shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings."

In 1862 the General Assembly of Iowa accepted the land grant upon the conditions and under the restrictions contained in the act of Congress, and by so doing entered into a contract with the general government to erect and keep in repair all buildings necessary for the use of the College.

It can, I think, be clearly shown to the proper committees of the Legislature that the building and repairs asked above are necessary for the use of the College, and therefore that the State is by its contract with the general government and with the College, obliged to provide for them.

For a time the State was liberal in its appropriations, but of late years its appropriations to the College have been small, compared both with its former liberality, and with the appropriations made by other States, as shown by the following brief tabulated statement. It has been compiled from returns from each institution obtained by recent personal correspondence.

can and do use their appropriations for public buildings, rooms, museums, laboratories and the like, and in permanent fixtures and appliances for better experimentation and investigation and for the better instruction of the students.

And yet no State can better afford than Iowa to be liberal toward its Agricultural College. For trustees and faculty have from the first so wisely managed its funds that its income from our land grant funds is now larger, I think, than in any other State except one, New York, where Ezra Cornell's great wisdom and liberality, with private munificence from other wealthy men have made Cornell University very rich in income.

The fact that but one State in the Union has to day a larger annual income than Iowa drawn directly from its land grant funds, is remarkable when it is remembered that the amount of "land script" received by each State under the Congressional grant of 1862, was in proportion to the population of each by the census of 1860. That is, each State received script for 30,000 acres of land for each of its senators and representatives in Congress. Also when it is remembered that nineteen other States then had a larger population and received more land than Iowa.

The following are the States, with their population in 1860:

New York.....	3,880,735
Pennsylvania.....	2,906,215
Ohio.....	2,330,511
Illinois.....	1,711,937
Virginia.....	1,596,318
Indiana.....	1,350,425
Massachusetts.....	1,291,066
Missouri.....	1,182,012
Kentucky.....	1,155,084
Tennessee.....	1,109,901
Georgia.....	1,037,286
North Carolina.....	992,922
Alabama.....	964,201
Mississippi.....	791,305
Wisconsin.....	775,881
Michigan.....	749,114
Louisiana.....	708,002
South Carolina.....	703,708
Maryland.....	687,049
Iowa.....	674,913

Table showing appropriations for State Agricultural "Land Grant" Colleges in the States and for the periods designated.

STATE.	1886-7.	1884-5.	Total.	REMARKS.
Minnesota.....	\$ 75,000	\$ 68,000	\$ 133,000	Including all departments.
Nebraska.....	about 120,000	.....	120,000	.....
Mississippi.....	60,000	65,000	125,000	Including all departments. Agricultural and mechanical departments alone.
Pennsylvania.....	112,000	.....	112,000	Agricultural and mechanical departments alone.
Illinois.....	1885-87 55,500	1887-89 51,500	110,000	Including all departments.
Michigan.....	about 110,000	.....	110,000	Agricultural and mechanical departments alone.
Indiana.....	60,500	45,000	105,500	Including all departments.
Massachusetts.....	52,000	31,000	83,000	Agricultural and mechanical departments alone.
Colorado.....	40,600	36,000	76,600	Agricultural and mechanical departments alone.
Ohio.....	30,000	44,950	74,950	Agricultural and mechanical departments alone.
West Virginia.....	40,000	33,000	73,000	Agricultural and mechanical departments alone.
Texas.....	35,000	30,000	65,000	Agricultural and mechanical departments alone.
Maine.....	31,600	12,400	47,000	Agricultural and mechanical departments alone.
Iowa.....	7,800	34,800	42,400	Agricultural and mechanical departments alone.

Thus of the States recently reported to me personally, Iowa stands at the bottom (except Maine) in her appropriations for her Agricultural College. And yet as shown our "land grant" funds have been more wisely managed here than in almost any other State, so that while many of the States named in the table use nearly their entire appropriations for paying salaries and running expenses, we have never asked a dollar from the State for those purposes, but only for buildings and repairs urgently needed, and which we are forbidden by law to provide from "land grant" funds or income, and which the State is under solemn contract to provide.

Thus it is seen that Iowa stands far below many other States in her recent liberality toward her State College of Agriculture and the Mechanic Arts. The difference is still more striking if it is remembered that in our College the dormitory and boarding features are a necessity, and have absorbed fully one-half of the appropriations of former years, while nearly all the States named in the table are free from this necessity, by reason of their city location, and hence

Thus by the wise management from the first, of our land scrip by the Trustees, our income, which would naturally have been less than that of nineteen other States, is really now less than that of but one other State, and that a State that received more than six times as large a grant from Congress.

Our College, too, owing to the wise management of Trustees and faculty, stands to-day the peer of any similar one in the land, in fidelity to its organic law, in the thoroughness and exactness of its instruction and drill, and in its number of students and graduates in the strictly industrial departments; but not by any means the peer of several others in the public buildings and equipments furnished it by the State, especially in recent years.

Now the argument I make is this: That the State can well afford to be liberal in the appropriations it makes to an institution whose Trustees and faculty have from the first so wisely guarded and guided its financial and its educational interests. It is the old and sound argument of scripture, of nature and of true philosophy: "To him that hath shall be given." To him that wisely uses trust funds shall more be entrusted. In our case it seems doubly safe and wise to follow this sound maxim. Our income from our land grant funds is about \$45,000 per year. But by law, as already stated, this must be used for purposes of instruction, experiment and illustration. It seems to me to be true wisdom, as well as clear duty, for the State to furnish such buildings and permanent fixtures and appliances that this large annual income from the land grants, which costs the State nothing, may furnish free tuition and industrial training to as large a number as possible of the young men and young women of the State. It would seem to be anything but wisdom, now that we have these large resources for instruction, for the State to refuse the buildings and equipments needed to make that instruction most effective.

I therefore urge that the members of your honorable Board unite in so presenting to the General Assembly the needs of the College and the clear duty of the State in relation thereto, that that body, at this winter's session, shall make the needed appropriations for at least the first three and the last of the items named above, and for the remainder of the list at its next biennial session, two years hence.

All the above is most respectfully submitted to your judgment. If, upon mature deliberation and consideration of all the facts, you

shall in any respect differ from the above views, you shall in the future, as in the past, find me helping you carry out your views just as heartily as if they were in all respects my own. I shall be specially pleased to aid you by explaining the details and the urgent need of the items given above, to the proper committees of the legislature, whenever you shall honor me by calling me to such work. In this, as in all other work for the College, my time is fully at your service.

The accompanying reports of the professors and officers of the College will aid in giving you a clear understanding of the condition, work and wants of the several departments. I bespeak a careful reading of them by the Trustees and by the members of the General Assembly of the State.

Respectfully submitted.

W. I. CHAMBERLAIN,
President.

Ames, Iowa, December 1, 1887.

REPORT OF THE DEPARTMENT OF AGRICULTURE

HERMAN KNAPP, ASSISTANT PROFESSOR.

At the meeting of the Board of Trustees held in June, 1886, Prof. S. A. Knapp was granted a leave of absence for one year, from March, 1886, and I, as his assistant, was appointed to supply his place. In November, 1886, Prof. Knapp tendered his resignation, to take effect March 1, 1887, and I was elected assistant professor, in charge of the department. Near the beginning of the school year of 1887, the death of Gen. J. L. Geddes, treasurer and land agent, left a vacancy in these departments, and I was chosen his successor, to take charge March 1st, with the understanding that I was also to assist President Chamberlain in the management of the Agricultural Department for the remainder of the year.

INSTRUCTION.

The entire number of students receiving instruction in this department during the biennial period, was 229, divided into classes as follows:

Stock-breeding, First term, Freshman.....	127
Dairying, Second term, Freshman.....	21
Agriculture, Second term, Sophomore.....	61
Stock-breeding and Experimental Agriculture, First term, Senior	10
Drainage and Agriculture, Second term, Senior.....	10
Total.....	229

As arranged for by the Board of Trustees, a course of lectures was given by Prof. S. A. Knapp, in the second term of the first year.

During the first term of the second year the class in stock breeding was conducted by my assistant, Mr. Frances S. Schoenleber, until the last two weeks of the term, when a course of lectures was given on the Principles of Heredity, by Dr. A. S. Welch.

In addition to the regular class instruction given in the second term of the second year President Chamberlain lectured to the students on Practical Agriculture.

FARM EXPERIMENTS.

At the beginning of the year 1886 an arrangement was made with Mr. W. M. Hays, a graduate in the class of 1885, by which he was to take charge of the detail work of the experiments on the Farm, performing the most careful experiments himself, and having direct charge of such as were performed by other labor. During the year many valuable experiments were completed, and others begun, a report of which may be found in the Bulletin of Experiments for 1886, a copy of which will be sent to any address upon application.

Mr. Hays received as remuneration for his services five hundred dollars (\$500.00) and a house. The amount expended on experiments from the various funds during the year 1886, was as follows:

From farm experiments.....	\$703.52
From State experimental fund.....	248.12
Total.....	\$951.64

Of this, \$500.00 was paid Mr. Hays, and the balance was expended in labor and material.

The second year a similar arrangement was made with Mr. E. S. Richman, of the class of 1886, and the amount expended was as follows:

From farm experiments.....	\$ 460.71
From State experimental fund.....	1,115.42
Total.....	\$1,576.13

Of this amount the sum of \$361.87 was paid to Mr. Richman and Mr. Hays; \$94.91 was used by the Committee on "Introduction of new plants and seeds," and the balance was expended for labor and material.

President Chamberlain gives elsewhere a statement of some of the experiments.

PERMANENT IMPROVEMENTS.

During the year 1886 the sum of \$499.80 was expended for the following improvements:

First. A twelve-foot Baker wind-mill was erected on a sixty-foot

tower, about four rods east of the pump house. Under this an eighteen-foot well was dug and connected with the main College spring by a two inch pipe. A force pump of the Baker pattern was put into the well and connected with the large cattle water tank in the barn-yard, with the horse barn well, with the creamery tank and with the supply tank in the farm engine house.

Second. About 230 rods of wire fence was built on different parts of the farm.

Third. Some tile draining was done and permanent outlets were constructed to some of the old drains.

Fourth. A new bed and platform to the Fairbank hay scales was laid. All the pieces for this were soaked in hot tar.

Fifth. Besides the above some division fences were constructed for the hogs, and a small well six feet deep was made on north farm and connected with a hidden spring.

During the second year there was expended \$722.63 for a statement of which see President Chamberlain's report elsewhere.

FARM STOCK.

The horses of the farm have been bred with two objects in view, the production of animals for heavy draft and the production of animals for the light, active work of the farm. The herd under both heads now numbers twenty-six.

The Short-horns kept on the farm are principally of the Young Mary and Young Phyllis families. The original cow of one of the Young Mary families was Mary Moore 1st, calved in 1875. In 1878 she had her first calf. Her produce and grand produce now numbers twenty-three, sixteen females and seven males. This family is almost entirely red with a slight mixture of white.

The original cows of the Holstein-Friesian herd were obtained in 1881. Imported by the Unadilla Valley Stock Breeders' Association of West Edmeston, N. Y. Bred in West Friesland province, Holland, and recorded in the foreign Friesian Herd Book. Many competent judges have pronounced it the most uniform herd they had ever seen.

The cow Metje produced from April 3, 1882, to November 4, 1886, six calves. She is a great milker and on some occasions it is impossible to dry her up before calving.

There is also the nucleus of a Jersey herd and a large number of

grades kept for dairy purposes. The total herd of cattle numbers one hundred and sixty.

In 1880 the College commenced crossing their thoroughbred South-down ewes with a Shropshire-down buck. As a result the individuals of the herd have increased twenty per cent in weight, and their fleeces have increased as follows:

1882, average of all fleeces	4.57 pounds
1883, average of all fleeces	4.94 pounds
1885, average of all fleeces	6.90 pounds
1887, average of all fleeces	8.29 pounds

The rate of production of lambs in 1880 was, seventy-seven per cent; in 1886, one hundred and twenty-eight per cent; in 1887, one hundred and thirty-one per cent. In the breeding there seems to have been a constant working toward good bone, heavy body, well-wooled head and good constitution.

FARM FOREMAN.

On the 15th of February, 1886, Mr. F. S. Schoenleber, of the class of 1885, was employed to act as assistant and foreman. He has remained in that relation since that time. The first year his salary was \$45 per month. The second year on account of my changed relations to the Farm his duties were greatly increased, the detail management almost entirely devolving upon him. For this reason and on account of his class instruction, the board made his total salary \$750 for the year.

FINANCE.

The expenditures for various purposes on the Farm for the year 1886 exceeded the income by \$712.16, and for the year 1887 by \$2,094.23. Total excess for the two years, \$2,806.39.

During this period \$1,164.23 were expended for experimental and instructive work, \$1,222.43 for permanent improvement, and \$959.32 for farm foreman. Total expenditure for above, \$3,345.98, leaving a balance of \$539.59 on the other accounts in favor of the Farm.

The amount paid for student labor during the period was \$1,544.46, an aid to the cause of education.

In submitting this report I sever my connection with the Agricultural department. I shall, however, note with deep interest its progress and development in the future. Allow me in closing to express

my grateful appreciation of the kindness and consideration shown me by the Board of Trustees.

DEPARTMENT OF AGRICULTURE.

SUPPLEMENTARY REPORT BY W. I. CHAMBERLAIN.

At the time of my election as president in May, 1886, I consented at the urgent solicitation of the Board of Trustees to give a few lectures on practical agricultural each year, to take a general advisory and suggestive oversight of the farm, then in charge of Acting Professor Knapp, and to have my name stand in the catalogue as professor of ethics and lecturer on practical agriculture. I entered upon my duties as president at the beginning of the second half of the college year of 1886. The freshman class had already completed its instruction in agriculture for the year, the sophomores had stock breeding in regular course for that year, the juniors and seniors had had Prof. S. A. Knapp's lectures on practical agriculture, including a course in the fall of 1886 mentioned by Prof. H. Knapp in his report which precedes this. For these reasons I gave no lectures in agriculture that year.

In the catalogue of 1886, which gave the course of study for 1887, agriculture was at the request of Prof. H. Knapp, thrown into the sophomore year, and stock breeding into the freshman year. But in 1887 as the sophomore class had had agriculture in their freshman year, they took stock breeding, while the freshman class also took stock breeding according to the new catalogue. This gave for the year two classes in stock breeding and none in agriculture. Also owing to the facts mentioned by Prof. Knapp in his report, his time was almost wholly occupied in office work, except the necessary time for giving instruction in stock breeding and to the agricultural students of the junior and senior years in the agricultural studies of those years. In attempting to carry the agricultural instruction and the farm management in the absence of a regular professor of agriculture, and in response to the wishes of the Trustees, it was thought

best that Professor Herman Knapp, who had already given the instruction in that department for two years, should continue the instruction, except as stated in his report, and that I should give my attention chiefly to the management of the farm. My lectures were therefore confined to a short course near the end of the year, given to the sophomores and seniors, and covered the ground of the inducements of farming for young men of education, the business management of the farm, farm plating and fencing, farm architecture, clover, tillage, fertilizers and rotation. Another year the course will be more full.

FARM MANAGEMENT.

The business management of the farm, and especially of the stock, with the sales and purchases, remained in the hands of Prof. H. Knapp, who managed it on full consultation with me, and carried it all out through our foreman, Mr. F. S. Schoenleber. I directed my own attention chiefly to farm improvements, experiments and crops, with frequent consultations and in full harmony with the views of Professor Knapp, whom I ever found a ready advisor and an earnest helper.

The farm fields were systematized, brought into better shape, made distinct and separate from the horticultural department, and connected with each other and with the farm barns by a system of lanes and gates, hitherto neglected because of the large amount of ditching, clearing, building of levees and other pioneer work that fell to the lot of Prof. S. A. Knapp. A former nursery projecting into a large farm field, and practically abandoned, has been grubbed out, leaving a fifty acre field of arable land in good shape. The old experimental orchard of twelve acres, of which nearly all the trees supposed to be hardy, had been destroyed by the severe seasons, has also been grubbed out, except a few of the more hardy trees still thrifty, and the whole field plowed for farm crops, and handed over to the farm by the horticultural department.

Quite early in the season it began to be probable that the drouth was to be severe, and that the hay crop would be light. We therefore directed every energy to providing forage for winter for the large amount of live stock on the farm, and to experimenting on drouth crops. Owing to the extreme drouth of 1886, which extended from July 1st to the close of the year, very little ground could be fall plowed for the crops of 1887, some thirty-five acres in all; while there was little corn stubble ground. Some thirty acres were sown to ex-

perimental oats, which proved nearly a failure owing to severe drouth and chinch bugs, and added little to the winter forage. We had some twenty-six acres of regular field corn, which looked quite promising in spite of the drouth, until nearly the time when the ears began to glaze, when it was so severely attacked by chinch bugs that it had to be cut and shocked to save it from their ravages. It made about two-thirds of a crop of fodder and little more than one-third of a crop of ears.

ENSILAGE CORN.

We planted about twelve acres of ensilage corn, and built three silos in the main barn, running from ten feet below the barn floor. They would hold about ninety tons each of ensilage according to the estimates of those who have put up and fed ensilage. "Ensilage," as now put up by those who have had most experience is green corn of the large leafy White Southern varieties, grown in drills some three and one-half feet apart with the kernels six to twelve inches apart in the rows, that is, thin enough to form ears. In the glazing or roasting ear stage it is cut, hauled to the barn while green, chaffed by a power feed cutter, ears and all, into lengths of one-half to three-fourths of an inch long, run directly into the cement pits or silos, spread, tramped, covered air-tight and weighted. It heats spontaneously to about 120° Fahrenheit, which drives out the air, partially cooks it and keeps it in good condition.

Of the twelve acres planted to Southern ensilage corn nearly eight acres were planted on turf ground, and produced scarcely one-fourth of a crop owing to extreme drouth and the ravages of turf worms and chinch bugs. We were forced also to cut it all before it was properly matured, and to let most of it and of the field corn dry in the shock from two to five weeks before finally getting it all into the silos. This was owing to delay in getting our cutting machinery, and to excessive rains all through September when we were filling the silos.

The three silos held the entire growth of field corn and ensilage corn from the thirty-eight acres and were not entirely full then. It all weighed (by actual weighing of each load as drawn from the field) a trifle less than 100 tons. Had it all been put in perfectly green the weight would probably have been 200 tons and the quality somewhat better. It heated properly and on opening one of the silos, December 1, it seemed to be in excellent condition and the cattle

begin to eat it at once with relish. It is too early to give an opinion as to its feeding value, but we seem to have all the feed that grew on the thirty-eight acres, in convenient form and without waste.

HUNGARIAN GRASS.

By June 10th it became evident that we were to have almost no meadow hay, owing to the unparalleled drouth of the preceding *eleven months*. On June 13th and 15th we sowed eleven acres of fall and early spring-plowed turf to Hungarian grass. It made rank growth until it was nearly knee high and promised a large yield. Encouraged by this good promise we plowed or killed meadow turf and some oat stubble, some forty-four acres in all, and sowed to Hungarian whenever the ground was ready, or there was a sprinkle of rain that gave promise of germinating the seed. The dates of sowing were as follows: June 13, 15, 16, 22, 27, 29, July 4, 14, 18, 25, 27 and 30. That sown on the first two and last three dates some thirteen acres in all, in spite of drouth and chinch bugs yielded about half a ton per acre. All the other sowings were totally destroyed by chinch bugs, which came in amazing numbers and staid right by it for weeks. The forty four acres in favorable weather should have yielded at least 100 tons of excellent cured Hungarian hay. We got only seven tons. Our meadows should have yielded 200 tons of good hay. We got only twenty tons of poor hay, mostly from a slough too wet to mow ordinary years. About all we have to show as winter forage for 160 cattle, 27 horses and colts and about 100 sheep, is 27 tons of hay and 100 tons of ensilage. The ensilage as dry as it was when stored should be worth as much as 65 tons of hay. The drouth was most disturbing and appalling; wholly unprecedented in Iowa, far worse than I have ever known for fifty years of my life in Ohio. The following* table shows that during the crop-making months of this year but little more than *one-third* the average amount of rain fell as compared with the average of the ten years preceding.

TABLE SHOWING AVERAGE RAINFALL AT AMES, IOWA, FOR 12 YEARS, 1876-1887.

YEARS.	AVERAGE RAINFALL AT AMES, IOWA, FOR 12 YEARS, 1876-1887.												
	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	AVERAGE OF 10 YEARS.	1886.	1887.
January.....	2.45	0.40	0.00	0.48	1.25	0.68	0.57	1.24	0.31	0.23	0.758	3.57	0.40
February.....	0.40	0.00	0.05	1.08	0.05	2.60	1.14	1.80	1.12	0.34	0.807	0.15	1.44
March.....	2.35	1.41	4.00	0.78	0.35	0.94	3.60	0.32	1.79	0.24	1.636	0.98	0.66
April.....	1.60	1.96	3.29	1.27	2.60	2.37	2.44	3.55	3.20	4.17	2.651	3.05	1.28
May.....	4.29	4.48	4.35	4.46	3.06	2.80	5.21	7.11	1.80	3.20	4.629	2.78	0.39
June.....	4.28	7.04	7.58	4.65	4.37	6.70	7.43	5.52	2.06	6.01	5.254	1.87	2.04
July.....	6.00	3.00	5.23	0.48	1.18	16.31	2.03	6.30	4.71	4.31	5.438	0.06	2.78
August.....	8.20	6.48	1.95	3.98	6.02	2.28	2.15	2.02	2.60	8.40	4.694	0.33	0.40
September.....	6.14	0.90	3.00	2.63	6.24	7.24	0.21	1.07	0.58	3.64	3.716	4.00	0.40
October.....	0.72	0.69	0.35	0.34	1.30	0.54	0.55	0.55	0.55	0.28	2.713	1.12	0.40
November.....	0.02	0.05	0.23	1.22	0.84	2.07	2.17	2.05	0.55	0.28	1.085	1.12	0.40
December.....	0.02	0.05	0.23	1.22	0.84	2.07	2.17	2.05	0.55	0.28	1.085	1.12	0.40
Total per year.....	37.62	33.00	32.30	30.16	29.50	51.94	32.69	33.35	29.90	33.85	*34.42	30.54	8.50
each year.....	3.13	2.75	2.69	2.51	2.46	4.33	2.67	2.83	2.50	2.82	2.87	1.71	1.28
Average per month the whole year.....	1.30	0.81	1.06	1.85	0.74	1.48	1.59	1.42	1.19	0.39	1.19	1.30	0.88
Average per month the non-agricultural months, January, February, March, November, December.....	4.58	4.11	3.85	2.78	3.69	6.41	3.45	3.98	3.42	4.55	4.06	2.01	1.62
Average per month the agricultural months, April-October, 7 months: Total.....	30.08	28.45	28.98	20.83	25.81	44.86	24.14	27.37	23.67	31.88	28.42	14.05	6.49
Average per month the months that grow the hay and oats, April-June.....	3.33	4.77	5.12	3.46	2.70	3.81	5.03	4.73	2.35	4.40	3.95	2.67	1.24
Average per month the months that grow the corn.....	6.82	5.61	4.80	3.39	3.91	7.16	4.80	4.96	2.79	5.00	4.88	1.31	1.74

* Average for year.

The fine rains of September gave a good bite of grass in fall which carried the farm stock in fine condition to nearly December 1, and it is gratifying to add that apparently the stock can be carried through the winter within our regular annual farm income and appropriations for experiments and improvements.

POTATOES.

For three years experiments have been conducted with eighty-four distinct varieties of potatoes to test comparative productiveness with varying tillage. In 1885, the months of June, July and August were exceedingly wet, averaging over six inches per month of rain-fall, as seen by the preceding table of rain-fall. Hence the potatoes rotted badly, and the yield was greatly reduced, since only sound ones were measured. The seasons of 1886 and 1887 were unprecedentedly dry; that of 1886 being driest later, and hence harder on late varieties, and that of 1887 being driest earlier and quite wet in September, and hence best for later varieties. The following table gives the yields of twenty-one varieties that yielded best this season, and one Early Ohio which stood highest last year.

Last year the entire land of the plats was heavily manured (the fall before) with well rotted stable manure. This showed a marked effect that year in enabling the potatoes to withstand drouth. The effect was specially marked on the earliest varieties, like Early Ohio, Early Vermont and Pearl of Savoy, which yielded respectively 158, 147 and 152 bushels per acre, whereas the same varieties on unmanured land near by yielded scarcely 40 bushels per acre. In 1887 potatoes were planted on the same land with no new application of manure. The yields were far above the average for the county, but far below the yields on the same land in 1886, especially of the early varieties. Manure shows a most marked beneficial effect even on the richest soils of the College farm, most marked of course during very dry seasons.

The subjoined table gives some twenty-two of the varieties that yielded best this year. Few of them were those that yielded best last year, and as remarked, owing chiefly, probably, to the fresh application of manure last year the average of the best yields then were far higher than this year, though the two seasons were about equally unfavorable; the ten best varieties last year averaging nearly 150 bushels per acre, and this year only a trifle over 88 bushels per

acre. The Pearl of Savoy planted this year on land nearly adjacent but manured this year yielded almost exactly the same as last year, viz., about 150 bushels per acre.

NAME OF POTATO.	YIELD PER ACRE.		
	1887.	1886.	1885.
Cloud's White Chief.....	127	110	139
State of Maine.....	94	101	109
McCormick.....	89	79	31
Beauty of Hebron.....	87	123	112
White Star.....	86	111	108
Mammoth Pearl.....	86	126	108
Peerless Peachblow.....	83	85	96
Prairie Flower.....	78	85	83
Sutton's Mg. B.....	78	52	37
Hall's Early Peachblow.....	77	92	49
Dakota Red.....	76	78	121
Peerless.....	75	117	111
Parsons' Prolific.....	75	97	62
Silver Skin.....	73	93	61
Davis' Seedling.....	73	79	62
Coleman's Superb.....	70	68	86
Dunsmore's Seedling.....	68	128	88
Rocky Mountain Rose.....	68	93	47
Pearl of Savoy.....	67	152	130
Blue Victor.....	67	123	75
Early Snowflake.....	67	107	45
Early Ohio.....	47	158	64

In due time a farm bulletin will be issued as last year. It will give in full the results of the potato experiments, the ensilage experiments, and other experiments in crops, feeding and breeding, and the like.

SMUT IN CORN.

An almost unprecedented amount of smut instead of ears, or around the ears of corn, appeared this year. Fearing the effect of it upon our live stock, I requested Dr. Halsted, our Professor of Botany, to test the question of its injurious character. He did so by feeding the smuttiest stalks selected, and run through a feed cutter, and feeding it for some weeks to two steers as their exclusive feed. They thrived upon it, and it seemed to have no injurious effect.

CHINCH BUGS.

The two dry years in succession developed, this year, amazing numbers of this pest. Kerosene emulsion, sprayed upon them with

force pump and cyclone nozzle, killed them by millions as they were traveling from the destroyed Hungarian upon the corn then in the "roasting ear stage," and deep furrows, with a log drawn through them to pulverize the soil into dust, delayed them a day or two in their travels. But before such multitudes man seems almost powerless. They seem to breed and feed best on spring wheat and Hungarian grass. Possibly we must stop raising these crops to protect our corn, a far more valuable crop for this State.

FALL PLOWING.

The severe drouth killed out much of the timothy and clover meadows. They were, as stated, plowed and sowed to Hungarian in hopes of a crop. This entire area with all that was in corn and oats, and some forty acres of rough, rather waste and unproductive pasture land, has been plowed this fall, making about one hundred and fifty acres all plowed ready for spring crops. It is too large a proportion of the arable lands of the farm to be annually under the plow, but the drouth made it necessary.

CONDITION OF THE FARM.

The farm, the stock and the implements are gradually and rapidly approaching the point at which it can justly be called a model farm in appearance and in productiveness. The new professor of agriculture, Prof. L. P. Smith, of New York, (a graduate of Cornell University, and a practical instructor) comes in at a most auspicious time to make a good showing for the farm, both in net receipts and in general tidiness and system of management, and he seems well fitted to such work as well as to the work of instruction.

DIVISION OF COLLEGE DOMAIN.

The farm committee having been directed to ascertain the divisions and amounts of horticultural, ornamental, arable, pasture, wooded and waste lands included in the entire college domain, reported as follows:

HOME FARM.

Arable Land, mostly fit for rotation.

	Acres.
Lot No. 1 contains	21½
Lot No. 2 contains	50
Lot No. 3 contains	13½
Lot No. 4 contains	18½
Lot No. 5 contains	35½
Lot No. 6 contains	10½
Lot No. 7 contains	17½
Lot No. 8 contains	8
Lot No. 9 contains	2½
Lots Nos. 10 and 11 contains	34½
Total arable (less waste 182 acres)	212½

Cleared Pasture Land, but partly wooded and part sloughs or subject to overflow.

	Acres.
Lot No. 12 contains 53 acres, less waste, now worth about	20
Lot No. 14 contains 110 acres, less waste, now worth about	50
Lot No. 15 contains 4 acres, less waste, now worth about	3
Lot No. 16 contains 19½ acres, less waste, now worth about	19
Lot No. 17 contains 38 acres, less waste, now worth about	18
Lot No. 18 contains 20½ acres, less waste, now worth about	20
Lot No. 19 contains 38 acres, less waste, now worth about	30
Total	281½ acres, less waste, now worth about 160

NORTH FARM.

Arable upland.

Lot No. 1 contains 35 acres, worth	30
Total arable north farm 35 acres, worth	30
Total arable both farms 247½ acres, worth	200

Non-arable.

Lot No. 2 lowland cleared	80 acres, worth	65
Lot No. 3 rough woods and waste 110 acres, worth		40
Total	190 acres, worth	105
Total pasture, both farms, 471½ acres, worth		265

That is, the total arable land including sloughs, runs, pits, etc., is fairly equivalent to about 200 acres of good clear plow land, and the 471½ acres of pasture is fairly equivalent to 265 acres of good clear upland pasture land, in the opinion of your committee. The land oc-

cupied for public grounds, horticulture, steward's garden, building sites, etc., is about 130 acres.

Land occupied by horticulture, ornamental grounds, etc.	130
Land occupied by sloughs, creeks, forests, creek bed and bayous, roads, etc.	300
Total land not subject to use for farming purposes, about	430
Total good land arable and pasture used in actual farming, about	465
Total college domain	895

The figures in the summary and in the amount of waste in each field are the results of careful estimates on the portion of waste in each field. Each field was accurately measured and platted by Prof. Mount and the students in his classes and under his direction. The main fact shown is that but little more than half of the entire college domain is now good cleared arable or pasture land now actually used for farming and grazing purposes.

CONDITION OF THE DEPARTMENT OF HORTICULTURE AND FORESTRY, 1887.

J. L. BUDD, PROFESSOR.

The outline of the work of this department in class room, field and garden for biennial period closing November 14, 1887, must necessarily be brief.

INSTRUCTION IN HORTICULTURE AND FORESTRY.

As the students of the freshman class have made little if any progress in the study of botany or any other supporting sciences the lessons are confined to elementary facts, modes, methods, principles and practice, connected with the selection of varieties and species, propagation and management of small fruits, orchard fruits, nut bearing trees, ornamental trees, shrubs and grove, shelter belt and forest trees in the prairie States. As we have no class book covering this ground, instruction is imparted by lectures, object lessons and practice.

I am glad to report a constantly increasing interest on the part of students from city and country, and that freshman and sophomore horticulture are now made optional studies in the ladies course.

The time allotted to horticulture in the sophomore year is mainly given to practical forestry, including the identification of species and varieties, their propagation, relative value of timber for varied uses, the relation of trees to climate, etc.

During the latter part of the term the selection, propagation and management of ornamental trees, shrubs, flowers, bulbs, etc., are considered in connection with campus and garden studies of growing specimens with view to needed familiarity with the habit and expression of species and varieties.

In the junior year the students in the agricultural course use in the first term Lindley's Theory and Practice of Horticulture as a text-book.

While many of Lindley's lessons are not applicable to our peculiar

soil and climate, the use of his text permits generalized statements and discussions on modes, methods and principles as modified by extreme variations of climate and soil.

With the aid of the supporting studies in natural science the junior student is able to consider intelligently all questions pertaining to seed germination, root and stem growth, action and structure of leaves, maturation of fruits, temperature and moisture of air as affecting plant growth, heat and moisture of soil, climatic adaptation of plants, diseases of plants, and the reasons for the varied systems of propagation, pruning, training and improvement of plant races.

During the second term of the junior year three lessons per week, with field and laboratory practice, are devoted to the application of facts and principles previously considered. As this class is relatively small, much use can be made of the object lessons of the campus, arboretum, nursery, horticultural museum, the graft room, the plant house, etc.

In a general way I am pleased to report that I am constantly receiving favorable statements in regard to the creditable and useful work of members of the horticultural classes of the past ten years, as horticultural teachers, department managers, officers of horticultural and forestry associations, writers for the press, and as pioneers in their respective localities in the introduction and culture of the best small fruits, orchard fruits, forest and ornamental trees, shrubs, flowers, vegetables, etc.

EXPERIMENTAL ORCHARD (NO. 1).

My initial work on the college farm was the filling of the few vacant places in the fine young orchard planted by Prof. Mathews and Prof. McAfee. It contained in 1887, over 1,200 trees, of about 120 varieties, all of which were considered by the planters reliable, or at least promising for culture in this climate.

In the biennial report of 1882 and 1883 I said:

In common with all orchards in this region, on rather low wet soil, the last test winter either killed or irreparably injured all trees of the grade of hardiness of Ben Davis, Jonathan, Dominic, Fulton, W. W. Pearmain, Stark, Red June, and even Saxton Strips. Fameuse, Gros Pomier, Cole's Quince, Walbridge, Plumb's Cider, Willow, Roman Stem, and others of this grade of hardiness, were not killed, but more or less lowered in vitality.

The absolutely perfect trees are the Duchess, Wealthy, Tetofsky, and the crabs, of the one hundred and twenty sorts shown on the plat.

Plumb's Cider and Drap de Or are perhaps, next to the above, the most perfect trees in the whole collection.

This wrecked orchard is a lesson in experimental horticulture applicable to a large portion of the central district, with rather moist, rich, dark-colored soil.

In the report of 1885 we reported :

The still more severe winter of 1884-5 has about completed the destruction of these hardier sorts of the old list on the College grounds, leaving the Duchess, Wealthy, Tetofsky, and the crabs, alone in their glory amid the wreck of one hundred and twenty recommended varieties, and promising seedlings having a local reputation in some parts of the State.

We now report the ground cleared, with the exception of the few iron-clads reported sound in 1885 and a few trees of Gros Pomier and Plumb's Cider that may yet produce some fruit.

EXPERIMENTAL ORCHARD (NO. 2).

Adjoining the site of the wrecked orchard, on less favorable soil, is located the—so-called—Russian orchard. This was started in 1878, 1879 and 1880, with a view to testing the hardier varieties then obtainable in this country or Europe.

In addition to about one hundred varieties of the Russian apples from the coast provinces and from Moscow, it included an almost equal number of promising seedlings and new sorts from the most trying portions of Maine, Vermont, Canada, Wisconsin, Minnesota, and Iowa, with all of the seedlings to which the Iowa State Horticultural Society had awarded special premiums. It is in no sense a test of the relative value of the Russian apples for central Iowa, as it does not include the varieties personally selected later from the corn-growing provinces of south central Russia.

Yet, after the winter-killing of nearly all of the American seedlings and the loss of several varieties of the Russian apples that do well farther north, by blight, visitors from our own and other states unite in the expressed belief that it is the most interesting and valuable collection of hardy varieties of the apple on this continent.

If confined to the varieties that have fruited in this orchard, we would be able to select satisfactory lists of varieties for every neigh-

borhood of the great northwest north of the 42d parallel, and many varieties that will prove valuable for summer, fall and early winter use to the south line of Iowa.

Of the many varieties of the American seedlings we are pleased to report favorably on the hardiness of tree and desirability of fruit of the following :

Iona Keeper.—This was originated by the lamented G. A. Knowles, of Black Hawk county, Iowa, and was awarded a premium by our State Society I think in 1878. Fruit above medium in size, dark red in color, fine fleshed, sub-acid, good in quality. Season, late winter.

Windsor Chief.—This was received from J. C. Plumb, of Wisconsin, as Hill's No. 2 in 1879. Fruit small to medium in size, four-sided, yellow with dots at top and pale red at base; flesh firm, sub-acid, better than good. Season, late winter.

Scott's Winter.—This was received from Dr. T. H. Hoskins, of Vermont, in 1879. Small to medium in size, with shape and color of Winesap, fine fleshed, quite acid, and prime keeper. When mature in spring its acidity is toned down and it becomes a fairly good dessert fruit.

RECENTLY IMPORTED VARIETIES OF THE APPLE.

The varieties of the apple personally selected in the corn, melon and tomato growing provinces of south central Russia, in the fall of 1882, have proven unexpectedly hardy and blight proof. These varieties have been propagated as rapidly as possible and widely distributed for trial, and the unexampled severity of our recent winters, with the heat and drought of the summers of 1886 and 1887, has given us a rare opportunity for a severe test of their ability to endure every possible extreme. On the College grounds they have, as a rule, been colored less in wood by our winters, and have made stronger growths from the terminal buds during our dry summers, than the Duchess.

We are also pleased to report that some of the varieties—top worked on Duchess—have already fruited, and that their time of ripening in this climate does not vary materially from that of their native land.

As examples, the Arabka and Winter Apport of Saratov, Russia, as grown, the past hot, dry season on young trees, are as firm and crude on the first day of November, 1887, as we found them on the Volga in the autumn of 1882.

Some of the fine winter apples of Poland, Silesia and Transylvania also promise to prove valuable in the south half of the State.

As we keep a ledger record with each variety sent out for trial, we shall soon be able to furnish exact information in regard to their behavior and relative promise, in bulletin form.

EXPERIMENTS WITH THE PEAR.

On the College grounds the last traces of our common varieties of the pear, that do well in some parts of the eastern States, disappeared after the winter of 1884-5.

With two years additional experience on our home grounds, and at our trial stations, I can repeat the language used two years ago in regard to some of the varieties of the pear we imported from south central Russia:

After careful study of the pears of east Europe in the summer of 1882, I could see no reason why the fine culinary varieties of the Volga, and some of the fairly good dessert pears of the black soil sections of central Russia would not succeed as well with us as the Duchess apple. After carefully watching the behavior of these varieties on the State grounds and in other parts of the cold north, we still believe the trees as hardy and as nearly blight proof as the above apple. But the coast varieties of Russia and those of Silesia and east Poland have shown a tendency to blight and premature loss of foliage.

We are now pleased to add that the Gakoosky pear seems to be hardier than Duchess apple and that two varieties of the pear from extreme northwestern China seem to endure our summers and winters as well as our native plum trees.

We are also pleased to state that up to the 43d parallel the famous seedless pear of Russia has been reported favorably from all our trial stations, and on our grounds it has maintained as perfect health as the Duchess apple.

EXPERIMENTS WITH THE CHERRY.

In our part of the State, and over a large part of the prairie states, the Early Richmond, Late Richmond and English Morello, have failed to endure our recent test winters. On the College grounds we have not a tree or sprout left of any one of the varieties of the old list.

On the other hand, the fine varieties we introduced in the spring of

1883, from Poland, Silesia, and south central Russia, have remained perfect in wood and foliage; even the little trees that have been mercilessly cut for scions and for budding, have retained perfect health, and made remarkable growth the past two rainless summers.

Several of the hardiest and best of the varieties have already produced fruit of better quality than any variety yet fruited in the State; hence we can say, positively, that their timely introduction by the College will advance our horticultural interests very materially, and extend the profitable culture of the cherry far north of its present limits.

East Europe is famed for its excellent varieties of the cherry, and we have reason to believe that all of them will prove hardier in tree, more regular in bearing, and better in quality of fruit than the sour sorts from England and France we have hitherto tried to grow.

EXPERIMENTS WITH THE PLUM.

In nursery and orchard we are making a specialty of testing the many fine native varieties of the plum for which the prairie states are noted. We are also testing and sending out for trial many varieties of the plum imported from northeast Germany and central and south Russia.

We shall watch with much interest the trial orchards of mixed varieties we have been able to establish in different parts of the State. These mixed trial orchards of best native and foreign varieties will not only tell the story as to the relative value of each sort for varied uses, but will furnish needed information on the question of cross-fertilization of varieties, with a view to increased fruitfulness and the production of valuable new varieties from seed.

EXPERIMENTS WITH THE APRICOT.

In addition to the selected varieties of the Russian apricot, we have introduced a valuable variety from the Province of Sheuse in northwest China. This is a rapid growing tree, hardy enough for the south half of the State. In expression and size and quality of fruit, it seems equal to the best of the French apricots.

EXPERIMENTS WITH THE PEACH.

We introduced six years ago several varieties of the peach from northwest China. Some of these have proven much hardier than any variety of this fruit yet tried at the west.

In south Iowa, Illinois and Indiana they have proven hardy, where Hill's Chili and Wager have been frozen to the snow line.

Two years ago we secured some pits of the peach from Russia; one of the seedling varieties has endured the two past severe winters about as perfectly as the Miner plum of the same age.

We do not hope to secure peaches that can be grown profitably north of the forty-first parallel, but we have demonstrated that the peach belt can be moved northward many miles.

EXPERIMENTS WITH THE ALMOND.

We find the Russian varieties of the almond to be as hardy with us as the hazel, and to produce flowers and fruit abundantly. The almonds resemble those of the shops, but are not valuable for dessert use. But they are valuable and interesting as flowering shrubs, and have a possible value for crossing with the varieties of the sweet almond grown in California. We shall attempt this promising cross next spring.

EXPERIMENTS WITH THE GRAPE.

The College vineyard is mainly planted with such well known sorts as Concord, Worden, Moore's Early, Cottage, Telegraph, Coe and Elvira. At the commencement of the dry period in 1886, it was quite heavily manured for the first time since it was planted, ten years ago. The manure worked in the soil by cultivation has seemed to aid the vines in carrying a full crop of perfect fruit the past two dry seasons.

Our younger plantations contain about all the promising new varieties, many of which are not yet on the market.

EXPERIMENTS WITH OTHER SMALL FRUITS.

We are testing all the new varieties of the raspberry, blackberry, dewberry, strawberry, currant, gooseberry, juneberry, etc., that we have reason to believe promising for culture in any part of the State, with a view to intelligent public reports as to their relative value.

EXPERIMENTS WITH ORNAMENTAL TREES AND SHRUBS.

With a view to adding to our restricted list of really hardy and beautiful ornamental trees and shrubs, we have introduced for trial a great number of varieties and species from east Europe, central

Asia and northwest China. After a careful inspection of these the past summer, President T. T. Lyon, of Michigan, wrote: "Large importations have also been made of such hardy forms of useful as well as ornamental trees, shrubs and plants as showed an apparent adaptation to that severe climate, and hence gave promise of success here. The quality of these introductions of both plants and fruit trees constitutes a wealth of possibly useful and valuable material, greatly in excess of public apprehension."

EXPERIMENTAL NURSERIES.

At this time of orchard troubles in the prairie states it is specially desirable to gather reports in favor of, or against the varieties of new fruits, trees and shrubs from varied parts of the State. It is too evident for discussion that reports from disinterested amateurs located on the varied soils and elevations in all parts of the State, and the northwest would have more value after one test winter than reports from a single station for a quarter of a century. Hence during the past eight years we have propagated for distribution the most promising new fruits—native and foreign—of the apple, pear, cherry, plum, apricot, peach, ornamental trees, shrubs and forest trees.

As the scions, cuttings, etc., must be cut from trees and shrubs on our own grounds, we have been forced to use our first plantations as stools to be annually cut back for scions and cuttings.

Hence many visitors are surprised to find scattered here and there collections of the orchard fruits, forest trees and ornamental trees and shrubs that look like the stubs of trees and the bushes in an old sheep pasture.

We are now pleased to report that we shall commence next spring the setting of orchards, shrub collections, arboretum collections, etc., that will not be deformed, and in most cases ruined by annual cutting back of the new growth for propagating purposes for our trial stations.

ARBORETUM.

In the way of groups and isolated specimens on public grounds and in plots and groups in the horticultural grounds, we have specimens of about all the trees and shrubs, native and foreign, that will live in our climate. The present arrangement is manifestly best for the landscape effect of the public grounds and its surroundings, but in

the near future we hope to commence the work of systematic planting of an arboretum that will be creditable to the State and College.

EXPERIMENTS IN CROSSING.

Believing that we shall make in the future, as in the past, very slow advances in the way of valuable and permanent additions to our list of orchard fruits by picking up stray seedlings, we have commenced the work of systematic crossing and hybridizing of the apple, cherry, plum, grape, etc.

During the past two years we have crossed the blossoms of the hardiest known varieties of these fruits with the pollen of the varieties producing fruits best in quality. We have the best reasons for believing that we will reach valuable results from this systematic crossing of varieties, combining the two essential requisites of fruits to be profitably grown in our climate.

DEPARTMENT NEEDS.

Ten years ago we urgently asked the legislature to appropriate the sum of six thousand dollars for a horticultural laboratory, with class rooms, office, seed room, work room for students, horticultural museum room, etc., with attached structures for propagation, plant house, cellar, etc. The appropriation actually made to meet all these imperative needs, was \$2,500.

The imperfect facilities provided by this small sum have been utilized to the best possible advantage, but they are now, and have been for several years, the laughing stock of visitors from other states. The class room is too small for the freshman class; it has no office or library room, no laboratory work for students; the museum in the attic has been for years too crowded with specimens for admission of visitors, and the propagating and plant room is discreditable to the College and the State.

The present building and cellars are needed for storage and general horticultural museum. With an appropriation of \$1,000 for needed changes, repairs, tables, cases, shelving, etc., we could in five years, with the available material now on hand, build up the most attractive and instructive horticultural museum in the country.

The new building should contain a commodious class room, laboratory work room, office and library, with attached propagating house and green house like that of the Indiana Agricultural College, of the

Michigan Agricultural College, of the Minnesota University, and, indeed, most of the agricultural colleges of the different States.

The estimated cost of these structures, built in substantial and durable manner, will not exceed *seven thousand dollars*.

REPORT OF THE SCHOOL OF VETERINARY SCIENCE.

—
M. STALKER, PROFESSOR.
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I can report for the school of veterinary medicine that it is in a healthy growing condition. Something more than thirty special students have been enrolled during the past year. There is a lively interest in the work on the part of students, and the future of the department looks altogether encouraging. As a faculty we have decided that two years does not afford sufficient time to acquire the thorough scholarship that is demanded by the progressive state of veterinary science. This has led to the adoption of a three years, in the place of a two years course of study. Under the new arrangement we hope to make the work much more satisfactory than in the past.

The department has some small needs. We have but one lecture room, while two, and sometimes three classes are in progress at the same time. I would earnestly request you to include in the list of appropriations asked from the legislature a sufficient sum to build an extension on the south end of the sanitary building, say twenty feet in width and the height of the present structure. This would furnish us a convenient lecture room on the first floor, and a microscopic laboratory on the second floor, with one or two additional rooms above. This would give us a laboratory of sufficient room to accommodate the class at one time. Our present accommodations are so restricted that only a limited number of students can engage in laboratory work at once, thereby dividing the class so that four or five afternoons per week are required to do the work that could be performed in one afternoon.

M. Turner estimates that a building could be constructed at a cost of \$1,500 or \$1,600.

Under our new arrangement this becomes a necessity, and I believe the legislature will readily appropriate that sum for the purpose mentioned.

It would be most desirable to have electric lights in the department, especially in the veterinary hospital. This would materially lessen the danger from fire, and would also give us the opportunity for using the current in surgical operations.

Many of the most skillful and scientific operations involve the use of electricity. This would be a most important means of instruction to the students, as well as furnishing valuable assistance in practical work.

Some slight repairs are required on the hospital building which should be made at once, as the roof supports are in such a condition as to endanger the building in event of a heavy fall of snow. Thirty dollars, or even less will make the needed repairs.

The patronage of the hospital during the present year has been very satisfactory. We have admitted two hundred and forty patients; many of these have been kept in the hospital for continuous treatment. We have placed the charges as low as possible to encourage stockmen to furnish clinical material. This is absolutely necessary in order to furnish the necessary amount of practical work for our students. The college can well afford to sacrifice a small sum in order to promote this branch of practical instruction. The receipts, \$2 per week for each patient, have probably not covered the actual expense.

We have been able to secure gratuitous courses of lectures from Dr. Schooler, of Des Moines, Dr. Cruttenden, of Des Moines, and Dr. Niles, of Webster City, the college paying the actual expenses of these gentlemen.

It would be well for you to make provision for a similar course of lectures for the coming year. If you can see your way to the appropriation of \$250, it would enable us to secure a requisite number of lectures from non-residents and give a compensation of about \$5 per day.

I recommend Dr. John Tillie, D. V. M., for the position of house surgeon for the year 1888.

REPORT OF THE DEPARTMENT OF MECHANICAL ENGINEERING.

NOELMAN C. BASSETT, PROFESSOR.

In my report for 1884-5 the following statement was made: "During the past year a wing sixty feet by thirty has been added to the engineering hall. This addition supplies all needed space for classrooms and machine-shops, but there is not as yet a sufficient equipment to enable us to obtain much benefit from the use of the new rooms."

The latter part of this statement yet holds good in part. That additional space in the machine shop is still almost vacant, notwithstanding the considerable purchase of machinery in 1887, and because of a lack of the machinery which should fill it, our students still have to wait their turn to use what machines we have, causing a loss of time and a degree of discouragement that the State of Iowa ought not to permit.

An increase of manufacturing is the one thing that the business interests of Iowa demand, and it is to the coming man trained from boyhood up, as a mechanic and engineer, that we must look for such increase. The failure of the old apprenticeship system makes it imperatively necessary that the State should train her young men as mechanics and engineers. No other investment will yield so large or so quick a return.

Iowa stands nearly or quite at the head of all the states in the number and excellence of public schools, but in the education of young men for the industrial pursuits, particularly in the direction of manufacturing, she stands well toward the other end of the list.

Our mechanical department is the only school of its kind in the State, and yet we have facilities in our machine shop for the instruction of only six or at most, eight, students at one time. Our last

freshman class numbered twenty-six at the beginning and sixteen at the end of the year. We were compelled however to omit shop instruction for the civil engineers, nearly one-half the class, because we had no machines or tools for them to use.

I wish to call attention also to the condition of our steam plant. The boiler which is now used for both electric lighting and shop power, is an old, badly set, and much-repaired affair. It is very near the dangerous stage, and should be replaced by one, or two taken together, of larger capacity. A new boiler house complete should be erected in such a location that the new boilers can be used for the electric light engine at night, and for the shop engines during the day.

There is now in connection with the College, no means whatever for extinguishing a fire in any of the buildings. Also, our present water supply is hardly sufficient and the water is so strongly impregnated with lime as to be unfit for use in steam boilers. I would therefore recommend that an artesian well be sunk until water of sufficient purity and quantity is found, and that a suitable steam pump be placed in connection with the new boilers for water supply and for protection against fire. There is a strong probability that either coal or natural gas, or both, will be found while boring for the well, and a fuel supply thus developed, which may be exceedingly valuable to the College. Complete detailed plans have been drawn, showing the location and arrangement recommended for all of these improvements.

The cost of machinery for the use of students in the machine shop will be \$3,000.00.

The cost for boiler house, boilers, smoke stack, water tank, artesian well and steam pump will be \$4,000.00.

In my last report I stated that a radical change had been made in the method of giving instruction in shop work—the change being from what is known as the Russian or exercise system which does not produce anything useful, to the manufacturing system, all of the products of which are to be used in the shops or sold in the market. This change has resulted in a marked improvement both in the interest of and progress made by the students. In fact, quite a number of students have asked for extra shop work. The last freshman class voted unanimously to have shop work on Saturday in order that they might have a full, uninterrupted day. When a whole class

of students will voluntarily forego the weekly holiday with its accompaniments of base ball, fishing, etc., and work in the shops instead, it shows that they get something which they need and appreciate.

During the past two years the students have made in the carpenter shop ten carpenter's benches, with tool cases complete, forty desk stools for the mechanical drawing rooms, eighteen small instrument cases, over seven thousand cleats for the Edison Electric Light Co., thirty wood screw clamps, two hundred and twenty turned cedar posts, one black walnut office desk, one oak wash stand, one oak dressing case, and have done about one-half the work on a fine wardrobe bed. In addition to the above a large variety of work which cannot be listed here has been done for the College.

In the machine shop the students have made ten carpenter's and machinist's vises, together with various tools and pieces of apparatus for the department, one adjustable speaker's stand, and two improved letter presses of original design; also a small steam engine, which had been set aside as useless, has been worked over into a model for illustrating the action of valve gears and thus made of value in the study of the steam engine. When contemplated attachments are added to this model, it will be worth at least \$300 to the department.

On commencing my work at the College three years ago, I took out from the general free hand drawing classes all engineering students, in order that I might give them such instruction in that line as would better fit them for industrial pursuits. During the fall term just closed, the general classes were also placed under my instruction, owing to the resignation of the teacher of drawing. By action of the Board of Trustees at their last meeting, all of the free hand drawing was placed permanently under my charge. I can now make this a complete course of industrial drawing, consistent with the purposes of the Institution. During commencement week of each year all drawings made by students are placed on exhibition at the Engineering Hall, together with all shop work retained by the department, and the closest inspection is invited.

Since my last report material changes have been made in the course of study in mechanical engineering. The French has been moved from the junior and senior to the freshman year, and reduced from three to two half years. English literature has been introduced into the junior year, while psychology and history of civilization have

been entirely omitted from the course. It is my judgment that it is of advantage to the student to take the general studies so far as is possible early in the course, and to devote the senior year exclusively to special engineering work. Also that it is more directly beneficial to the student to attain a more complete mastery of English than to attempt philosophical studies. My position in regard to these changes is abundantly supported, for it will be found on comparison that the mechanical engineering course, as laid down in the catalogue for 1888, is in substance almost identical with such courses in all of the leading engineering schools of the country.

It is the policy of the mechanical department to give its students a training so practical and thorough, both in shop work and drawing, that it shall enable them as machinists and draughtsmen to earn a living, to get a foothold, immediately on graduating from the College. At the same time the course of study and practice is sufficiently comprehensive and liberal to give our graduates a strong impetus toward the higher positions in their profession. The wisdom of this policy is clearly demonstrated in the record shown by the Worcester Polytechnic Institute, Worcester, Mass., for ninety per cent of their graduates are now working successfully in the professions for which they were trained. With liberal support our mechanical department will, in the near future, be able to show an equally favorable record.

DEPARTMENT OF CIVIL ENGINEERING.

CHARLES F. MOUNT, PROFESSOR.

In the past two years the course of study in this department has been made much more technical, and hence more valuable to the student desiring to follow the engineering profession in after life.

Many studies, not directly connected with the work, have been discontinued and others more closely related have taken their place. The engineering and mathematical studies now embraced in the course are algebra, geometry, trigonometry, land surveying, railroad

surveying, analytical geometry, calculus, analytical mechanics, descriptive geometry, stereotomy, physics (including electrical engineering), roof and bridge designing, retaining walls, resistance of materials, lectures, reading and recitations upon such subjects as foundations, cements, mortars, piling, specifications, contracts, water supply, drainage, sanitary engineering, etc. In each and every subject taught special effort is put forth to make the work practical. In land surveying the student makes surveys of fields as they exist, preparing maps of the same drawn to a scale, calculating their contents and locating any prominent object that the field may contain. In railroad surveying the student lays out in the field, special problems in simple, compound and reverse curves, turnouts, crossings, locates frogs, makes a preliminary and locating survey of a few miles of road, stakes out the cuts and fills, and finally prepares a map showing profile, location and all the prominent topographical features of the line.

In descriptive geometry a thorough knowledge of the principles is a prominent feature sought for. Each student is required to prepare a complete set of some twelve to fifteen plates, each plate being a graphical representation of from one to half a dozen of the problems as studied in the class-room.

In bridge designing the student learns to calculate the stresses, not only in the truss members, but also in the pins, plates, rivets, beam hangers, beams, joist, posts, etc., in the bridge. Each student must prepare a complete design of a highway bridge, including working drawings of all the parts. In this way the student becomes familiar with the application of the theory to practice, and what is equally important, the modifications of theory in practice, on account of economy in work and ease of manufacture. In short, the object in all the instruction given in the department is to be as practical as possible, and also to give a thorough knowledge of the underlying principles.

The department is supplied with three transits, with such attachments as solar compass, gradienter, stadia wires, vertical arc, variation plate, shifting head, etc., two levels, a solar compass, surveyor's compass, chains, tapes, poles, pins, level rods, cross section and stadia rods, maps, stereotomy models, blue prints, tracings, etc., of bridges, culverts, trestles and other engineering structures, including a fine set of blue prints of the working drawings for the bridge across the St. Lawrence, at Lachine, Canada.

Its library of reference is being increased as rapidly as funds will permit, none but works of acknowledged excellence being purchased. The text books are changed whenever a work better fitted to the needs of the student is obtainable.

The department has no pressing needs, being well supplied with rooms and equipments, to the latter of which additions are being constantly made.

For a full list of studies, text-books and other information concerning the department the reader is referred to the catalogue issued by the college.

REPORT OF THE DEPARTMENT OF BOTANY.

BYRON D. HALSTED, PROFESSOR.

In botanical instruction the endeavor is to lead the student to feel that the best way to get a clear idea of plant life is to study the plants themselves. This is no easy task, especially as the beginning class is composed of pupils who have had no previous drill in that direction. They shrink instinctively from the task set for them, and often express the wish that the lesson in botany might be as clearly defined as that in algebra. A large part of the first term, therefore, is consumed in teaching methods of observations. Some pupils have a bent toward a study of natural objects, but the great majority inherit a love for book learning and think they require their lessons given to them in a stereotyped number of pages of text. The course in botany with the freshmen is mapped out with this aversion to the "new education" fully in mind, and there is a combination of the study of plants with the study of a text book. Care is constantly taken to have the particular work upon the specimens precede the discussion of the same subject in the book. For example, leaves are studied before anything is learned about them. First study the thing itself and afterward learn what others may have observed. The observing powers are to be awakened, and this is best accomplished by leading the pupil to read directly from the great book of nature. The course, in short, is intended to make thoughtful, conscientious, critical observers with sufficient book knowledge so that they will realize that others have read the same thoughts and gone much farther than they can hope to do in the limited time given them.

The roll of membership for the classes has been practically the same for the past two years, namely: two hundred and fifty pupils for each college year. The bulk of the students are in the freshman and sophomore classes. The regular work in botany for the science and lady students ends in the junior year. Provision is, however,

made for those who may desire to take special work to the end of the senior year. In the agricultural course a half-year of applied botany and another of diseases of plants are required in addition to the regular work above mentioned. The seniors in the civil engineering course study the structure of woods and the veterinary seniors have a course in bacteria and other plants injurious to live stock.

The freshmen, beginning botany in the fall term, gain a general knowledge of the structure of plants and their relations to each other. In the sophomore year the work is taken up with more thoroughness, and each pupil is required to make a herbarium of fifty species of wild plants, collected, classified, pressed, mounted and labeled by himself. This work takes the student out into the fields and woods and makes him familiar with the haunts, habits, time of flowering and other peculiarities of plants. Each student is examined separately upon the collection and is expected to be familiar with the name, order and characteristics of each specimen. During the second term fifty more species are added to the herbarium. The classroom work is divided between a study of the economic products of plants, the leading orders and the presentation of the reports of the students upon their topics of research. This last feature has proved so satisfactory that special mention is here made of it. At the beginning of the term each student chooses a subject upon which he is to make extended observations or experiments. It may be the classification of the species in some difficult genus, as the solidagos or asters; the number of kinds of plants growing upon an assigned area; a study of some complicated flower, as that of the milk-weeds or lobelia; or the pollen of closely and distantly related plants, etc.

Pains are always taken to keep the pupils away from books until their own observations are well advanced. During the same time that these class room exercises are progressing the same pupils spend three hours per week in the botanical laboratory. Each is here provided with a compound microscope and the necessary appliances for the independent study of the minute structure of all parts of plants.

In the junior year this laboratory work is continued, and three lectures per week are given upon the various groups of flowerless plants, including rusts, smuts, mildews, moulds, etc., followed by a course in vegetable physiology. A small collection of cryptogams is required this term. Beyond this the pupils become advanced students in botany and their work is determined in part by personal preferences.

Some are anxious to prosecute their systematic work still further, and such find ample means for this in the College herbarium. Others are intent upon a deeper knowledge of anatomy and spend their time in the laboratory.

The work with the several classes and special students consumes the greater part of my time, and being without assistance of any kind there is no possible opportunity for extended observations and experiments. However, some work has been done and much more stands ready to be accomplished. The experimental work of the first year covered by this report has already appeared in a bulletin of the botanical department, and the results of the year just closed will form another pamphlet before the next term opens. From these sources a brief outline of some of the work is here made.

The ergot of the wild rye (*Elymus Canadensis*) has been so abundant in some parts of the west as to be a serious matter to live stock feeding upon the ergotted grain. The infested rye grains were placed in moist earth in flower pots, and at the end of two months the spores were developed and ready to pass to the young rye flowers and reproduce the trouble. As far as can be learned this is the first successful attempt made in this country to develop these spores of the ergot. During the present year similar results were obtained with the ergot growing upon the squirrel tail grass (*Hordium jubatum*).

Tests were made in setting willow twigs top end up and the reverse in jars of water. The roots uniformly started from the tissue surrounding the buds, and never from the cut surface of the base of the twig. In many instances the first indications of roots could be found after the twigs had been in water for only a single day. The experiment teaches that willow twigs do best when planted in their natural position, i. e., top end upward.

The germination of red clover and timothy was the subject of investigations in the laboratory in the hope of determining some points in the growth of these plants. The results of these investigations have been published in the last report of the society for the promotion of agricultural science, and are too long to outline here. It may be said that considerable structural differences were found, and these may help to explain well known facts respecting these two leading farm crops.

The cup plant—a common rank sunflower—like composite (*Silphium perfoliatum*) is so named from the cups, made by the united bases of the opposite leaves. These cups hold considerable quantities of

water and often contain many insects of various kinds. The suspicion that the plant made use of these insects was strengthened by a microscopic examination of the inner surface of the base of the cups. Stalked glands were found there which are similar to those borne by plants, the insectivorous nature of which has been proved beyond a doubt.

The following are some of the conclusions arrived at by a study of the common dandelion: The flower heads open in early morning on bright days and close by ten o'clock, unless in the shade or the day is cloudy. The same head may open on three successive days at the most. After flowering the upright stalk bends down and outward until it lies upon the turf. In about four days the scape becomes thick and with a double curve like a long German pipe. At this time the stem begins to rise, and in two days it has become upright again with the head globular and each fruit with a feathery balloon ready for the wind to carry it away. Some of the stalks elongate eight inches in five days. The greater part of this takes place in the upper half and three-fourths of the elongation is made in the night time. The stem lengthens sometimes four to six inches after the seeds have all gone and the heads are "bald."

A series of observations was carried out upon the common thistle (*Cnicus altissimus*). The flowers are packed in a large close head and frequented by various kinds of bees. Heads from which insects were excluded by the use of cloth sacks did not ripen many seeds. This result accords with the generally accepted belief in the superiority of cross over close fertilization. An interesting sensitiveness was observed in the thistle's blossom. When kept in a room with all insects excluded the blossoms exhibited a quick motion upon being touched. The movement resulted in a drawing down of the ring of anthers, and the exposure of a quantity of pollen upon the hairy surface of the protruding style. The mechanism by which this movement is secured was determined and it has proved an interesting subject for laboratory students.

One of the most extended experiments has been with the casting of the seed coats in the process of germination. This work began with mustard, flax and other seeds, but for the past year it has been confined to different sorts of melons, squashes, pumpkins, cucumbers and gourds. All these last are members of the same family and have certain features in common. There is, for example, a structure developed in germination which is known as the peg, and serves the special

purpose of separating the hard thick seed coats from the embryo. After this end is reached the peg withers away. Many tests were made to determine the best position for the seed in the soil, and it was found that the young plants extricated themselves best when the seeds were flatwise. In this position the peg was able to act most advantageously. The results of these experiments were published in full in the July issue of Agricultural Science, and the last report of the Society for the Promotion of Agricultural Science contains additional facts from more recent observations.

The horseradish, although flowering freely, produces no seeds with us. An examination of the organs of reproduction showed that the pistils were apparently healthy, but the stamens were inferior and failed to produce plump pollen. This plant propagates so readily by its roots that probably there is no great demand for seed-production.

The systematic exclusion of pollen from pistillate flowers of squash, melons and cucumbers, led to some results which have attracted notice. In brief, the pistils from which pollen was excluded did not mature, but instead began to wither soon after the stigmas were ready to receive the fertilizing dust. This group of plants offered to the student of cross fertilization a wide and most encouraging field for investigation.

Perhaps the most valuable piece of work outside of class-room labor has been the establishment of the identity of a fungus which grows upon the red cedar, and a very unlike form upon the leaves of the wild crab (*Pirus coronaria*). The fungus upon the cedar forms knots of an inch or less in length, called cedar apples, and in moist weather of early spring are orange-colored and showy. The exterior is made up of many gelatinous horns, borne by the hard center. The jelly contains multitudes of spores, and when the weather is dry they are carried away as dust particles by the wind. These spores were sown upon the crab apple leaves, which were afterward covered with cloth sacks. In twenty-two days unmistakable signs of inoculation were manifest, and five days later the genuine leaf rust of the crab apple was evident upon the leaves. Repeated sowings, followed with the same results, and during the present year special students have successfully grown the cedar fungus upon the crab apple. Equally careful parallel sowings were made upon cultivated apple leaves of several kinds, but no rust followed. At the same time independent experiments were carried on by Mr. Thaxter at Cambridge, Mass. He obtained the same results, and it is safe to conclude that the cedar

apple fungus (*Gymnosporangium macropus* Lik.) and crab apple rust *Rossetelia pyrata*, Sch.), are forms of the same species. The polymorphic nature of various species of fungi is becoming a common fact, and one that the farmer and gardener needs to understand, as well as the metamorphoses of many of the insect enemies to cultivated plants. During the present year another species of the same genus with the cedar apple fungus, and not found at the College, was obtained from Massachusetts, where it infests the native dwarf cedar. Spores of this were sown upon various species of the apple group of plants, but without success, except upon the leaves of the juneberry or shadbush (*Amelanchier*), where the result was a rust known as *Rossetelia botryopites* Schwe. As there was no opportunity for natural inoculation through the wind, the results of this experiment are conclusive.

A considerable work has been done upon the weeds of the State. Although the prairie soil has not been long under the plow, it is surprising with what rapidity the various weeds have crept in and asserted their ability to retain a place whenever a foothold has been secured. For example, the spiny nightshade (*Solanum rostratum*), one of the worst weeds of the southwest, is destined to soon find its way into the cornfields of the State, unless speedy measures are used for its eradication. This year, for the first time, a number of specimens of the much-dreaded horse nettle of the south (*Solanum Carolinense*), have been found upon the College farm. If this species finds a congenial, unmolested place in our rich prairie soil, as it doubtless will, the farmers of Iowa will realize, some day, the importance of striking these enemies when they are weak in numbers. The best way to begin a systematic fight against weeds is to become acquainted with their habits and their strong and weak points. To this end it is hoped that a preliminary list of our weeds, stating the habits of each, will be considered as a step in the right direction. It would add to the value of this publication (which it is hoped will appear next year), if farmers would send contributions. It is especially desired that a full list of the common names of our weeds be obtained. The "red root" of one section is not that of another, and the "daisy" is a very general term applied to a long list of species.

The needs of the Department of Botany are many. A plant house in connection with the department would supply the classes with fresh material at times when none can be obtained elsewhere. There should be a botanical garden as an educational feature of the Institution. In this, plants could be arranged according to their affinities,

bringing together species from all parts of the world, and thus aid the student in obtaining a broad grasp of the affinities of plant life. The green-house and garden would work together and aid each other. Many experiments, now impossible, could be conducted if a place for growing plants indoors was provided. Of course such improvements would require a liberal appropriation and annual supplies of funds for their proper keeping and development.

It would be a great relief to have a room where plants can be assorted, pressed and prepared for the herbarium. This work is now done in the general laboratory, at times when students are not present, and it necessitates the daily cleaning up of tables and floor by the teacher, thus taking much time and destroying any continuity of effort in herbarium work. A loft over the herbarium has been asked for, but this is low, hot, and only reached by a ladder.

The severe drought of the last two years has made the work much harder than usual in this department, but it is a pleasure to report progress along every line. There seems to be a growing interest on the part of students, which is the chief source of gratification to the one in charge.

DEPARTMENT OF ZOOLOGY, ENTOMOLOGY AND GEOLOGY.

HERBERT OSBORN, PROFESSOR.

The following summary will indicate the classes taught in this department during the past two years, with the enrollment in each:

FIRST TERM.	1886.	1887.
Senior class in geology	17	21
Junior class in zoology (Vets. included for 1886)	20	15
Junior veterinary class in zoology.....	—	14
Sophomore class in entomology.....	36	47
Special and post graduates	2	1
Totals.....	75	98
SECOND TERM.		
Senior (agricultural) class, farm insects	—	3
Junior (Vet.) class, animal parasites	10	8
Sophomore class in zoology.....	22	24
Freshman class in zoology.....	68	42
Special and post graduates	4	2
Totals.....	104	79

The course of study remains, in general, as outlined in previous reports, such changes as have been made being simply in the character of the work taken up in certain terms. Such modifications have been made with a view to securing more thoroughness and completeness in the course as a whole.

In the fall term of the freshman year students begin the study of zoology, using an elementary text-book, which is largely supplemented by practical work in examination and drawing of living animals. Special attention is given to anatomy and physiology of typical forms, their habits and distribution; and the term's work is closed with an outline of classification.

The first term of the sophomore year is devoted to entomology. Lectures, class discussions and special papers occupy the time in class-room, and each student makes dissections and drawings of representative species, and collects, prepares and classifies a given number of specimens, preserving them in a neat, cork-lined box. As far as possible, species of economic importance are treated in detail, and remedies and preventive measures discussed.

In the second term of the sophomore year is begun the advanced study of comparative zoology. Three hours per week are spent in the laboratory in dissection and microscopical study of forms which furnish a basis for lectures, recitations and papers in the class room. This term is occupied with invertebrate animals, and in the spring term of the junior year the subject is continued in a similar study of the vertebrates. In both terms students make such collections as are possible, in the latter term learning to preserve skins of birds and mammals. These collections, though belonging to the student, are frequently donated to the department, and thus useful specimens added to the College collections.

Geology is taken up in the first term of the senior year and embraces: a thorough study of the principles as given in Lecont's "Elements of Geology"; lectures on the geology of Iowa; a study of typical rocks and fossils, and preparation by each student of two or more papers on special topics relating mainly to economic geology. In addition to these regular lines of study, students pursuing special lines of study, regular students in junior and senior years and post graduate students may take advanced work in the department. While such work will be adapted as far as practicable to the special wants of each student, it will in general consist of laboratory work in histology, embryology, etc. of certain groups of animals.

The equipment of the zoological laboratory consists of twenty-four microscopes (Beek "economic" and histological dissecting) section cutters, microtome, injecting apparatus, chemical reagents, staining and injecting fluids and other apparatus and material for microscopical study and gross dissection. A supply of marine animals, properly preserved for laboratory work is kept on hand and native specimens are preserved in quantity or collected as needed.

The zoological museum includes mounted specimens of a number of native and foreign mammals; several hundred birds, representing quite fully the species found in the State; a large collection of reptiles and batrachians in alcohol; a collection of Pacific coast fishes,

donated by the United States Fish Commission; a few native fishes, and a small but typical collection of lower invertebrates with a set of glass models representing delicate marine forms. The collection of shells has been considerably enlarged and now contains, beside numerous native species, sets from the Pacific coast, from Alabama and Georgia, from Tennessee, and odd specimens from various parts of the world.

The collection of insects embraces a large series of native species in many instances all stages in the life history of an insect being represented, and special care has been taken to secure the species of economic interest. Cases containing typical species in the different orders and families of insects, and sets illustrating the species destructive to certain crops have been placed in the general exhibition rooms, while the main collection is accessible to any one wishing to refer to any particular group or species.

There are also collections of nests and eggs of birds, and of skulls, skeletons and brains of vertebrates. A set of Ward casts illustrating the principal fossils is of service both in zoology and geology. The geological collections contain examples of the principal ores, minerals and common rocks; a set of Iowa fossils, samples of coal, etc. Among the additions to the museum during the past two years I may mention, a Rocky Mountain sheep, a number of interesting Australian mammals, a set of Iowa shells and a number of interesting marine invertebrates. Considerable time has been spent in the arrangement and classification of specimens. Work to which there is no end.

Correspondence relating to injurious insects has as usual occupied considerable time and I have continued observations and experiments upon destructive and beneficial species. The past season has been marked by very extensive losses in the State from chinch bugs, turf web-worms and various other insects. Appended I give fuller data concerning the chinch bug with recommendations of remedial and preventive measures. Papers giving details of observations and experiments will be published by the department of agriculture, in reports of State societies and College bulletin with a view to distributing as fully as possible such information as will be of value to the cultivators of the State. I may add that I should be pleased to have specimens of injurious insects forwarded as soon as they appear at any point and will cheerfully give such information as I can concerning them.

NEEDS OF THE DEPARTMENT.

I beg once more to call attention to the pressing need of a building especially designed for museum, laboratory and class rooms. As at present located visitors must climb to the third floor of the main building and grope their way through dim corridors to reach the museum. It is distant from the laboratory and lecture room in north hall, making it most inconvenient to use as an adjunct in teaching. Specimens used for illustration must either be duplicated and given shelf room in the laboratory or carried back and forth while many of the more bulky ones can only be used by sending students on special trips to examine them in the museum. Moreover the museum rooms are too small for proper exhibition of specimens now on hand, and will not admit of further growth without serious crowding. The collections are already too valuable to run the risk of being kept in a building liable to fire, crowded with students and provided with necessary heat and light. The present rooms can be fitted for dormitories at slight expense, and would furnish rooms for forty students.

The room at present occupied for laboratory will only accommodate ten or twelve students conveniently, though we have often been obliged to have fifteen to eighteen working at the same time, besides dividing the class into sections, working on alternate days. This renders laboratory work for the freshman and spring term sophomore classes, for the present, entirely out of the question.

The lecture room will accommodate only about thirty students, and the larger classes have to meet in the lecture room of another department. A building suitable for the department should be fire proof; not combined with any rooms where there will be occasion for lights at night; provide museum rooms, laboratory, lecture rooms, office and rooms for taxidermy, insect preparation, breeding, etc.

It should be built in a durable manner, and cost not less than eighteen or twenty thousand dollars. If deemed desirable, it could be made to furnish room also for the botanical department, thus setting free rooms that could be used by other departments already crowded.

THE CHINCH BUG (*Blissus leucopterus* Say).

The extensive ravages of this pest during the past season, which have no precedent in the history of the State, together with the present strong probability that it will be equally destructive, perhaps

more so the coming year, make it important that the fullest knowledge of its habits and the best known methods of preventing its damage, should be thoroughly distributed throughout the State.

According to the Iowa crop report, issued July 10th, this insect had already caused extensive losses in three fourths of the counties of the State, and its damage to one crop, spring wheat, had run into the millions of dollars. Later damage to other crops must have been even more important, but it is not easy to estimate the proportion of damage to be referred to chinch bugs and to drought, respectively.

LIFE, HISTORY AND HABITS.

The life, history and habits of the species have been very fully recorded, it having been studied in detail by such entomologists as Fitch, Riley, Walsh, LeBaron Shimer, Thomas Forbes and others. The facts here stated must not therefore be looked upon as given with any claim of originality though I have, I think, verified by personal observation nearly every statement here recorded.

At the present time (winter) chinch bugs are in the adult stage and may be found secreted under grass, dead leaves, rubbish of various kinds both in the fields and in thickets or timber, especially along borders of thickets or wood, under leaves, loose bark, etc. In the spring these adults issue and after finding suitable plants for the food of the young deposit their eggs. The eggs are about one-thirty-second of an inch in length, rather slender, slightly curved, of a yellow color and one end (the head end) is truncated or apparently cut square across and on this end are four small granules or tubercles, too small to be seen with the naked eye. The egg becomes darker as it nears the time for hatching and at the head end the eyes may be seen plainly through the egg walls. Each female is said to be capable of laying about five hundred eggs, occupying about twenty days in their deposition so that if wet weather destroys those deposited at one time, others are likely to escape. The process begins in April (possibly earlier in favorable seasons) and extends into May. If wheat is available this will be the principal crop attacked at this time, but eggs may also be laid in oats, rye, barley, corn and various grasses. The bugs depositing eggs live for some time afterward; if plenty, may even do some damage to the crop but usually they are too few in number to cause trouble and they gradually die off till by the time their off-spring mature they are mostly dead.

The eggs hatch into minute yellow or light red bugs which have the same general form as the adults. They begin feeding on the roots of the plant where the eggs were laid. (Eggs, it is said, may be laid above ground but they are almost always found on the stems or roots of the plant, half an inch to an inch or more beneath the surface.) After growing for a time the larva sheds its skin, assuming a darker color, but retains a light band across the middle of the back. After growing for another period it moults again, assuming after this moult a brownish color with a whitish line across the back. After still another moult it becomes nearly black save the white band on the back and in this stage the wing pads become well developed, indicating the pupa stage and when another moult occurs (really the transformation from pupa to adult,) the insect assumes the winged condition. It is now three-sixteenths of an inch long, of a deep black color and with white wings which have a black spot on the border near the middle. Bugs which have hatched in April or May become mature in the latter part of June or in July and after pairing another lot of eggs is deposited to produce a second brood of bugs. The bugs which have been feeding in wheat, however, find upon its ripening that they must migrate or starve so that there is a general movement of bugs, both mature and partially developed from wheat fields into corn, etc., accomplished as a rule on foot by the winged bugs as well as the immature ones. Sometimes in July there is a general flight of bugs and at such times the air will be loaded with bugs and fields which have not been previously infested will swarm with them. This is bad enough but as each female of this swarm deposits hundreds of eggs, it is not long till the field is so packed with bugs that the plants rapidly succumb. On corn they will cluster on the stalks from the roots to near the tips of the leaves while on grasses such as Hungarian, fox-tail, etc., every part of the plant may be crowded with them. The second brood attains its growth during the late summer and fall and by the time cold weather approaches nearly all have reached the mature form and are ready to secrete themselves for the winter.

REMEDIAL AND PREVENTIVE MEASURES.

Prof. Forbes, State entomologist of Illinois, in a recent bulletin makes the following pertinent remarks concerning the general neglect of applying remedies for this pest:

"There is a general but mischievous impression among the farmers

of this State, especially to the southward, that it is useless to contend against the chinch bug, and that its visitations must be received, like those of the drought and the tornado, as evils beyond our power to prevent or remedy. A careful study of the literature of the subject, several years' observation in the field, and some experiments, have convinced me that this belief often doubles, at least, the calamity of the outbreak, by discouraging at the outset any except sporadic and individual measures of defense. This discouragement is, of course, not without its reasons. Commonest, I think, are the following:

"1. In this, as in many other cases of insect injury, the number of unreasonable and even preposterous recommendations that have been made have tended to discredit the whole subject of remedial measures.

"2. Few are aware of the very considerable number of valuable remedies which have been carefully tried, here and there with decisive or highly encouraging results.

"3. Failures of measures not intelligently or thoroughly applied, or applied under exceptional circumstances, have often led to the conclusion that there was no value in them under any circumstances whatever.

"4. Partial or complete failure of the isolated efforts of individuals has sometimes illegitimately discouraged combined action by the farmers of a neighborhood.

"5. The use of proper measures in the beginning of an outbreak has been prevented by the failure, elsewhere or previously, of the same measures when the chinch bug had already overwhelmed the country. The best of remedies will fail when the patient is already in the enticel of death.

"6. Failure to accomplish *everything* has sometimes caused abandonment of measures which nevertheless do accomplish *much*.

"7. Many reasonable and promising remedies lack the endorsement of accurate experiment, and so fail to command the confidence of the practical farmer.

"8. The disposition to speculate on the weather is very common. A hope that heavy rains may intervene to destroy the bugs often prevents action which it is thought may be rendered unnecessary by the turn of events."

Much of this applies with equal force in our own State, but I believe that the majority of our progressive farmers will choose to adopt the best measures known in the way of prevention rather than

run the risk of another chinch bug scourge in 1888. At present wintering chinch bugs are apparently in best of condition for wintering, and while it is of course possible that next spring may be a wet one, it would be folly to depend upon such being the case. The question then arises, what can be done to lessen the danger the coming season? I will attempt to give briefly, and without referring here to supporting evidence, the measures which I believe should be adopted in every neighborhood where the chinch bug has been present during the past season.

First. As soon as it is dry enough so that grass, dry leaves, etc., will burn, set to work systematically to burn over every foot of land possible. Burn all old corn stalks, burn grass and weeds along fences and in corners. This can be done quite safely with a little care for the posts where the fence is of wire; for board fences it would of course be dangerous. Carry the fire into thickets and edges of timber, burning off all the dead leaves, and attend also to the loose bark on fallen logs. In short, carry fire into every hiding place that the circumstances will permit. It should be done when the grass, etc., is dry enough to burn well down to the ground, otherwise many of the bugs may escape. One bug killed at this time may mean a hundred thousand or more prevented from working on the crops in summer; and, on the other hand, every bug escaping may mean an equal number ready to devour the fruits of hard labor. While it will pay every farmer to adopt this method, even if his neighbors do not, since the bugs for the most part do not travel great distances, the best results will be reached if every farm in the neighborhood is thoroughly renovated by fire.

Second.—Make a careful study of the crops to be planted and reduce as much as possible the area planted to wheat, rye, barley and Hungarian grass especially, and to a less extent oats, corn and meadow grasses, remembering that bugs feed only on members of the grass family of plants, and have a decided preference for wheat, barley, rye and Hungarian. Where such crops cannot be suspended plant as early as possible and sow heavily. Defer planting corn as long as practicable to make sure that none of it is up in time for adults wintering over to be attracted to it. If possible avoid planting it next to wheat, barley or Hungarian grass, and if this is unavoidable sow strips of potatoes, turnips, buckwheat or some other crop not relished by the bugs between the fields. This will tend to retard migration and possibly starve some of the younger bugs, while if the maturing bugs

take wing and scatter generally through the corn, the effect is not so severe. As far as possible plant crops not affected by the chinch bugs, such as clover, buckwheat, flax, beans, potatoes, turnips and other root crops. In fields intended for late planting of corn or some other crop, an early planting of strips of wheat or Hungarian to attract the laying of eggs, to be plowed under as soon as egg laying is over, will result in destruction of great numbers and prevent the damage they might have caused in other fields. Unless the strip is planted to some crop not eaten by the bugs, it should lie two or three weeks at least to insure the death of the bugs before the second crop is planted, though when plowed under deep there is little probability of their getting again to the surface.

Third.—After crops are started keep a careful watch of fields in wheat, barley, etc. If portions of the field become badly infested before much growth has been made, while other parts of the field seem free, plow under deep and later plant to buckwheat, turnips or some crop not affected by bugs. If the whole field becomes infested early it may pay to plow under to destroy the bugs and plant as late as possible to fodder corn or other late crop. If crop is far enough along to pay for cutting as hay, or ripe enough for early cutting for the grain, clear the field at once; burn the stubble if dry enough, and plow under as quickly as possible. The bugs make very slow progress traveling over a rough plowed field, and most of the younger ones at least must perish.

Fourth.—When the bugs begin to migrate into corn from wheat and other fields, or rather before this has commenced, if no strips of crops disliked are between the fields, see to it that a strip of at least three or four yards next to the corn is plowed and finely pulverized. Then as soon as bugs begin to travel mark this with several parallel furrows and pulverize the sides of these furrows thoroughly by dragging a heavy block or log along them. The bugs cannot crawl up the sides as long as the earth rolls back with them, and vast numbers will starve to death along such an obstruction. Spread straw along side of these furrows toward evening, and the bugs will go under it for the night, then set fire to it in the morning before the bugs start to travel again. Similar precautions can be used in connection with strips planted to potatoes, etc. At this time too the stubble if it has not been plowed under, is probably dry enough to burn, if a little care is taken to carry the fire over thin spots, and if burned in hottest

part of the afternoon hosts of bugs will be burned. While the older ones may have already left, close examination will probably show hosts of small ones on the move. If the bugs reach the corn and begin to accumulate there, procure a few gallons of cheap kerosene and a few pounds of cheap bar soap. A hand force pump is also almost essential, though the sprinkling can be done more slowly with a watering pot. The best nozzle I know of for the purpose is the cyclone nozzle, recommended by Prof. Riley.

Heat a quantity of water (half as many gallons as you intend to use of kerosene) and dissolve in it half a pound of soap to each gallon. Add this boiling hot to the kerosene (one gallon of suds to two gallons of kerosene) and churn violently together from ten to fifteen minutes, or until it forms an emulsion. It will then appear thick and creamy, and will not separate on standing or cooling. The churning is best done by forcing the fluid through the force pump, driving it through a short hose without the spray nozzle back into the vessel from which it is drawn. Having prepared this emulsion it may be mixed at pleasure with pure water, or water with a little soap in it, using nine gallons of water to one gallon of the emulsion. This gives thirty gallons of mixture for every two gallons of kerosene. It may be diluted still further if desired, but should not at the farthest be diluted so as to use more than fourteen or fifteen gallons of water to each gallon of emulsion. The mixture in barrels may be drawn in a wagon along side the rows of corn, and the bugs sprayed by directing the nozzle upon the stalks where they are massed. To reach rows beyond the first two or three it will be necessary to have a long hose and one man to manipulate the nozzle, passing among the hills for as many rows as convenient, while another works the force pump and manages the team. This method is applicable where the bugs are massed on a few rows of corn next to wheat and may prevent serious damage to the bulk of the field.

Fifth. When corn fields are infested throughout and liable to be seriously damaged, a plan already very generally adopted is to cut it up for fodder.

Sixth. And lastly, after the season's crops are attended to, every effort should be made to reduce the number for the next year. The rubbish in fence corners, the dry grass, leaves, etc., may be raked into heaps from places not accessible to fire. These will form excellent attraction for the bugs when secreting themselves for their winter hibernation, and then on some dry day in late fall or early winter,

or in early spring, the whole mass may be burned. At the same time, all ground covered with grass, leaves, etc., should be burned over as thoroughly as possible. There is an advantage in doing this late in fall, after bugs have taken up their winter quarters, in that there is more probability of burning thoroughly to the ground, and bugs, if any escape, will have difficulty in finding shelter for the winter, and many are likely to perish by the attacks of birds or other natural enemies.

Many of the measures recommended for the latter part of the season may be unnecessary, and of course the greatest gain results if careful attention is given to the matter at the beginning of the season. As far as possible there should be concerted action by all the farmers in a neighborhood, for though it may pay the individual farmer to do all he can for the protection of his own crops, he can but partially succeed if bugs are continually coming in from the neglected fields of his neighbor. Each man should study the conditions on his own farm, become thoroughly familiar with the habits of the bug, the crops it will infest and the time and manner of its work, and then adapt his crops and the remedies he applies to the particular conditions of his locality.

It is my intention to issue, at an early date, a more detailed account of this insect in a College bulletin, and in the meantime should be pleased to receive communications from persons interested, giving facts as to distribution, injury, etc., of the insect, with any information possible concerning measures used in contending with it.

REPORT OF THE DEPARTMENT OF PHYSICS.

—
J. C. HAINER, PROFESSOR.
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To the Honorable Board of Trustees:

GENTLEMEN—I herewith transmit to you the report of the department of physics for the biennial period of 1886-7, together with an abstract of the meteorological observations for the quadriennial period of 1884-7.

The report naturally divides into three separate and distinct parts:

First. An outline of the course in physics as taught during the biennial period.

Second. The present condition and needs of the department.

Third. Meteorological observations and comments thereon.

Of these, in their order:

The study of physics begins with the sophomore year and extends through the junior year. The following is an outline of the course of study: In the first term of the sophomore year the main topics are composition and resolution of force; the elementary machines; laws of motion; composition and resolution of motion; friction; work; kinetic and potential energy; center of gravity; specific gravity; elasticity; hydrostatics and pneumatics.

In the first term of the junior year the main topics are chemical and heating effects of currents; relation between electricity and magnetism; induced currents; principles and instruments of electrical measurements; the nature and propagation of sound; the laws of the vibration of sounding bodies; reflection and refraction of light; properties of mirrors and lenses; optical instruments; spectrum analysis; radiant heat; polarization and the physical nature of light.

In the second term of the junior year the study is pursued by practical work in the physical laboratory. One afternoon is given to this work per week.

This embraces the course of study in general physics. The subject is taught by lectures, text books and recitations. Experimental demonstrations are given of the important laws and principles; and, so far as the knowledge of the student will permit, the practical applications of physical laws in the industries will be indicated.

To students who desire it, and who are properly qualified, an opportunity is given to take extra work in physics. The following is an outline of the work offered: In the second term of the junior year, a course of lectures in analytical mechanics especially adapted to further the study of advanced physics; methods of physical investigations and the reduction of observations, including the method of "least squares." Laboratory work two afternoons per week is required.

During the senior year the study is continued in the following lines: Theory of heat (Maxwell); theory of electricity (Cumming); undulatory theory of optics (Airy), and dynamo-electric machinery (Thompson). The student continues laboratory work throughout the year, using as a guide "Physical Measurements," by Kohlrausch.

The physical cabinet is well supplied with apparatus, both for experimental demonstration and for exact measurements in laboratory work.

Astronomy was added to the course in 1885. This work fell to me. As aids to the study of this science, the department has a fine celestial globe thirty-two inches in diameter, a fine sextant, and the use of a telescope of 3 3-16 inch objective, the property of the late Gen. Geddes. A rent of \$10 per annum is paid his widow for the use of this instrument.

The instruction in analytical mechanics was transferred from the professor of mechanical engineering to me in 1886. The text-book used this year was Church's Statics and Dynamics, a book well adapted to our grade of students both as to the amount of matter it contains and the mode of presentation as well.

3d. As is seen in the above outline of the course in physics, laboratory work in this study is now given, not only to special students in physics as heretofore, but also in the regular course. This is an advance in the proper direction. Laboratory practice in physics is just as essential to the student in natural philosophy as is the same kind of practice in chemistry or botany or zoology. Physics is an experimental science and must be studied from that standpoint, if studied at all. To make this work of greater educational value and practi-

cal utility, the board appropriated \$1,600 to this department for the purchase of instruments of precision. These were ordered from abroad early in 1887. This addition to the apparatus already in possession of the department places the instrumental equipment of the department in reasonably good condition for the work offered in physics. Not that all the apparatus necessary to a well equipped physical laboratory is collected; but an advance has been made in that direction. Yearly additions can be made of special apparatus as their need becomes urgent.

Just now the great, the urgent need of the department is a *physical laboratory*. As now located the department has no laboratory. The lecture room, the two apparatus rooms, and the office room, have, in the past, been used as the students' laboratory. These rooms are not adapted to this work. It is evident, therefore, that if this part of the work is to be increased in efficiency, suitable and commodious quarters must be provided. To meet the present wants of the College in this regard, the following plan is suggested: Let the west wing of the chemical laboratory be raised one story higher. This will bring the new story on the same level as the present location of the physical rooms. Fit up this new story with the proper and necessary piers, tables and supports for a physical laboratory. The estimated cost for above outlined improvements is \$3,000.

The faculty have prepared a course of study requiring laboratory practice in physics, which course was adopted by the Board of Trustees. The board has appropriated money from the college funds, to buy the needed apparatus to carry out in a generous spirit the course of instruction as outlined above. But the board cannot supply the needed building. To do this is the duty of the State. Is there any good reason why the facts shall not be presented to the legislature with the request that an appropriation of \$3,000 be made for the above purpose?

3d. The following tables give a summary of the meteorological data collected during the past four years. To interpret correctly the numbers given in the tables adhere to the following:

1st. Barometric heights are given in inches reduced to the temperature of melting ice and sea level.

2d. Days on which the cloudiness averaged 7 or more, on a scale of 10, are termed "cloudy"; from 2 to 7, on same scale, "fair"; below 2, "clear."

3d. The temperatures refer to the scale of Fahrenheit.

4th. The "relative humidity" is given in per cent, 100 denoting saturation.

5th. The rain-fall is given in inches.

6th. The observations were made at 7 A. M., 1 P. M. and 6 P. M. daily, and the monthly averages were reduced from these.

7th. The instruments were exposed in a lattice-framed box on north side of physical building, 25 feet above the surface of the earth; and in making comparisons with other observations, especially as regards temperature, this fact must be noted.

1884.

MONTH.	Barometer.		Mean barometer.	Number days		
	Highest.	Lowest.		cloudy.	fair.	clear.
April.....	30.39	29.23	30.01	10	14	6
May.....	30.25	29.46	29.82	14	7	10
June.....	30.47	29.60	29.85	9	15	6
July.....	30.06	29.48	29.76	12	13	6
August.....	30.32	29.62	29.90	9	14	8
September.....	30.24	29.45	29.80	10	10	10
October.....	30.30	29.05	29.92	8	11	12

1885.

MONTH.	Barometer.		Mean barometer.	Number days		
	Highest.	Lowest.		cloudy.	fair.	clear.
April.....	30.18	29.62	29.89	21	7	2
May.....	30.12	29.44	29.78	11	17	3
June.....	30.02	29.41	29.75	12	14	4
July.....	29.89	29.06	29.42	12	14	5
August.....	29.88	29.10	29.34	13	12	6
September.....	29.67	29.61	29.36	10	11	9
October.....	29.66	29.13	29.36	14	13	4

1886.

MONTH.	Highest barometer.	Lowest barometer.	Mean barometer.	Number days cloudy.	Number days fair.	Number days clear.
April.....	30.30	29.69	29.81	15	8	7
May.....	30.18	29.32	29.76	9	15	8
June.....	30.19	29.34	29.69	5	15	10
July.....	29.96	29.28	29.64	7	15	11
August.....	30.23	29.81	29.76	12	11	14
September.....	30.65	29.29	29.57	10	9	12
October.....						

1887.

MONTH.	Highest barometer.	Lowest barometer.	Mean barometer.	Number days cloudy.	Number days fair.	Number days clear.
April.....						
May.....						
June.....	29.82	29.40	29.68	10	10	11
July.....	29.68	29.53	29.66	9	10	6
August.....	29.81	29.33	29.61	9	10	6
September.....	30.00	29.20	29.67	14	8	6
October.....	30.14	29.29	29.65	8	14	9

1884.

MONTH.	Highest temperature.	Lowest temperature.	Mean temperature.	Relative humidity.	Rain fall.	Prevailing winds.	Date of highest temperature.	Date of lowest temperature.
April.....	72	28	49.6	78.5	3.64	NW, SE	29	8
May.....	78	37	60.0	84.7	2.29	NW, SE	16	5
June.....	88	59	72.0	86.7	2.13	SE, S	31	11
July.....	91	63	71.6	83.4	6.32	NW	19	20
August.....	85	54	70.3	84.0	7.18	NW	19	21
September.....	87	44	70.1	82.4	5.82	SE	28	23
October.....	83	29	57.2	87.3	7.77	SE, NW, SW	32	23

1885.

MONTH.	Highest temperature.	Lowest temperature.	Mean temperature.	Relative humidity.	Rain fall.	Prevailing winds.	Date of highest temperature.	Date of lowest temperature.
April.....	73	23	47.7	77.9	2.80	E, N	21	3
May.....	84	34	60.0	83.8	0.30	E, N	22	6
June.....	84	42	70.3	87.2	0.35	N, S	6	7
July.....	92	66	77.3	89.4	4.07	S, S	30	6
August.....	86	43	69.8	89.2	2.78	S, S	1	31
September.....	84	41	64.3	90.3	3.35	W, NW	25	1
October.....	75	24	48.9	81.0	1.83	S, S	16	3

1886.

MONTH.	Highest temperature.	Lowest temperature.	Mean temperature.	Relative humidity.	Rain fall.	Prevailing winds.	Date of highest temperature.	Date of lowest temperature.
April.....	79	29	55.9	84.7	2.33	SE	22	2
May.....	85	35	65.2	73.9	3.06	SE	21	16
June.....	89	39	71.7	74.5	1.26	N, S	14	3
July.....	96	38	74.9	73.5	5.04	SW	24	31
August.....	92	34	69.7	75.9	3.66	S, S	5	30
September.....	92	21	51.3	84.3	0.93	N, NW	11	27
October.....	76	21	51.3	84.3	0.93	N, NW	11	27

1887.

MONTH.	Highest temperature.	Lowest temperature.	Mean temperature.	Relative humidity.	Rain fall.	Prevailing winds.	Date of highest temperature.	Date of lowest temperature.
April.....	79	30	60.0	..	1.28	S, NW	9	4
May.....	83	53	75.2	..	0.39	SE, N, NW	11	11
June.....	87	57	73.4	74.3	2.12	SE, N, NW	18	23
July.....	96	65	80.2	81.0	2.74	S, S	21	21
August.....	97	50	74.9	74.4	1.03	S, NW	10	24
September.....	85	38	65.1	80.9	9.29	SW, SE	12	23
October.....	80	18	47.8	82.1	1.02	NW, SW	7	24

On account of the great drouth of the past two summers, of the facts tabulated above, the greatest interest attaches to the columns "rain-fall," "relative humidity" and "mean temperature." For convenience of comparison the following arrangement may prove useful:

RAIN-FALL.

	April.	May.	June.	July.	August.	September.	October.	Total.	Mean per month.
1884.....	3.64	2.29	2.13	4.62	2.71	5.88	3.77	25.64	3.58
1885.....	2.80	5.30	3.45	0.75	7.86	12.35	1.83	24.37	3.48
1889.....	2.33	3.06	1.29	.....	0.41	3.66	0.98	11.65	1.66
1887.....	1.28	0.39	2.12	2.74	1.03	9.20	1.02	17.78	2.54

RELATIVE HUMIDITY.

	April.	May.	June.	July.	August.	September.	October.	Mean per month.
1884.....	78.7	84.7	86.9	83.9	84.0	82.4	87.7	84.0
1885.....	79.12	83.0	87.12	89.4	89.12	90.3	91.0	87.0
1886.....	81.2	73.9	74.5	.....	73.5	75.9	84.3	81.0
1887.....	.....	.....	74.3	81.0	74.4	80.9	82.1	79.0

MEAN TEMPERATURE.

	April.	May.	June.	July.	August.	September.	October.	Mean per month.
1884.....	49.6	60.0	72.0	71.6	70.3	70.1	67.2	64.4
1885.....	48.7	60.3	70.3	77.3	69.3	64.3	48.8	62.8
1886.....	55.9	65.12	71.7	.....	74.9	60.7	61.3	64.3
1887.....	60.0	75.12	73.4	80.12	74.9	65.1	47.8	68.1

An inspection of these tables shows that, in the average, more rain fell per month in 1884 than in 1885, yet the atmosphere as regards moisture was higher in 1885 than in 1884. The same observation may be made for 1886 and 1887. A comparison of the tables for temperature and moisture shows intimate relation of the two, and that the higher the temperature the lower, relatively, the per cent of moisture. The tables also illustrate the fact of but slight dependence of rain-fall and moisture; the former exhibiting very wide limits of variation, taken month by month, the latter remaining from month to month well high constant.

REPORT OF THE DEPARTMENT OF DOMESTIC ECONOMY.

MRS. EMMA P. EWING, PROFESSOR.

The Iowa legislature in 1880 enacted that south hall should, as early as practicable, be "used for the purposes of domestic economy," and at the same time appropriated \$500 to fit it up for such purposes. But when I took charge of the department of domestic economy, in 1884, I found it located in two small, dark, imperfectly ventilated rooms in the basement of the College building—a place unsuitable in every way for the purpose, and one in which it was impossible to give instruction of any practical value in the direction of applied house keeping.

At my request the Board passed an order allowing me to take possession of south hall, in February, 1885, and expend \$400 in furnishing it for use as a school of domestic economy. This I did; and since that time I have expended \$90 additional for necessary household utensils, out of the annual contingent fund of the department, as shown by my different yearly reports. The property thus purchased, together with that I found in the department—worth probably \$100—when I took charge of it, I have turned over to your Treasurer, with an inventory of the same. The approximate value of the property is estimated in the inventory at \$374.65—a price for which it can readily be sold—thus making the entire cost of running the department, including wear and tear of furniture and material used in lessons, during the four years it has been under my charge, about \$900. I care for no better record of the economic side of my work than this simple statement; and for the value of the instruction I have given during that period, I refer you with pride to my pupils, their parents and friends.

NUMBER OF PUPILS.

After offering my resignation in May last I declined taking any more special students. Four, however, attended the school during a

portion of the second term, and took the lessons that were given the sophomore and junior classes.

The pupils who received instruction in the department during the past two years I tabulate as follows:

FIRST TERM.

	1886.	1887.
Freshmen	25	33
Sophomores	14	
Post graduates	3	
Special students	4	5
Total	46	38

SECOND TERM.

Post graduates	3	
Sophomores		11
Juniors	2	11
Special students	4	4
Total	9	26

The total of 64 during the year 1887 is the greatest number that has attended the school any year since it was organized. It is very gratifying to me to be able to show an increase of pupils every year, and to assure you that the pupils are as much interested, and as thoroughly in earnest, in their studies in this department, as in any other department of the College. And I am sanguine enough to believe that the number of women who will wish to qualify as home-makers, house-keepers and teachers of domestic economy—when it becomes more generally known there are schools where practical instruction is given in the household arts—will increase so rapidly that no seminary, college or university, for the education of women, can retain a standing in the front ranks of educational institutions without a well equipped department of domestic economy.

For a year and a half after its organization I watched with intense anxiety the development and growth of this, the first school of domestic economy in the United States, and during that period I could not readily have been induced to relinquish it to other hands. And now, after it has ceased to be an experiment and has become an established fact, I reluctantly sever my connection with it; but I would have been unjust to myself, ungrateful to the people of Indiana, and unfit for the work in which I am engaged, if I had refused

to accept the position offered me at Purdue University, where the field for labor is so much more accessible, and the opportunity for usefulness so much more favorable, than I could expect them to be for many years yet in Iowa.

In retiring from south hall and from my work at the Iowa Agricultural College, permit me to thank you for the courtesy you have always shown me and the assistance you have given me in the performance of my official duties; and allow me also to express the earnest hope that you may see your way clear, to push on, as vigorously as any other branch of study taught in the College, that branch which teaches the art of making pleasant homes and rearing healthful men and women.

REPORT OF THE DEPARTMENT OF CHEMISTRY.

—
A. A. BENNETT, PROFESSOR.
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Students in this department may continue the study of chemistry for three years, averaging about three recitations per week with the corresponding amount of laboratory practice.

The courses of study embrace general chemistry, qualitative and quantitative chemical analysis, organic chemistry, proximate organic analysis, agricultural chemistry, and urine analysis and toxicology. It is not expected that the student will in any sense, exhaust any one of these lines of study here referred to, but that he will be able by this study to take a comprehensive view of the subject in its branches and thus be prepared to do thoroughly, future work in any of these lines of study.

The aim and character of the instruction is two-fold; first and foremost to give mental training, and second to give a practical knowledge of the subject as it is related to the various industries.

The method of instruction is chiefly by recitation from text-books, familiar lectures, and laboratory practice.

The following brief account of the various subjects mentioned above will give some idea of the character of the work done.

General Chemistry.—The study of general chemistry is intended to introduce the student to some of the theoretical conceptions of the subject and acquaint him with the metalloids; to train him in manipulation of apparatus; to teach him to observe, note and describe chemical phenomena.

Analytical Chemistry.—For the beginner the main purposes and advantages of a study of analytical chemistry are to gain knowledge of the properties of chemical compounds; to learn experimentally their relations to each other and their reactions when brought in contact with each other; to use the reasoning faculties by applying the knowledge gained to the analytical processes; to gain the power that comes from the generalizing and classifying of chemical phenomena,

and thus aid in the understanding of the more abstract theories of the science.

Organic Chemistry.—The course in organic chemistry is intended to give the student a reasonably clear idea of some of the important organic compounds, and their mutual relations. This subject in connection with proximate organic analysis gives the student a fairly complete idea of the limits of the subject.

Agricultural Chemistry.—When the student takes up this work he is prepared to proceed toward the technical side of the subject. He is consequently allowed to choose from quite a variety of subjects his work of investigation, *e. g.*, analysis of soils, fertilizers, mineral waters, water for sanitary purposes, with butter, plant analysis, etc.

The work in urine analysis and toxicology is done by the students taking the veterinary course.

It covers an elementary treatment of these subjects, including a study of normal and morbid urine, and cases of poisoning with the common mineral and vegetable poisons.

The facilities for instruction are ample for all the work offered. The laboratory consists of two rooms, one 40x45 feet, and the other 60x30 feet, for general and qualitative chemistry; a room for quantitative and organic chemistry, weighing room, and general office and library room. There are accommodations for one hundred students working at one time.

Each table is supplied with water and gas, reagent bottles, and all necessary apparatus.

The apparatus includes all the various kinds necessary to do good work.

Post graduates can continue any of the lines of work mentioned. Special encouragement will be given to such as desire to do advanced work in agricultural chemistry.

Students not candidates for a degree will be admitted to the courses of study under conditions described in the last annual catalogue.

The expenses of the work are made to barely cover the cost of material used and apparatus broken.

ESTIMATES FOR ADDITION TO LABORATORY.

If the room on the second floor of the wing to the laboratory that the department has used for a store-room is needed to accommodate the growth of the physical department it will necessitate that such a

room be provided elsewhere. The use of this room for a store-room is very inconvenient, and it is so used because no other place is provided. It is so dark that artificial light is necessary to find articles stored there. Heavy articles like carboys of acids are now stored in any corner of the main room of the laboratory that can be so used.

In fact, three or four places are used to keep apparatus and chemicals because of the inaccessibility of our present store-room.

We respectfully ask for an appropriation of \$800 to build two rooms, one for a store-room and the other for an office and library.

The objects and necessities for these additions may be summarized as follows:

First. As stated above in reference to the appropriation of the room now used for a store-room, for the physical department.

Second. The great inconvenience of having material stored in three or four places.

Third. The room now used for the weighing instruments is so situated (never having been calculated for this purpose) that it is impossible to prevent the gases attacking them, making it necessary to readjust them every few days, and at the same time seriously and permanently injuring them.

Fourth. We need the room now used as a weighing room for volumetric analysis.

Fifth. The room now used for an office, work-room, and store-room combined, can be arranged for a weighing room with the danger referred to removed.

Many other reasons could easily be adduced to show the need of these additions. Trusting, however, that these already presented may make the matter sufficiently clear, I respectfully submit them for your consideration.

DEPARTMENT OF MILITARY SCIENCE AND TACTICS.

JAMES RUSH LINCOLN, PROFESSOR.

It is not intended to complete the education of the thorough soldier, but to fit young men for filling intelligently positions in the State troops as line officers and company instructors. The constant demand for men thus trained emphasizes the value of a thoroughly organized and well sustained military course. The chief advantages derived are the acquirement of a dignified carriage of the person, a gentlemanly deportment and a self-respecting discipline, with habits of neatness, order and punctuality. Opportunities are afforded each cadet for extending the studies in military science as desired, the College being provided with the necessary arms, accoutrements and outfits for drill and instruction in the infantry, artillery and signal tactics, for which special classes will be formed. Lectures on military subjects are delivered throughout the course, and regular battalion drill and dress parade taken place each Wednesday afternoon. All male students of the College, except such as may be excused by proper authority, are required to become members of the college battalion, and wear the prescribed uniform during military exercises.

There have been no changes in the military department since the last report, with the exception of one hour, each week, being added to the time set aside for military exercises, for the purpose of study in military science. This class has made creditable progress, and the advantages derived from this extra study have been very apparent in the added efficiency of the cadet officers in their work.

Several of our cadets have taken positions in the Iowa National Guard, and are looked upon with great respect, and are recognized as young officers of knowledge and ability. The formation of a company for drill among the ladies of the College has been of great benefit to them as a health exercise, as well as of interest as a beautiful exhibition of drill.

Military training and discipline are becoming more generally recognized as desirable factors in education, and as a mental drill has worth, as it requires a quick action of the mind in the interpretation and execution of orders in military maneuvers.

More cadet rifles and two light guns for artillery service would greatly add to the thoroughness of the work and instruction.

DEPARTMENT OF MATHEMATICS, POLITICAL ECONOMY
AND COMMERCIAL LAW.

—
H. W. STANTON, PROFESSOR.
—

MATHEMATICS.

The regular course in mathematics begins with the first term of the freshman year. It pre-supposes a knowledge of algebra, through equations of the first degree. Students passing a satisfactory examination upon this much of the subject are assigned to one of the two divisions in algebra into which the regular freshman class is divided. These divisions are of equal rank, and complete the study in one term. In addition to these classes it has been customary to form a third or beginning class in algebra, to which were assigned all students not prepared to undertake the advanced work. Such a class was established in the spring term of 1886, and placed under the charge of my efficient assistant, Mrs. Riley. This class was afterward divided into two sections, upon the basis of attainment, one section completing the study during the fall term, while the other mastered the work sufficiently to advantageously enter the advanced divisions in the following year.

In the spring of 1887 the regular sub-freshman class in algebra was discontinued, but during the early part of the term Mrs. Riley gave personal aid and class drill to such as found difficulty in keeping up with the regular classes. This work was also discontinued about the middle of the term in accordance with the action of the faculty, doing away with all instruction in preparatory studies.

The requirement that students, entering the institution shall show proficiency in algebra, through equations of the first degree is a necessary one. Even with this preparation a single term is scant time in which to obtain such knowledge of the subject as should go with a college education. The object of the instruction in this branch is to bring out clearly the principles involved, and by the analysis and so-

lution of examples and problems impress these principles upon the minds of the students.

Geometry is taken up in the second term of the freshman year. The entire term is devoted to the study. The student is required, at the very beginning, to thoroughly understand the nature of a geometrical demonstration. Unless he sees clearly the strength and beauty of each step of the logical process from the axioms to the final conclusion, he gains neither discipline nor pleasure from his work. If, after repeated trials, the student cannot be brought to adopt the right method of study in geometry, he is advised to temporarily drop the subject.

During both 1886 and 1887 one division of the class has been under my instruction; the other was conducted, in 1886, by Prof. Hainer, and in 1887 by Miss Eaton, in both cases with marked success.

Analytical geometry is a required study in the engineering school. During the last two years it has been open to all students in the other four year courses, but hereafter the privilege of electing it will be confined in the general course to those who shall have secured a standing of 3.70 (four being perfect) in trigonometry. Newcomb's analytic geometry is used as a text-book. The student is first taught to locate points on a plane and is drilled on the problems connected therewith. The representation of magnitudes by equations is next taken up, and the relation between the two carefully studied. The analytic process is afterward applied to the investigation of the properties of the straight line, circle, parabola, ellipse, hyperbola and other curves.

Calculus follows analytical geometry in regular course and is open to those who have taken the necessary antecedent studies. The first two or three weeks of the term are devoted to a study of the rules of differentiation and the philosophical principles upon which they are based. The student is then drilled upon the application of these principles. In the explanation of problems he is required in each case to state the principles involved and explain their use. He is thus made familiar with the rules and gains considerable expertness in applying them. The five or six weeks spent upon integration—the reverse of differentiation—helps to still further impress these rules upon the student's mind and as a result he is able by the end of a term of diligent study to handle the complicated machinery of this method of mathematical analysis with accuracy and a fair degree of readiness.

POLITICAL ECONOMY AND COMMERCIAL LAW.

These studies are options in the second term of the junior year. The class in political economy is divided into two divisions. One division recites three times per week during the term and makes use of Walker's Political Economy as a text book; the other recites five times per week and uses no particular text. In this last division the student is furnished at each recitation with an outline of the work for the following day with references to authorities. He is expected to prepare himself upon the work thus assigned, and at the next recitation to present fully the views and arguments of the different authorities upon the points covered by the outline. His own views and conclusions are set forth in essays, written debates and oral discussions. In this way, the student becomes an investigator. He learns to overcome the difficulties attendant upon all research, acquires some degree of familiarity with the standard works of economic literature and gains power and confidence in forming and stating his own conclusions. Value, land, labor, capital, money, credit and foreign trade are some of the subjects investigated. The students have shown a high degree of enthusiasm in the work and thus far the method has proven eminently successful.

A short course of instruction in business law is given during the second term of the junior year. Contracts, agency, partnership, commercial paper, etc., are studied. This class will recite hereafter in the first term of the junior year.

The following table will show the number of students who have completed the studies of the department during the past two years and the time devoted to each study:

	1886.	1887.
Algebra—5 recitations per week, one term.....	78	67
Geometry—5 recitations per week, one term.....	71	65
Analytical Geometry—5 recitations per week, one term....	21	31
Calculus—5 recitations per week, one term.....	11	20
Political Economy—		
} 3 recitations per week, one term....	28	19
} 5 recitations per week, one term....	4	22
Commercial Law—2 recitations per week, one term.....	19	29
	232	253

DEPARTMENT OF PSYCHOLOGY, HISTORY OF CIVILIZATION, AND RHETORIC.

A. S. WELCH, PROFESSOR.

PSYCHOLOGY.

Psychology, which presents an analysis of the intellectual powers, supplies two distinct wants:

First; giving to the student an insight into his own mental processes, it enables him to *think*, with greater accuracy and clearness, on the various subjects that thereafter engage his attention; and since success in all the lines of human activity depends on genuine thinking, psychology is one of the most practical of studies.

Secondly; especially as taught here, it elucidates fully the fundamental principles and mutual relations of the industrial sciences comprised in the various courses of study. Thus, for example, while botany and zoology arrange the useful plants and animals into classes, psychology discloses to the student the underlying principles of association which render such classification possible. While chemistry analyzes the fertilizers and the products whose growth they hasten, psychology reveals the methods of reasoning on which such analyses proceed. Moreover, the incipient unit in each science, the processes of experimentation, discovery and mathematical research, by which it advances, are all brought to light in the study of psychology.

Finally; it is by the study of psychology, that we are enabled to classify the industrial sciences into closely related groups, thus showing that no student can become eminent in any one, without studying the entire group to which it belongs.

It is, then, apparent that the student can scarcely reach the final breadth and depth of science, without gaining from psychology, the ultimate principles of reasoning and classification on which it is based.

Psychology occupies the senior class, in the lecture room, five hours a week, during the first term of the year. It is taught by daily lec-

tures and the students make original investigations in the library, according to a syllabus prepared by the professor. In the course of the term, each member writes five essays on different psychological topics. Psychology is a necessary antecedent to such branches as ethics, logic and history of civilization.

HISTORY OF CIVILIZATION.

The study of those forces which promote civilization, occupies five hours a week in the lecture room during the second term of the senior year. One of the main objects sought in this study, is to gain a clear knowledge of the origin and progress up to the present time, of the practical sciences, arts and industries previously studied and practiced in the different industrial departments of the College. In this way it will be seen that the study of the history of civilization is in full harmony with the industrial courses and that the student can hardly attain the complete mastery of his speciality until he knows its history as one of the civilizing forces.

The attempt is also made to give a clear, yet concise, history of the origin and growth of government, religion, science, language, education, industry and mechanic arts; in short, to scrutinize rapidly the forces, both natural and supernatural, by means of which the primitive savage was, as the centuries passed, metamorphosed into the civilized man.

The daily exercises consist of a lecture of twenty minutes on the methods of investigating each of the subjects mentioned, and the remainder of the hour is occupied in hearing written reports from members of the class appointed to pursue, in the library, special lines of research. In this work each member selects a topic in the history of the civilizing forces, which embraces the matter most nearly related to his future vocation.

By the above method it is believed the habit of independent investigation is formed. As to the actual knowledge acquired, nothing further can be attempted than to lay well the foundation for future acquirements in a branch of learning which every genuine student will subsequently pursue.

COMPOSITION AND RHETORIC.

Instruction in English composition is given during the first term (half) of the freshman year. The correct expression of thought through written language is taught and enforced by frequent exer-

ercises. A clear knowledge of the grammatical structure of the English sentence is sought. A thorough knowledge of spelling, punctuation and the proper use of capitals is pre-supposed, but if found to be lacking on the part of any, special extra drill is given, and work required.

In the second term (half) of the freshman year the time of three recitations each week is devoted to a series of exercises in applied rhetoric, in which the design is to familiarize the mind with those details of composition and expression, which are most in requisition in practical life, and are usually most neglected; going no further in the philosophy of this branch than these practical ends will indicate and permit. The attempt is to teach the pupil to express his thoughts clearly and forcibly by means of written language.

DEPARTMENT OF ENGLISH LITERATURE, LATIN AND HISTORY.

—
A. C. BARROWS, PROFESSOR.
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Herewith I have the honor respectfully to submit a report of work done by me in my various departments of instruction during the year 1887.

I. HISTORY.

During the first term I met a class of fifty-two freshmen, five times each week. The history of Greece was traced from the earliest times to the subjugation of Greece by Rome. Then we studied the history of Rome from the foundation of the city to the settlement of the northern hordes within the Roman Empire.

I had also two exercises each week in history with the sophomore class of the ladies' course. There were in the class eighteen the first and nineteen the second term, when the exercises were opened to some of the gentlemen in the engineers' courses, who wished to study history as an extra study. This class took Roman history from the foundation of the city to year 500 A. D., and the history of England down to the signing of "Magna Charta," thus including the period of the formation of the nation.

During the first half of the year the work was mainly by recitation from text-book, with a running commentary by the instructor. Later on the "seminary method" was also used. The review took the form of topical study of various lines of development. Not much attention has been given to mere dates, or to the details of intrigue and the story of exploits; but the student has been taught to follow the development of laws, institutions and manners, and to understand the causes of the strength and weakness of nations. Each member of the freshman class was required to construct a synchronous chart of the entire period covered by the term's work.

II. LATIN.

I have instructed the sophomores of the ladies' course in Latin four hours each week during the entire year. The lessons were in Cæsar's *Gallic War*, the *Fables of Phædras*, Nepos' *Lives of Excellent Commanders*, and Vergil's *Æneid*—two writers of prose and two of verse. This class numbered but five.

The freshmen of the general course and ladies' course recited in Latin five times each week. Also several ladies of the sophomore and junior classes, who had no previous opportunity to study Latin, joined the class, so that it numbered forty-two the first term and thirty eight the second term.

This was a beginner's class. We took Jones' Latin Lessons, with the Allen and Greenough Grammar, proceeding slowly and carefully. Then we read the Latin *History of Rome* by Eutropius. An effort has been made so to lay the foundations that they may never need to be relaid. I have bestowed special labor upon the connection of Latin and English words, and the contrasts between the Latin and English sentence, teaching my pupils from the beginning to learn to think with the Latin author, as this habit at once explains the more vexatious idiomatic peculiarities of the language and makes its syntax perfectly clear.

III. ENGLISH LITERATURE.

English literature was studied five hours each week of the first term by a class of thirty-two juniors. A brief manual was used to give a connected view of the subject. But most of the time was devoted to a critical study of select works of those authors who were most typical of their times, especially Chaucer, Shakespeare, Bacon and Milton.

During the last weeks of the second term I met the seniors in literary criticism. We discussed Herbert Spencer's *Essay on the Philosophy of Style*, and made a critical study of a translated drama of Sophocles and a play of Shakespeare. The two were then compared—the Greek with the English.

My aim in this, which seems to me to be the most important department of my work, has been to put the students into the closest possible contact with the greatest minds of our race, to teach them how to read a great author so as to get at his best contents, show them the secret of literary power and success, and give them some knowledge of the stores of our literature.

I have also preached once on about three fourths of the Sundays of both terms, conducted the daily chapel services rather more than one quarter of the time, examined and corrected all the orations that were delivered at junior exhibition, and a part of the seniors' graduation theses. Also, finding that the choir was in need of a conductor I have given more than an hour each week to the work of choir-drill; and as a rule have conducted the singing, excepting when I was myself conducting the services.

GERMAN AND FRENCH.

MISS STOCKMANN.

German is taught in the first term of the freshman year, ladies' course, the grammar being illustrated and practically applied through the natural method and by original work. In the second term, instruction in the etymology, syntax, idioms and pronunciation of the language is given by means of conversation and exercises in writing. In the first term of the sophomore year German literature is taught by reading, conversation and one lecture per week. At the end of this term the student has gained facility in conversing in German. In the second term of the sophomore year of the ladies' course, students translate into German from the works of standard English authors, and have two lectures per week on comparative literature. In the first term of the junior year of the ladies' course the history of German literature and art is taught by reading, conversation and two illustrated lectures per week. In the junior year this study is optional in the gentlemen's courses.

French.—French, open to students in the various courses, is taught by the same methods as those outlined above for the study of the German language.

ELOCUTION.

MISS BLOOD AND MISS EATON.

Instruction in elocution is given in all the courses. The system of voice culture is based upon the discoveries of modern scientists and removes all impurities from the voice, giving fullness, flexibility and power. A thorough physical training is involved in this course, resulting in improved health as well as grace and ease of manner. The laws underlying the art of expression are taught, so that the pupil becomes the master of principles and rules, not a mere imitator

of a certain model. The philosophy of expression taught is that discovered by Delsarte in gesture, and that adaptation of the system to voice and rendering begun by Prof. Lewis. B. Monroe, and developed by C. W. Emerson, M. D., principal of the Monroe Conservatory of Oratory, Boston, Massachusetts.

INSTRUMENTAL AND VOCAL MUSIC.

MISS ANNA S. GAFF, TEACHER.

The above branches are not taught by law in the College curriculum. Opportunities are afforded, however, to such as desire it to take lessons upon the organ, piano and in vocal training.

The Piano Forte.—In the study of this instrument particular attention is given to technique as a necessary foundation for a perfect mastering of the piano forte. The works used are technical studies of a high character and the compositions of the best writers.

The Pipe Organ.—The methods of George Whiting, of the New England Conservatory of Music, Boston, are followed as far as possible, and the works of Kirk, Mendelssohn, Guilman, Whiting, and others, are used. No pupils are advised to take up the study of the pipe organ until somewhat advanced in piano forte playing. Charges per term of twenty lessons upon the piano or organ, ten dollars. For use of piano, two hours daily practice, fifty cents per month. For use of piano, one hour daily practice, twenty-five cents per month. No pupils are taken for less than a full term, and no deduction will be made for temporary absence from lessons.

Vocal Music.—Instruction in vocal music is given in private lessons and to a choral class. Voices are trained with the utmost care, and fitted for the concert room if desired. The choral exercises are most effective in rendering works which train and strengthen the voice, and elevate the musical taste. Charges per term of twenty half hour lessons, ten dollars. Choral class two lessons per week for four months, four dollars.

The teacher in music is allowed the tuition collected from students. Miss Gaff having resigned, a committee was appointed at the November meeting of the board to secure a competent person to fill the vacancy. It is the intention of the College to furnish first class advantages in this department.

REPORT OF LIBRARIAN.

MRS. IDA M. RILEY.

During this biennial period there have been added to the library:

By purchase, volumes.....	436
By donation, volumes.....	138
By exchange of duplicates through the Department of the Interior, volumes.....	93
By binding of periodicals, volumes.....	285
Total accession, volumes.....	952
Total number of volumes in the library, exclusive of duplicates,	6,929

The binding of the periodicals was done by C. C. Purrinton, Boone, Iowa, at the following rates:

Octavos.....	\$.75
Quartos.....	1 00
Folios.....	1.25

All binding was done in half sheep, with marbled sides and sprinkled edges, except the theses, which were bound in half morocco and cloth.

The scientific books were purchased of specialists, the others of Redhead, Norton, Lathrop & Co. or A. C. McClurg & Co., according to prices offered.

Of the many needs of the library, I will speak of but one, the catalogue of subjects and of authors. We have no subject catalogue and practically none of authors. We have a catalogue of titles, but the title of a book frequently is no guide to its contents, therefore faculty, students and librarian spend hours searching for matter, of which these catalogues would give information at once. The rapid growth of the library and the increasing inclination of the professors to teach by the library method make a subject catalogue almost a necessity.

From estimates received of the library bureau, I think an experienced cataloguer could make us a subject catalogue in two years, and would work at the rate of five hundred dollars per college year.

The librarian, if relieved of teacher's duties, could do the work, but it would take much longer.

HEALTH REPORT OF THE IOWA AGRICULTURAL COLLEGE FOR THE YEARS 1886-87.

D. S. FAIRCHILD, COLLEGE PHYSICIAN.

During the college year of 1886 thirty-three cases of sickness occurred; of these twenty were cases of measles.

The first case was that of a young man who had been exposed before leaving home ten days before. On March 5th he was seized with the premonitory symptoms of the affection. These facts coming to our knowledge he was at once removed to the hospital for isolation and treatment; the eruption came two days later. We were too late, however, to prevent the occurrence of other cases, and on the 17th of March the second case appeared. Others followed in rapid succession.

We are exposed every year by students coming from families affected by measles, only to be taken with the disease soon after their arrival. We would recommend in justice to themselves as well as to the College that a little more care be observed in this matter.

A case of typhoid fever appeared October 23d. This patient (a lady) had been visiting the family of a sister some two weeks previous, where a case of typhoid fever existed, and was exposed, no doubt, to some infectious influence. She returned to the College, and on the above mentioned date was taken down with the disease. She was at once removed to the hospital, a trained nurse was obtained from Des Moines, who, with her mother, carried her successfully to a complete recovery. The remaining cases were mild cases of sore throat, colds, accidents, etc.

During the college year of 1887 seven cases of sickness appeared; one of these was a case of measles. In this instance we were fortunate enough by early isolation in the hospital to prevent the disease spreading. Three of the remaining cases were of dysentery, which was at this time prevailing as an epidemic in this locality. These cases all reached a favorable termination. Of the remaining three

cases one was of sore throat, and two of fever arising from exposure to cold, and were of short duration.

Great care is observed in giving immediate attention to all cases of sickness, and if isolation, quiet, or special attention is needed the patient is taken to the hospital where all these conditions can be obtained.

FINANCIAL REPORTS.

REPORT OF THE SECRETARY.

[FOR THE BIENNIAL PERIOD ENDING NOVEMBER 9, 1887.]

IOWA AGRICULTURAL COLLEGE, }
NOVEMBER, 9, 1887. }

To the Board of Trustees:

It is the duty of the Board of Audit to examine all bills presented for payment, and to audit only such as are just and legal claims against the College, and for which appropriation has been made by the Board of Trustees. This duty has been performed in strict compliance with the State and National laws, and the rules of your honorable body. All bills audited are on file in the Treasurer's office, subject to the examination of your committee. Certain bills not allowed are respectfully referred to you for action.

Monthly examinations have been made of the Treasurer's accounts. In making such examinations the stubs of the Treasurer's receipt book and the duplicate receipts filed in my office have been compared with the debit items of the cash account. The monthly report of the State Treasurer and the College land agent, and the cash reports of the different departments have been compared with the Treasurer's account. The vouchers for cash paid out have been examined and note taken that each is properly audited, receipted and correctly entered in the cash account. The items of receipts and expenditures have been added and the total receipts and disbursements thus ascertained. As a result of such examination I hereby certify that the books of the Treasurer are correct.

The itemized account kept by me with the Treasurer of the College shows the following receipts and disbursements during the biennial period:

TOTAL RECEIPTS AND DISBURSEMENTS FOR 1886.

RECEIPTS

Cash on hand at the beginning of the year	\$ 4,333.18
From State appropriations	5,150.00
From sale of contingent fund land	1,600.00
From rental of endowment fund land	26,714.02
From rental of contingent fund land	2,615.20
From interest on investments of endowment fund	14,485.45
From principal on loans of accumulated interest	3,400.00
From interest on loans of accumulated interest	1,503.69
From sales by departments	8,244.52
From payment of sale notes falling due	250.00
From interest on sale notes	37.07
From interest on State warrants	2.08
From room rent paid by students	1,324.00
From payment by students to the College hospital fund	275.40
From payment by students for diplomas	56.00
From payment on donation account	31.65
From tuition of students living outside of the State	30.00
Total receipts for the year	\$ 70,052.21

DISBURSEMENTS.

Expended on account of State appropriations	\$ 4,024.68
Expended on account of the various College departments	49,729.18
Expended on account of donation fund	35.00
Expended on account of room rent	1,376.46
Expended on account of College hospital fund	227.10
Paid for diplomas, etc	111.90
Tuition refunded	30.00
Invested in sale notes during the year	35.00
Contingent principal fund invested in farm mortgages	5,665.00
Total disbursements during the year	\$ 61,224.27
Cash balance on hand	8,817.94
\$ 70,052.21	

TOTAL RECEIPTS AND DISBURSEMENTS FOR 1887.

RECEIPTS.

Cash on hand at the beginning of the year	\$ 8,817.94
From State appropriations	5,150.00
From sale of contingent fund land	2,040.00
From rental of endowment fund land	27,607.06
From rental of contingent fund land	2,829.66
From interest on investments of endowment fund	17,831.22
From principal on loans of accumulated interest	2,000.00
From interest on loans of accumulated interest	1,395.00
From sales by departments	7,686.87
From payment of sale notes falling due	100.00
From interest on sale notes	7.00
From room-rent paid by students	1,304.75
From payment by students to the College hospital fund	336.00
From payment by students for diplomas	177.00
From cash from interest fund for investment	2,000.00
Total	\$ 79,282.50

DISBURSEMENTS.

Expended on account of State appropriations	\$ 5,262.66
Expended on account of the various College departments	53,781.52
Expended on account of room-rent	781.67
Expended on account of College hospital fund	329.84
Contingent principal fund invested in farm mortgages	4,850.00
Transferred to contingent principal fund for investment	2,000.00
Total disbursements during the year	\$ 67,005.69
Cash balance on hand	12,276.81
\$ 79,282.50	

The cash balance on hand belongs to the following funds :

State appropriations	\$ 1,991.18
Interest on State warrants	2.08
Right-of-way damages	593.50
Room-rent fund	866.06
College hospital fund	57.39
Diploma fund	177.00
Contingent principal fund	5,325.00
Interest fund	3,264.60
Total	\$ 12,276.81

During the last year you have transferred the sum of \$6,000 to contingent principal fund, making the present endowment of the College, in round numbers, \$649,000. Of this sum over \$625,000 is invested. As stated in my report upon the land department, leases fall due as follows :

In the fiscal year 1888.....	\$ 25,000.00
In the fiscal year 1889.....	37,000.00
In the fiscal year 1890.....	122,000.00
In the fiscal year 1891.....	50,000.00

Loans of endowment fund can, under the optional clause in each note, be paid as follows :

In the fiscal year 1888.....	\$ 53,450.00
In the fiscal year 1889.....	131,025.00
In the fiscal year 1890.....	61,800.00
In the fiscal year 1891.....	4,700.00

From these figures it can reasonably be expected that the income of the College for the fiscal years of 1888 and 1889 will not show any material reduction, but that the year 1890 will witness a decided temporary, and without doubt a considerable permanent, falling off in the annual revenue of the institution.

I estimate the funds available for the fiscal year of 1888, as follows :

ESTIMATE OF INTEREST FUND AVAILABLE FOR 1888.

Cash on hand belonging to interest fund	\$ 3,264.60
Rental on land.....	25,500.00
Interest on bonds	860.00
Interest on farm mortgages	21,640.00
Total	\$ 50,764.60

ESTIMATE OF REPAIR FUND AVAILABLE FOR 1888.

Balance on hand belonging to repair and land fund, 1887.....	\$ 203.28
Annual repair and land fund, 1888.....	1,000.00
Total	\$ 1,203.28

(This does not include room-rent fund)

The usual exhibits, giving full information regarding the present condition of the College endowment fund, the income received therefrom and the expenditures of the same, are attached to this report.

Respectfully submitted.

E. W. STANTON,
Secretary.

EXHIBIT A.

The following statement shows the condition of the lands and funds which constitute the endowment of the College :

Land under lease, 106,632.24 acres	\$341,996.90
Land not under lease, 1,309.67 acres	7,049.01
Proceeds of sales of endowment fund land.....	269,080.25
Proceeds of sales of land purchased with interest money	12,240.00
Amount transferred from interest fund	18,600.00
Total endowment fund.....	\$648,916.16

The lands and funds yielding income are as follows :

Land under lease, eight per cent.....	\$341,116.90
Land under lease, ten per cent.....	880.00
Amount invested in bonds, six per cent	6,000.00
Amount invested in farm mortgages, eight per cent	250,875.00
Amount invested in farm mortgages, seven per cent	25,515.00
Total investments	\$624,386.90

The lands and funds not yielding income are as follows :

Lands not yielding income	\$ 7,049.01
Cash in hands of State Treasurer awaiting investment	3,500.00
Cash in hands of financial agent, awaiting investment.	8,655.25
Cash in hands of College treasurer awaiting investment.	5,325.00
Total amount uninvested.....	\$ 24,529.26

EXHIBIT B.

The following statement shows the ordinary income of the College for the fiscal year ending November 10, 1886, together with the expenditures on account of the different departments:

INCOME.

Cash balance on hand November 11, 1885...	\$ 1,562.79	
Received on sale notes on hand at beginning of year.	250.00	
		\$ 1,812.79
Rental on endowment fund land.....	\$ 26,714.02	
Rental on land purchased with interest money	2,615.20	
Interest on bonds held by State Treasurer.....	2,879.93	
Interest on endowment fund invested in farm mortgages	11,605.52	
Interest on interest fund invested in farm mortgages	1,503.69	
Interest on sale notes.....	37.07	
		45,355.43
		\$ 47,168.22

EXPENDITURES.

Salaries.....			\$ 28,997.80
Farm department—	DR.	CR.	
Current expenses.....		\$ 900.48	
Permanent improvements.....	\$ 499.90		
Experiments	703.52		
Foreman	409.32		
			712.16
Mechanical department—			
Current expenses and apparatus	\$ 1,097.29		
Foreman.....	997.18		
			2,094.47
Veterinary department—			
Expenses and apparatus	\$ 450.00		
House surgeon.....	200.00		
			650.00
Chemical department—			
Expenses and apparatus.....	\$ 305.84		
Assistant	299.17		
			605.01
Horticultural department.....			98.62
Civil engineering.....			188.13
Domestic economy ..			225.00
Military department.....			204.24
Physics.....			252.32
Botany.....			397.87
Entomology and zoology			264.05
Library.....			799.49
Public grounds.....			599.58
Public rooms			1,588.06
Sabbath services.....			374.50
Contingent expenses			3,101.48
Department bulletins.....			182.39
North hall, heating and cleaning....			123.67
Sanitary building furnishing			30.82
Net amount expended on account of diploma fund.....			55.90
Net amount expended on account of donation fund.....			3.35
Total ordinary expenses for the year			\$ 41,548.91
Invested in sale notes during the year.....			35.00
Cash balance on hand.....			5,599.31
			\$ 47,168.22

EXHIBIT C.

The following statement shows the ordinary income of the College for the fiscal year ending November 10, 1887, together with the expenditures on account of the different departments:

INCOME.

Cash balance on hand November 11, 1886.....	\$ 5,589.31
Received on sale notes on hand at beginning of year....	100.00
	<u>\$ 5,689.31</u>
Rental on endowment fund land	27,607.06
Rental on land purchased with interest money.....	2,829.66
Interest on bonds held by State Treasurer.....	360.00
Interest on endowment fund invested in farm mortgages	17,471.22
Interest on interest fund invested in farm mortgages	1,395.00
Interest on sale notes	7.00
	<u>\$ 55,359.25</u>

EXPENDITURES.

Salaries	\$ 28,714.99
Farm department—	
Current expenses	\$ 360.89
Permanent improvements.....	722.63
Experiments.....	460.71
Foreman.....	550.00
	<u>2,094.23</u>
Mechanical department—	
Current expenses and apparatus	\$ 2,200.00
Foreman	1,000.00
	<u>3,200.00</u>
Veterinary department—	
Expenses and apparatus.....	\$ 537.80
House surgeon.....	200.00
	<u>737.80</u>
Chemical department—	
Expenses and apparatus	\$ 515.03
Assistant	300.00
	<u>815.03</u>
Horticultural department	991.46
Civil engineering	200.00
Domestic economy	163.12
Military department	224.42
Physics.....	1,246.55
Botany	371.77
Entomology and zoology	355.84
Library	1,082.57
Public grounds	823.98
Public rooms	1,500.00
North hall—heating and cleaning	106.41
Contingent expenses	2,818.35
Sabbath services and lectures	65.00
Department bulletins.....	330.01
Water supply	223.12
	<u>\$ 46,094.65</u>
Total ordinary expense for the year.....	\$ 46,094.65
Amount transferred to contingent fund, principal for investment	6,000.00
Cash balance on hand	3,264.60
	<u>\$ 55,359.25</u>

EXHIBIT D.

The following statement shows for the fiscal year ending Nov. 9, 1887:

- expenditures of each department.
 (2) Total income of each department.
 (3) Net amount of interest fund expended by each department.
 (4) Appropriations by the board to each department.

DEPARTMENTS.	Total expenditures	Total income from sales.	Amount of appropriation expended	Amount of appropriation.
Salaries	\$28,744.99	\$.....	\$28,744.99	\$28,744.99
Farm department—				
Foreman	550.00	.....	550.00	550.00
Expenses, improvements and experiments	6,061.68	4,517.45	1,544.23	1,850.00
Mechanical department—				
Foreman	1,000.00	.....	1,000.00	1,000.00
Expenses and apparatus	2,504.26	304.26	2,200.00	2,200.00
Horticultural department	2,480.19	1,488.72	991.46	1,750.00
Veterinary department—				
House surgeon	200.00	.....	200.00	200.00
Lectures .....	.....	.....	.....	64.00
Expenses and apparatus	846.90	309.10	537.80	550.00
Chemical department—				
Assistant	300.00	.....	300.00	300.00
Expenses and apparatus	1,290.09	775.06	515.03	555.00
Civil engineering	200.00	.....	200.00	200.00
Domestic economy	178.12	15.00	163.12	225.00
Military department	289.42	65.00	224.42	225.00
Physics	1,248.30	1.75	1,246.55	1,950.00
Botany	40.27	28.50	371.77	375.00
Entomology and zoology	467.29	111.45	355.84	380.00
Library	1,084.94	2.37	1,082.57	1,100.00
Public grounds	892.18	68.20	823.98	825.00
Public rooms	1,500.00	.....	1,500.00	1,500.00
North hall—heating and cleaning	106.41	.....	106.41	125.00
Contingent expenses	2,818.35	.....	2,818.35	3,355.35
Department bulletins	330.01	.....	330.01	350.00
Water supply	223.12	.....	223.12	300.00
Sabbath services and public lecturer's	65.00	.....	65.00	300.00
Totals	\$53,781.52	\$ 7,686.87	\$46,094.65	\$48,974.34

REPORT OF THE TREASURER.

[FOR THE YEAR ENDING NOVEMBER 10, 1886.]

The following are the receipts and expenditures on account of the different College funds for the year ending November 10, 1886.

CONTINGENT PRINCIPAL FUND.

RECEIPTS.

Balance from last year	\$ 21,200.00
Amount from State Treasurer	1,600.00
Amount from G. W. Bassett	3,400.00

EXPENDITURES.

Amount previously invested in mortgages by G. W. Bassett	\$ 25,500.00
Amount invested in mortgages by J. L. Geddes	565.00
Balance on hand	135.00
	<u>\$ 26,200.00</u>
	\$ 26,200.00

MORTGAGES RECEIVABLE.

Balance from last year	\$ 20,400.00
Amount invested during the year	5,665.00
Amount received on mortgages	\$ 3,400.00
Amount of mortgages on hand	22,665.00
	<u>\$ 26,065.00</u>
	\$ 26,065.00

INTEREST FUND.

RECEIPTS.

Balance from last year	\$ 3,037.74
Amount received from G. W. Bassett	13,411.99
Amount received from J. L. Geddes	13,302.03
Amount received from State Treasurer	14,485.45
Amount from investment of accumulated interest	4,118.89
Amount from interest on notes	37.07
Total receipts	\$ 48,893.17

EXPENDITURES.

Paid sanitary building furnishing	\$ 30.82	
Paid chemical department	605.01	
Paid civil engineering department.....	188.13	
Paid zoology and entomology.....	264.05	
Paid domestic economy	225.00	
Paid military department.....	204.24	
Paid mechanical department.....	2,094.47	
Paid physical department.....	252.32	
Paid veterinary department.....	650.00	
Paid botanical department.....	397.87	
Paid salaries.....	28,997.50	
Paid contingent expense.....	3,101.48	
Paid public grounds.....	599.58	
Paid public rooms.....	1,583.06	
Paid north hall.....	123.67	
Paid department bulletins	182.39	
Paid for chapel services.....	374.50	
Paid for library.....	799.49	
Paid for farm department.....	712.16	
Paid for horticultural department	98.02	
Total expended	\$ 41,484.66	
Total unexpended.....	6,908.51	
	\$ 48,393.17	\$ 48,393.17

BILLS RECEIVABLE.

Balance from last year... ..	\$ 1,057.25	
Amount of notes received.....	35.00	
Notes paid during the year.....		\$ 250.00
Amount of notes on hand.....		842.25
	\$ 1,092.25	\$ 1,092.25

PERSONAL ACCOUNTS.

Debit balance from last year.....	\$ 476.95	
Amount to balance		\$ 476.95
	\$ 476.95	\$ 476.95

ROOM RENT FUND.

RECEIPTS.

Amount from last year	\$ 395.44	
Amount received this year.....		1,324.00

EXPENDITURES.

Amount paid as per vouchers.....	\$ 1,376.46	
Amount to balance	342.98	
	\$ 1,719.44	\$ 1,719.44

COLLEGE HOSPITAL.

RECEIPTS.

Balance from last year.....	\$ 2.93	
Amount received this year.....		275.40

EXPENDITURES.

Amount paid as per vouchers.....	\$ 227.10	
Amount to balance	51.23	
	\$ 278.33	\$ 278.33

RAILROAD DAMAGES.

Credit balance from last year	\$ 593.50	
Amount to balance	\$ 593.50	
	\$ 593.50	\$ 593.50

INTEREST ON STATE WARRANTS.

Amount received this year.....	\$ 2.08	
Amount to balance.....	\$ 2.08	
	\$ 2.08	\$ 2.08

FARM IMPROVEMENT.

NET EXPENDITURES.

Paid for farm experiments.....	\$	703.52
Paid for farm produce		428 17
Paid for farm hay field		5.32
Paid for farm permanent improvements.....		499.80
Paid for farm current improvements		81.24
Paid for farm tools.....		116 82
Paid for farm foreman.....		409 32

NET RECEIPTS.

Farm stock	\$	1,532 03
Amount above receipts		712 16
	\$	2,244 19
	\$	2,244.19

HORTICULTURAL DEPARTMENT.

NET RECEIPTS.

Experimental horticulture.....	\$	147.23
Small fruits.....		153.66

NET EXPENDITURES.

Cash paid for horticulture and forestry.....	\$	357.56
Paid for propagating house		25.70
Paid for orchard.....		16.25
Amount above receipts		98.62
	\$	399 51
	\$	399.51

CASH ACCOUNT.

RECEIPTS.

Balance from last year.....	\$	4,333 13
Amount received from all sources		65,719.08
Total receipts.....	\$	70,052.21

EXPENDITURES.

Amount paid out as per vouchers in Treasurer's office.....	\$	61,234.27
Cash on hand, State appropriations		2,103.84
Cash on hand from other sources		6,714.10
	\$	70,052.21
	\$	70,052.21

SUMMARY.

	DEBIT.		CREDIT.
Bills receivable	\$ 842.25	Contingent principal	\$ 22,800 00
Mortgages receivable.....	22,665 00	Room rent.....	342.98
Personal accounts.....	476 95	College hospital	51.23
Cash on hand.....	6,714 10	Railroad damages	593.50
		Interest on State warrants	2.08
		interest fund.....	6,908 51
	\$ 30,698 30		\$ 30,698.30

STATE APPROPRIATIONS.

RECEIPTS.

Balance on hand from last year	\$	978.47
Amount received from State Treasurer.....		5,150.00

EXPENDITURES.

Amount expended as per vouchers.....	\$	4,024.63
Cash on hand		2,103 84
	\$	6,128.47
	\$	6,128.47

Respectfully submitted,

J. L. GEDDES, *Treasurer.*

REPORT OF THE TREASURER.

[FOR THE YEAR ENDING NOV. 9, 1887.]

The following are the receipts and expenditures on account of the different College funds for the year ending November 9, 1887.

CONTINGENT PRINCIPAL FUND.

RECEIPTS.

Balance from last year.....	\$ 22,800.00
Amount from State Treasurer.....	2,040 00
Amount from James L. Geddes.....	2,000 00
Amount transferred from interest fund.....	6,000.00

EXPENDITURES.

Amount invested in mortgages Nov 11, 1886.....	\$ 22,665 00
Amount invested in mortgages by Herman Knapp ..	4,850 00
Balance on hand.....	5,325.00
	<u>\$ 32,840.00</u>
	\$ 32,840.00

MORTGAGES RECEIVABLE.

Balance from last year.....	\$ 22 665.00
Amount invested during the year.....	4,850 00
Total amount invested.....	\$ 27,515.00
Amount received on mortgages.....	2,000 00
Amount of mortgages on hand.....	25,515.00
	<u>\$ 27,515.00</u>
	\$ 27,515.00

INTEREST FUND.

RECEIPTS.

Balance from last year.....	\$ 6,908.51
Amount received from James L. Geddes.....	6,701.31
Amount received from Herman Knapp....	20,905.75
Amount received from investments of interest fund.	4,224.66
Amount received from State Treasurer.....	17,831.22
Amount from interest on notes.....	7.00
Total receipts.....	<u>\$ 56,578.45</u>

EXPENDITURES.

Amount transferred to contingent principal fund...\$	6,000.00
Paid for chemical department.....	815.03
Paid for civil engineering department.....	200.00
Paid for zoology and entomology.....	355.84
Paid for domestic economy.....	163.12
Paid for military department.....	224.42
Paid for mechanical department.....	3,200.00
Paid for physical department.....	1,246.55
Paid for veterinary department.....	737.80
Paid for botanical department.....	371.77
Paid for salaries.....	28,744.99
Paid for contingent expenses.....	2,818.35
Paid for public grounds.....	823.98
Paid for public rooms.....	1,500.00
Paid for north hall.....	106.41
Paid for bulletin fund.....	330.01
Paid for chapel services.....	65.00
Paid for library.....	1,082.57
Paid for water supply.....	223.12
Paid for farm department.....	2,094 23
Paid for horticultural department.....	991.46
Total expended including transfer.....	\$ 52,094.65
Amount unexpended.....	4,483.80
	<u>\$ 56,578.45</u>
	\$ 56,578.45

BILLS RECEIVABLE.

Balance from last year.....	\$	842.25	
Notes paid during the year.....			\$ 100.00
Amount of notes on hand.....			742.25
	\$	842.25	\$ 842.25

PERSONAL ACCOUNTS.

Debit balance from last year.	\$	476.95	
Amount to balance.....			\$ 476.95
	\$	476.95	\$ 476.95

ROOM RENT FUND.

RECEIPTS.

Amount from last year.....	\$	342.98	
Amount received this year.....			1,304.75

EXPENDITURES.

Amount paid as per vouchers.....	\$	781.67	
Amount unexpended.....		866.06	
	\$	1,647.73	\$ 1,647.73

COLLEGE HOSPITAL FUND.

RECEIPTS.

Balance from last year.....	\$	51.23	
Amount received this year.....			836.00

EXPENDITURES.

Amount paid as per vouchers.....	\$	329.84	
Amount unexpended.....		57.39	
	\$	387.23	\$ 387.23

RAILROAD DAMAGES FUND.

Credit balance from last year.....	\$	593.50	
Amount to balance.....	\$	593.50	
	\$	593.50	\$ 593.50

DIPLOMA FUND.

Amount received this year.....			\$ 177.00
Amount unexpended.....	\$	177.00	
	\$	177.00	\$ 177.00

INTEREST ON STATE WARRANTS.

Balance from last year.....			\$ 2.08
Amount to balance.....	\$	2.08	
	\$	2.08	\$ 2.08

FARM DEPARTMENT.

NET RECEIPTS.

Amount received from farm stock.....			\$ 331.58
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NET EXPENDITURES.

Paid for farm experiments.....	\$	460.73	
Paid for farm produce.....		212.72	
Paid for farm permanent improvements.....		722.61	
Paid for farm current improvements.....		295.24	
Paid for farm tools.....		184.51	
Paid for farm foreman.....		550.00	
Balance expended over receipts.....			\$ 2,094.23
	\$	2,425.81	\$ 2,425.81

HORTICULTURAL DEPARTMENT.

NET RECEIPTS.

Amount received from small fruits.....			\$ 126.93
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NET EXPENDITURES.

Paid for horticulture and forestry.....	\$	265.06	
Paid for experimental horticulture.....		677.39	
Paid for propagating house.....		6.95	
Paid for orchard.....		169.00	
Balance expended over receipts.....			991.46
	\$	1,118.39	\$ 1,118.39

CASH ACCOUNT.

RECEIPTS.

Balance from last year.....\$ 8,817.94
 Amount received from all sources..... 70,464.56
 Total receipts.....\$ 79,282.50

EXPENDITURES.

Amount paid out as per vouchers in Treas's office... \$ 67,005.69
 Cash on hand, State appropriations..... 1,991.18
 Cash on hand from other sources..... 10,285.63
 \$ 79,282.50 \$ 79,282.50

SUMMARY.

	Dr.		Cr.
Mortgages receivable.....	\$ 25,515.00	Contingent principal.....	\$ 30,840.00
Bills receivable.....	742.25	Diploma.....	177.00
Personal accounts.....	476.95	Room rent.....	866.06
Cash on hand.....	10,285.63	College hospital fund.....	57.39
		Railroad damages.....	598.50
		Int. on State warrants....	2.08
		Interest fund.....	4,483.80
	\$ 37,019.83		\$ 37,019.83

The following is a statement of the receipts and expenditures on account of the State appropriations, during the biennial period ending in November 9, 1887:

STATE CONTINGENT FUND OF 1885.

RECEIPTS.

Cash balance on hand.....\$ 57.47

EXPENDITURES.

Amount paid as per vouchers..... \$ 57.47
 \$ 57.57 \$ 57.47

STATE CONTINGENT FUND OF 1886.

RECEIPTS.

Amount from State Treasurer.....\$ 1,000.00

EXPENDITURES.

Amount paid as per vouchers..... \$ 1,000.00
 \$ 1,000.00 \$ 1,000.00

STATE CONTINGENT FUND OF 1887.

RECEIPTS.

Amount from State Treasurer.....\$ 1,000.00

EXPENDITURES.

Amount paid as per vouchers..... \$ 796.72
 Amount unexpended..... 203.28
 \$ 1,000.00 \$ 1,000.00

STATE EXPERIMENTAL FUND OF 1885.

RECEIPTS.

Cash balance on hand.....\$ 921.00

EXPENDITURES.

Amount paid as per vouchers..... \$ 921.00
 \$ 921.00 \$ 921.00

STATE EXPERIMENTAL FUND OF 1886.

RECEIPTS.

Amount from State Treasurer.....\$ 1,500.00

EXPENDITURES.

Amount paid as per vouchers..... \$ 808.81
 Amount unexpended..... 691.19
 \$ 1,500.00 \$ 1,500.00

STATE EXPERIMENTAL FUND OF 1887.

RECEIPTS.

Amount from State Treasurer.....\$ 1,500.00

EXPENDITURES.

Amount paid as per vouchers.....	\$ 403.29	
Amount unexpended	1,096 71	
		\$ 1,500.00
		\$ 1,500.00

ELECTRIC ENGINE AND ELECTRIC PLANT EXTENSION.

RECEIPTS.

Amount from State Treasurer.....\$ 2,300.00

EXPENDITURES.

Amount expended as per vouchers.....	\$ 2,300.00	
		\$ 2,300.00
		\$ 2,300.00

GENERAL REPAIRS AND CONTINGENT FUND.

RECEIPTS.

Amount from State Treasurer.....\$ 2,500.00

EXPENDITURES.

Amount expended as per vouchers.....	\$ 2,500.00	
		\$ 2,500.00
		\$ 2,500.00

CHEMICAL LABORATORY EXTENSION AND GAS SUPPLY.

RECEIPTS.

Amount from State Treasurer.....\$ 500 00

EXPENDITURES.

Amount expended as per vouchers.....	\$ 500.00	
		\$ 500.00
		\$ 500.00

Respectfully submitted,
HERMAN KNAPP, *Treasurer.*

REPORT OF THE SECRETARY ON LAND DEPARTMENT.

IOWA AGRICULTURAL COLLEGE, }
NOVEMBER 9, 1887. }

To the Board of Trustees:

The following is a brief history of the land department during the biennial period ending November 1, 1887.

At the beginning of the period the department was under the charge of Geo. W. Bassett of Fort Dodge.

His contract, which expired December 31st of that year, was by order of the Board extended for a term of six months. Desiring to remove to Colorado, Mr. Bassett, at his own request, was relieved from duty June 1, 1886, and final settlement made of his accounts. Under your orders the land agency was transferred to the College, and a contract made with Gen. Geddes, similar in its terms to the one under which Mr. Bassett had served. The regular annual settlement was made with Gen. Geddes at the close of the fiscal year of 1886, and upon his death in February last a committee of the Board examined his accounts and found the same correct. Herman Knapp was elected as his successor, and entered upon his duties March 1st. As provided in his contract with the Board, I have made an examination of his accounts from the beginning of his agency to November 1st. During that period the receipts of the land department have been as follows:

From the sale of endowment fund land.....	\$ 17,451 92
From the sale of land purchased with accumulated interest money.....	1,760.00
Total from sale of land	\$ 19,211.92
From rental of endowment fund land	20,905.75
From rental of land purchased with accumulated interest	2,158.46
From interest on loans of accumulated interest	365 83
Total from rental and interest....	\$ 23,430.04

The amount received from the sale of land has been forwarded as required by law to the Treasurer of State, while the income from

rentals and interest has been paid over to the College Treasurer. Duplicate receipts covering in the aggregate both of these amounts are on file in my office.

The following loans of accumulated interest have been made by the agent:

Loan No. 38, Richard Jones.....	\$ 2,850.00
Loan No. 39, Daniel McCarthy.....	2,060.00
Total	\$ 4,850.00

Lease No. 1688, has been forfeited, and is reported to the Board for reappraisalment.

Agent Knapp has satisfactorily accounted for all the land charged against him and for all funds collected either as principal or interest.

A careful examination of his books and a comparison of the same with the duplicate set kept in my office show his accounts to be correct, and the department to be in every way in excellent condition.

The following is a summary of the financial transactions of the land department during the biennial period as shown by the settlements made with the different officers in charge.

At the beginning of the period the land charged to the department was as follows :

Land included in congressional grant, acres.....	113,060.14
Land purchased with interest money, acres.....	11,173.17
Total number of acres.....	124,233.31

This land is accounted for as follows :

Endowment fund land—	
Sold, acres	15,171.40
Under lease, acres	96,979.07
Forfeited, acres	320.00
Withdrawn from market, acres.....	360.00
In conflict with swamp land entry, acres.....	149.67
Decided to be swamp land, acres.....	80.00
	113,060.14
Land purchased with accumulated interest—	
Sold, acres.....	1,040.00
Forfeited, acres	160.00
Withdrawn from market, acres.....	320.00
Under lease, acres.....	9,653.17
	11,173.17
Total accounted for, acres	124,233.31

The following is the land now owned by the College :

Land under lease, acres.....	106,632.24
Land not under lease, acres	1,309.67
	107,941.91

The following are the total receipts from the sale of land to November 1, 1887 :

Endowment fund land—	
Sales prior to November 1, 1885.....	\$223,067.70
Sales during the biennial period.....	45,962.55
	\$269,030.25

Land purchased with interest fund—	
Sales prior to November 1, 1885.....	8,600.00
Sales during the biennial period.....	3,640.00
	\$ 12,240.00

At the beginning of the biennial period the loans of accumulated interest amounted to		\$ 20,400.00
The investments during the biennial period amounted to		10,515.00
		\$ 30,915.00
Loans paid amounted to.....		5,400.00
Leaving the amount now invested in farm mortgages.....		\$ 25,515.00

The sum of \$5,325, belonging to this fund is now awaiting investment.

The income from the agency during the two years is as follows :

For 1886—	
Rental on endowment fund land.....	\$ 26,714.02
Rental on land purchased with interest fund.....	2,615.20
Interest on loans of interest fund.....	1,503.69
	\$ 30,832.91
For 1887—	
Rental on endowment fund land.....	\$ 27,607.06
Rental on land purchased with interest fund.....	2,829.66
Interest on loans of interest fund.....	1,395.00
	\$ 31,831.72
Total for the biennial period	\$ 62,664.63

During the two years leases covering 11,402.54 acres, amounting to \$29,010.99 have been renewed for terms of five or ten years. Comparing this amount with the sales during the same period it will be

noticed that the renewals equal about two-fifths of the leases falling due.

During the next three years principal upon leases will fall due as follows :

In the fiscal year 1888.....	\$ 25,000.00
In the fiscal year 1889.....	37,000.00
In the fiscal year 1890.....	122,000.00

I estimate that the payment of principal of leases will amount during the next fiscal year to \$20,000.

Your attention is called to the land withdrawn from market. If legislative action is desired concerning it arrangements should be made for presenting the matter to the next General Assembly.

Respectfully submitted,

E. W. STANTON,
Secretary.

REPORT OF LAND AGENT.

To the Board of Trustees of the Iowa State Agricultural College and Farm :

The following report of the transactions of the land department of the Iowa State Agricultural College, from November 1, 1885, to October 31, 1887, inclusive, is hereby submitted for your consideration.

Interest or rent upon leases belonging to the congressional grant has been collected as follows :

1885.	DR.	
To amount collected month of November.....	\$	2,819.47
To amount collected month of December.....		2,580.42
1886.		
To amount collected month of January.....		1,244.34
To amount collected month of February.....		1,849.20
To amount collected month of March.....		1,080.18
To amount collected month of April.....		1,750.41
To amount collected month of May.....		2,087.97
Total amount collected by Agent Bassett.....	\$	13,411.99
To amount collected month of June.....		3,336.51
To amount collected month of July.....		3,216.53
To amount collected month of August.....		2,585.72
To amount collected month of September.....		1,891.40
To amount collected month of October.....		2,271.87
Total amount collected by Agent Geddes.....		13,302.03
Total amount collected during the fiscal year ending October 31, 1886.....	\$	26,714.02
	\$	26,714.02

1886.	DR.		
To amount collected month of November.....	\$	2,328.88	
To amount collected month of December.....		2,945.47	
1887.			
To amount collected month of January.....		1,426.96	
Total amount collected by Agent Geddes.....	\$	6,701.31	
To amount collected month of February.....		1,299.67	
To amount collected month of March.....		1,659.72	
To amount collected month of April.....		2,267.22	
To amount collected month of May.....		2,777.85	
To amount collected month of June.....		2,684.54	
To amount collected month of July.....		2,567.68	
To amount collected month of August.....		2,248.72	
To amount collected month of September.....		2,316.16	
To amount collected month of October.....		3,084.19	
Total amount collected by Agent Knapp.....		20,905.75	
Total amount collected during the fiscal year ending October 31, 1887.....	\$	27,607.06	\$ 27,607.06

1885.	CR.		
By amount remitted November 30, voucher No. 188.	\$	2,819.47	
By amount remitted December 31, voucher No. 189.		2,580.42	
1886.			
By amount remitted January 30, voucher No. 190...		1,244.34	
By amount remitted February 27, voucher No. 191..		1,849.20	
By amount remitted March 31, voucher No. 192.....		1,080.18	
By amount remitted April 30, voucher No. 193.....		1,750.41	
By amount remitted May 31, voucher No. 194.....		2,087.97	
Total amount remitted by Agent Bassett.....	\$	13,411.99	
By amount remitted June 30, voucher No. 1.....		3,336.51	
By amount remitted July 31, voucher No. 2.....		3,216.53	
By amount remitted August 31, voucher No. 3.....		2,585.72	
By amount remitted September 30, voucher No. 4...		1,891.40	
By amount remitted October 30, voucher No. 5.....		2,271.87	
Total amount remitted by Agent Geddes.....		13,302.03	
Total amount paid to College Treasurer during the fiscal year ending October 31, 1886.....	\$	26,714.02	\$ 26,714.02

1886.	CR.		
By amount remitted November 30, voucher No. 6...\$		2,328.88	
By amount remitted December 31, voucher No. 7...		2,945.47	
1887.			
By amount remitted January 31, voucher No. 8....		1,426.96	
Total amount remitted by Agent Geddes.....	\$	6,701.31	
By amount remitted March 15, voucher No. 9.....		1,299.67	
By amount remitted March 31, voucher No. 10.....		1,659.72	
By amount remitted April 30, voucher No. 11.....		2,267.22	
By amount remitted May 31, voucher No. 12.....		2,977.85	
By amount remitted June 30, voucher No. 13.....		2,684.54	
By amount remitted August 1, voucher No. 14.....		2,567.68	
By amount remitted August 31, voucher No. 15....		2,248.72	
By amount remitted September 30, voucher No. 16..		2,316.16	
By amount remitted October 31, voucher No. 17....		3,084.19	
Total amount remitted by Agent Knapp.....		20,905.75	
Total amount paid to College Treasurer during the fiscal year ending October 31, 1887.....	\$	27,607.06	\$ 27,607.06

CONTINGENT FUND.

INTEREST, OR RENT, UPON LEASES BELONGING TO LANDS PURCHASED
WITH ACCUMULATED INTEREST.

1885.	DR.		
To amount collected month of November.....	\$	201.60	
To amount collected month of December.....		76.80	
1886.			
To amount collected month of January.....		233.60	
To amount collected month of February.....		220.80	
To amount collected month of March.....		102.40	
To amount collected month of April.....		233.60	
To amount collected month of May.....		375.20	
Total amount collected by Agent Bassett.....	\$	1,444.00	
To amount collected month of June.....		166.40	
To amount collected month of July.....		348.80	
To amount collected month of August.....		76.80	
To amount collected month of September.....		156.80	
To amount collected month of October.....		422.40	
Total amount collected by Agent Geddes.....		1,171.20	
Total amount collected during the fiscal year ending October 31, 1886.....	\$	2,615.20	\$ 2,615.20
1886.			
To amount collected month of November.....	\$	178.40	
To amount collected month of December.....		400.00	
1887.			
To amount collected month of January.....		92.80	
Total amount collected by Agent Geddes....	\$	671.20	
To amount collected month of February.....		224.00	
To amount collected month of March.....		89.60	
To amount collected month of April.....		105.75	
To amount collected month of May.....		339.15	
To amount collected month of June.....		276.76	
To amount collected month of July.....		364.80	
To amount collected month of August.....		76.80	
To amount collected month of September.....		102.40	
To amount collected month of October.....		579.20	
Total amount collected by Agent Knapp.....		2,158.46	
Total amount collected during the fiscal year ending October 31, 1887.....	\$	2,829.66	\$ 2,829.66

1885.	CR.		
By amount remitted November 30, voucher No. 106..	\$	201.60	
By amount remitted December 31, voucher No. 107..		76.80	
1886.			
By amount remitted January 30, voucher No. 108...		233.60	
By amount remitted February 27, voucher No. 109..		220.80	
By amount remitted March 31, voucher No. 110.....		102.40	
By amount remitted April 30, voucher No. 111.....		233.60	
By amount remitted May 31, voucher No. 112.....		375.20	
Total amount remitted by Agent Bassett.....	\$	1,444.00	
By amount remitted June 30, voucher No. 1.....		166.40	
By amount remitted July 31, voucher No. 2.....		348.80	
By amount remitted August 31, voucher No. 3... ..		76.80	
By amount remitted September 30, voucher No. 4... ..		156.80	
By amount remitted October 30, voucher No. 5.....		422.40	
Total amount remitted by Agent Geddes.....		1,171.20	
Total amount paid College Treasurer during the fiscal year ending October 31, 1886.....	\$	2,615.20	\$ 2,615.20
1886.			
To amount remitted November 30, voucher No. 6...		178.40	
To amount remitted December 31, voucher No. 7...		400.00	
1887.			
To amount remitted January 31, voucher No. 8.....		92.80	
Total amount remitted by Agent Geddes.....		671.20	
To amount remitted March 15, voucher No. 9.....		224.00	
To amount remitted March 30, voucher No. 10.....		89.60	
To amount remitted April 30, voucher No. 11.....		105.75	
To amount remitted May 31, voucher No. 12.....		339.15	
To amount remitted June 30, voucher No. 13.....		276.76	
To amount remitted August 1, voucher No. 14.....		364.80	
To amount remitted August 31, voucher No. 15.....		76.80	
To amount remitted September 30, voucher No. 16..		102.40	
To amount remitted October 31, voucher No. 17.....		579.20	
Total amount remitted by Agent Knapp.....		2,158.46	
Total amount remitted to College Treasurer dur- ing the fiscal year ending October 31, 1887.....	\$	2,829.66	\$ 2,829.66

Interest on loans made from accumulated interest.

1885.	DR.	
To amount collected month of November.....	\$	201.16
To amount collected month of December		661.06
1886.		
To amount collected month of January.....		427.00
To amount collected month of February.....		116.47
Total amount collected by Agent Bassett.....	\$	1,405.69
To amount collected month of June		70.00
To amount collected month of July.....		28.00
Total amount collected by Agent Geddes.....		98.00
Total amount collected during the fiscal year ending October 31, 1886.....	\$	1,503.69
	\$	1,503.69
1886.		
To amount collected month of November.....	\$	119.00
To amount collected month of December.....		283.50
1887.		
To amount collected month of January.....		626.67
Total amount collected by Agent Geddes.....	\$	1,029.17
To amount collected month of February.....		36.20
To amount collected month of March.....		42.00
To amount collected month of April.....		43.15
To amount collected month of June		75.88
To amount collected month of July.....		98.60
To amount collected month of October.....		70.00
Total amount collected by Agent Knapp.....		365.83
Total amount collected during the fiscal year ending October 31, 1887.....	\$	1,395.00
	\$	1,395.00

1885.	CR.	
By amount remitted November 30, voucher No. 27..	\$	201.16
By amount remitted December 31, voucher No. 28 ..		661.06
1886.		
By amount remitted January 30, voucher No. 29		427.00
By amount remitted February 27, voucher No. 30...		116.47
Total amount remitted by Agent Bassett.....	\$	1,405.69
By amount remitted June 30, voucher No. 1.....		70.00
By amount remitted July, voucher No. 2		28.00
Total amount remitted by Agent Geddes.....		98.00
Total amount paid to College Treasurer during the fiscal year ending October 31, 1886.....	\$	1,503.69
	\$	1,503.69
1886.		
By amount remitted November 30, voucher No. 3...\$		119.00
By amount remitted December 31, voucher No. 4....		283.50
1887.		
By amount remitted January 31, voucher No. 5		626.67
Total amount remitted by Agent Geddes	\$	1,029.17
By amount remitted March 15, voucher No. 6		36.20
By amount remitted March 31, voucher No. 7		42.00
By amount remitted April 30, voucher No. 8		43.15
By amount remitted June 30, voucher No. 9.....		75.88
By amount remitted August 1, voucher No. 10		98.60
By amount remitted October 31, voucher No. 11.....		70.00
Total amount remitted by Agent Knapp.....		365.83
Total amount paid to College Treasurer during the fiscal year ending October 31, 1887.....	\$	1,395.00
	\$	1,395.00

ENDOWMENT FUND.

1885.	DR.		
To amount collected month of November.....	\$	5,760.68	
To amount collected month of December.....		1,760.00	
1886.			
To amount collected month of January.....		2,800.00	
To amount collected month of March.....		1,253.32	
To amount collected month of April.....		1,662.65	
To amount collected month of May.....		1,540.00	
Total amount collected by Agent Bassett.....	\$	14,776.65	
To amount collected month of June.....		2,960.00	
To amount collected month of July.....		4,272.83	
To amount collected month of August.....		1,981.15	
To amount collected month of September.....		240.00	
To amount collected month of October.....		880.00	
Total amount collected by Agent Geddes.....	\$	10,333.98	
Total amount collected during the fiscal year ending October 31, 1886.....	\$	25,110.63	\$ 25,110.63
1886.			
To amount collected month of December.....	\$	1,320.00	
1887.			
To amount collected month of January.....		2,080.00	
Total amount collected by Agent Geddes.....	\$	3,400.00	
To amount collected month of March.....		2,880.00	
To amount collected month of April.....		1,600.00	
To amount collected month of May.....		1,710.00	
To amount collected month of June.....		4,000.00	
To amount collected month of July.....		3,781.92	
To amount collected month of August.....		1,480.00	
To amount collected month of October.....		2,000.00	
Total amount collected by Agent Knapp.....		17,451.92	
Total amount collected during the fiscal year ending October 31, 1887.....	\$	20,851.92	\$ 20,851.92

1885.	CR.		
By amount remitted November 30, voucher No. 113.		5,760.68	
By amount remitted December 31, voucher No. 114..		1,760.00	
1886.			
By amount remitted January 30, voucher No. 115 ...		2,800.00	
By amount remitted March 31, voucher No. 116		1,253.32	
By amount remitted April 30, voucher No. 117.....		1,662.65	
By amount remitted May 31, voucher No. 118		1,540.00	
Total amount remitted by Agent Bassett.....	\$	14,776.65	
By amount remitted June, voucher No. 1.....		2,960.00	
By amount remitted July, voucher No. 2.....		4,272.83	
By amount remitted August, voucher No. 3.....		1,981.15	
By amount remitted September 30, voucher No. 4...		240.00	
By amount remitted October, voucher No. 5.....		880.00	
Total amount remitted by Agent Geddes	\$	10,333.98	
Total amount paid to State Treasurer during fiscal year ending October 31, 1886.....	\$	25,110.63	\$ 25,110.63
1886.			
By amount remitted December 31, voucher No. 6...\$		1,320.00	
1887.			
By amount remitted January 31, voucher No. 7....		2,080.00	
Total amount remitted by Agent Geddes	\$	3,400.00	
By amount remitted March 19, voucher No. 8		800.00	
By amount remitted March 31, voucher No. 9.....		2,080.00	
By amount remitted April 30, voucher No. 10.....		1,600.00	
By amount remitted May 31, voucher No. 11		1,710.00	
By amount remitted June 30, voucher No. 12.....		4,000.00	
By amount remitted August 1, voucher No. 13.....		3,781.92	
By amount remitted August 31, voucher No. 14....		1,480.00	
By amount remitted October 31, voucher No. 15		2,000.00	
Total amount remitted by Agent Knapp	\$	17,451.92	
Total amount paid to State Treasurer during the fiscal year ending October 31, 1887.....	\$	20,851.92	\$ 20,851.92

CONTINGENT FUND PRINCIPAL.

SALE OF LANDS PURCHASED WITH ACCUMULATED INTEREST.

1886.	DR.		
To amount collected month of March	\$	800.00	
Total amount collected by Agent Bassett .. .	\$	800.00	
To amount collected month of July.....		800.00	
Total amount collected by Agent Geddes.....	\$	800.00	
Total amount collected during the fiscal year ending October 31, 1886.....	\$	1,600.00	\$ 1,600.00
1886.			
To amount collected month of November.....		280.00	
Total amount collected by Agent Geddes .. .			280.00
1887.			
To amount collected month of March		480.00	
To amount collected month of October.....		1,280.00	
Total amount collected by Agent Knapp.....	\$	1,760.00	
Total amount collected during the fiscal year ending October 31, 1887.....	\$	2,040.00	\$ 2,040.00
1886.	CR.		
By amount remitted March 31, voucher No. 10	\$	800.00	
Total amount remitted by Agent Bassett	\$	800.00	
By amount remitted July 31, voucher No. 1		800.00	
Total amount remitted by Agent Geddes.....		800.00	
Total amount remitted State Treasurer during the fiscal year ending October 31, 1886.....	\$	1,600.00	\$ 1,600.00
1886.			
By amount remitted November 30, voucher No. 2....		280.00	
Total amount remitted by Agent Geddes			280.00
1887.			
By amount remitted March 31, voucher No. 3.....		480.00	
By amount remitted October 31, voucher No. 4.....		1,280.00	
Total amount remitted by Agent Knapp.....	\$	1,760.00	
Total amount remitted State Treasurer during the fiscal year ending October 31, 1887	\$	2,040.00	\$ 2,040.00

PRINCIPAL ON LOANS MADE FROM ACCUMULATED INTEREST.

	DR.		
1885.			
To principal collected month of December.....	\$	3,400.00	
Total collected by Agent Bassett.....			\$ 3,400.00
Total amount collected during the fiscal year ending October 31, 1886.....	\$	3,400.00	\$ 3,400.00
1887.			
To principal collected month of January.....		2,000.00	
Total amount collected by Agent Geddes.....			2,000.00
Total amount collected during the fiscal year ending October 31, 1887	\$	2,000.00	\$ 2,000.00
1885.	CR.		
By principal remitted December 31, voucher No. 5..		3,400.00	
Total remitted by Agent Bassett.....			3,400.00
Total amount remitted College Treasurer during the fiscal year ending October 31, 1886...\$		3,400.00	\$ 3,400.00
1887.			
By principal remitted January 31, voucher No. 6... \$		2,000.00	
Total remitted by Agent Geddes.....			2,000.00
Total amount remitted College Treasurer during the fiscal year ending Oct. 31, 1887.....\$		2,000.00	\$ 2,000.00

RECAPITULATION.

Amount of interest fund collected during year ending October 31, 1886.....	\$ 26,714.02	
Amount of interest fund collected during year ending October 31, 1887.....	27,607.06	
Amount of contingent fund collected during year ending October 31, 1886.....	2,615.20	
Amount of contingent fund collected during year ending October 31, 1887.....	2,829.66	
Amount of interest on loans collected during year ending October 31, 1886.....	1,503.69	
Amount of interest on loans collected during year ending October 31, 1887.....	1,395.00	
Total income from department since last report		62,664.63
Amount of endowment fund collected during year ending October 31, 1886.....	\$ 25,110.63	
Amount of endowment fund collected during year ending October 31, 1887.....	20,851.92	
Amount of principal on loans collected during year ending October 31, 1886.....	3,400.00	
Amount of principal on loans collected during year ending October 31, 1887.....	2,000.00	
Amount of contingent fund collected during year ending October 31, 1886.....	1,600.00	
Amount of contingent principal fund collected during year ending October 31, 1887.....	2,040.00	
		\$ 55,002.55
Total collections since last report.....		\$ 117,667.18

There have been loaned of the contingent fund principal since date of last report, \$10,515.00, at seven per cent, secured on improved farming land, as follows:

Loan number 32, Walter L. Lyons	\$ 800.00	
Loan number 33, Walter L. Lyons	1,200.00	
Loan number 34, H. A. Rustebahke.....	1,200.00	
Loan number 35, Wm. V. Manchester.....	900.00	
Loan number 36, Peter and Anna Peterson	1,000.00	
Total loaned by Agent Bassett.....		\$ 5,100.00
Loan number 37, Mary Spencer	\$ 585.00	
Total loaned by Agent Geddes		\$ 585.00
Loan number 38, Richard Jones.....	\$ 2,850.00	
Loan number 39, D. McCarthy	2,000.00	
Total loaned by Agent Knapp.....		\$ 4,850.00
Total loaned since last report		\$ 10,515.00
Amount of loans outstanding at last report		20,400.00
Total		\$ 30,915.00
Amount of principal paid since last report.....		5,400.00
Amount of loans outstanding		\$ 25,515.00
Number of acres of congressional grant forfeited since last report.....	320	
Valuation of same when forfeited		\$ 1,520.00
Number of acres of Sioux City purchase forfeited since last report	160	
Valuation of same when forfeited		480.00
Number of acres of congressional grant patented since last report	15,171.40	
Valuation of same		\$ 45,962.55
Number of acres of Sioux City purchase patented since last report	1,040.00	
Valuation of same		\$ 3,640.00

LANDS BELONGING TO CONGRESSIONAL GRANT.

Number of acres in market for leasing.....	680.00
Number of acres under lease.....	96,995.02
Total number of acres patented.....	106,317.62
N W ¼, 30, 97, 28 in conflict with swamp land entry .	149.67
S ¼ of N E ¼, 29, 95, 30 decided to be swamp land....	80.00
Total number of acres	204,222.31

LANDS BELONGING TO SIOUX CITY PURCHASE.

Number of acres in market for leasing.....	480.00
Number of acres under lease.....	9,653.17
Total number of acres patented.....	4,880.00
Total number of acres.....	15,013.17

The following is a description of the lands, which, by order of the Board of Trustees at the November meeting, 1887, are now on the market to be leased :

LAND BELONGING TO ENDOWMENT FUND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Valuation per acre.
Se qr.....	28	99	48	160	\$ 3.00
Ne qr of the se qr and s hf of se qr.....	21	99	48	120	3.00
E hf of se qr.....	31	94	37	80	5.00
Sw qr.....	36	95	27	160	*
Ne qr.....	30	96	33	160	*

* Not yet appraised

LAND BELONGING TO CONTINGENT FUND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Valuation per acre.
Sw qr.....	26	93	36	160	\$ 10.00
Ne qr.....	36	93	36	160	5.00
Se qr.....	26	93	36	160	9.00

Respectfully submitted,

HERMAN KNAPP,

Land Agent Iowa Agricultural College.

REPORT OF THE FINANCIAL AGENT.

CORNING, IOWA, November 1, 1887.

To the Honorable Board of Trustees:

GENTLEMEN—I herewith hand you my report of the transactions of this office for the biennial period ending November 1, 1887. In the report rendered your honorable body in November, 1885, and printed on page 112 of the eleventh biennial report the amount of endowment fund loaned is reported at \$136,825.00. During the fiscal year of 1886 additional loans amounting to \$50,000.00 were negotiated making the total on November 1, 1886, \$186,825.00. To this as a basis I have added during the year just passed and ending November 1, 1887, the sum of \$67,950.00, making a total investment of your endowment fund of \$254,775.00 to November 1, 1887.

During the year there has been paid under the terms allowed by law: Loan No. 3, \$800; loan No. 19, \$1,200; loan No. 13, \$1,500; loan No. 60, \$1,600, was merged into loan No. 192, \$3,200, leaving the condition of the investment account to date as follows:

Amount invested up to November 1, 1887.....	\$254,775.00
Amount loans paid off.....	5,100.00
Balance invested.....	\$249,675.00
I have drawn on the State Treasurer since November 1, 1886,	
funds amounting to.....	\$ 50,041.87
Amount on hand November 1, 1886.....	24,963.38
Amount to increase Sac county loan.....	1,600.00
	\$ 76,605.25
Amount invested in mortgages.....	67,950.00
Leaving balance on hand with agent.....	\$ 8,655.25

With applications under consideration to about this amount.

I have collected and paid into the hands of the State Treasurer during the past year amounts as follows:

Amount for interest on endowment fund falling due January 1, 1887.....	\$ 7,831.93
Amount sent in, in odd amounts during year.....	393.35
Amount interest falling due October 1, 1887.....	8,839.34
Being a total of interest collected during the year.....	\$ 17,064.62

There is yet due from Carl Peters' loan, No. 53, Sac county, due
January 1, 1887.....\$ 40.00
There is yet due from interest, due October 1, 1887..... 1,025.86

These parties offer various excuses, and promise payment in due time. The loans made by your agent, including the year ending November 1, 1887, have been made in the following counties in Iowa, to-wit:

Adams county.....	\$ 42,550.00
Appanoose county.....	3,800.00
Butler county.....	5,000.00
Crawford county.....	5,000.00
Clarke county.....	2,700.00
Calhoun county.....	1,100.00
Cherokee county.....	22,650.00
Cass county.....	5,000.00
Decatur county.....	4,800.00
Fremont county.....	8,300.00
Dickinson county.....	1,250.00
Greene county.....	1,600.00
Taylor county.....	4,300.00
Hancock county.....	5,100.00
Mills county.....	5,400.00
O'Brien county.....	2,250.00
Emmet county.....	9,850.00
Hamilton county.....	2,750.00
Ringgold county.....	4,550.00
Shelby county.....	3,200.00
Sioux county.....	4,950.00
Monona county.....	11,000.00
Montgomery county.....	9,600.00
Sac county.....	29,075.00
Ida county.....	1,600.00
Poweshiek county.....	800.00
Wayne county.....	4,050.00
Humboldt county.....	2,000.00
Palo Alto county.....	1,600.00
Plymouth county.....	3,200.00
Kossuth county.....	700.00
Marion county.....	600.00
Lyon county.....	13,600.00
Van Buren county.....	3,400.00
Harrison county.....	9,450.00
Osceola county.....	11,000.00
Wright county.....	1,900.00
Total.....	\$249,675.00

Your investment now stands in thirty-seven counties of the State. The question of delinquent taxes has had due attention, and up to this year these have all been paid. This, with the payment of interest, is a good recommendation of the people with whom we have dealt. The expenses I do not think will exceed \$250 for the year, beginning February 1, 1887, the date of the allowance of \$400 for said annual expenses, but I ask that the amount be continued as the annual allowance, for two reasons. I shall use no more than is needed, and some unforeseen expenses may come up, the past year being no doubt the minimum year in the line of expenses.

In loan No. 124, of \$2,000, the parties wish to pay off the present loan and increase the amount to \$3,000. The land has been crossed by a railroad just built, which has no doubt affected the value of the land, but to what extent I am not advised. As the time allowed by law to pay off the original loan has not expired, I refer the matter to you for decision and action.

Respectfully submitted,

D. S. SIGLER, *Agent.*

PROCEEDINGS

OF

BOARD OF TRUSTEES.

ABSTRACT OF THE PROCEEDINGS OF THE BOARD OF
TRUSTEES, 1886-7.

MEMBERS OF THE BOARD OF TRUSTEES.

<i>First District</i>	HON. J. W. GARNER, Columbus City,	-	-	-	1892
<i>Second District</i>	HON. C. M. DUNBAR, Maquoketa,	-	-	-	1892
<i>Third District</i>	HON. B. P. SPEER, Cedar Falls,	-	-	-	1890
<i>Fourth District</i>	HON. S. P. YEOMANS, Mason City,	-	-	-	1892
<i>Fifth District</i>	HON. JOSEPH DYSART, Dysart,	-	-	-	1888
<i>Sixth District</i>	HON. JOHN MORRISON, Sigourney,	-	-	-	1890
<i>Seventh District</i>	HON. J. S. CLARKSON, Des Moines,	-	-	-	1888
<i>Eighth District</i>	HON. C. M. PASCHAL, New Market,	-	-	-	1892
<i>Ninth District</i>	HON. PLATT WICKS, Harlan,	-	-	-	1890
<i>Tenth District</i>	HON. D. W. MOTT, Hampton,	-	-	-	1888
<i>Eleventh District</i>	HON. A. D. PECK, Sac City,	-	-	-	1888

OFFICERS OF THE BOARD.

HON. D. W. MOTT, Hampton, *Chairman*.

E. W. STANTON, Ames, *Secretary*.

HERMAN KNAPP, Ames, *Treasurer*.

J. B. LINCOLN, Ames, *Steward*.

STANDING COMMITTEES.

Executive and Finance Committee—Trustees Wicks, Dysart, Peck, Garner and Clarkson.

Committee on Faculty and Courses of Study—Trustees Clarkson, Peck, Dysart, Speer and Dunbar.

Committee on Farm and Farm Buildings—Trustees Garner, Speer, Paschal, Yeomans and Dysart.

Committee on Horticulture, Experiments and Hybridizing—Trustees Speer, Paschal and Yeomans.

Committee on Workshop—Trustees Morrison, Dunbar and Mott.

Committee on College Lands—Trustees Dysart, Peck and Dunbar.

Building Committee—Trustees, Yeomans, Garner and Morrison.

Committee on Investments—Trustees Wicks, Mott and Dunbar.

Committee on Library—Trustees Paschal, Garner and Clarkson.

Committee on Rules—Trustees Dunbar, Morrison and Garner.

Committee on Scientific Departments—Trustees Peck, Yeomans and Dysart.

Committee on Bonds—Trustees Dysart and Garner.

Committee on Domestic Economy—Trustees Yeomans, Dysart and Garner.

STATE APPROPRIATIONS.

The Twenty-first General Assembly appropriated to the Agricultural College the following sums:

For engine for electric light system and improvement thereof	\$ 2,300
For renewing gas supply and for laboratory extension...	500
For general repairs and contingent fund	2,500
Total	\$ 5,300

At the meeting of the Board of Trustees, in May, 1886, Trustees Mott, Morrison and Dunbar were appointed a committee to purchase the engine and arrange for the other needed improvements of the electric light system. Under the direction of this committee an engine and a dynamo were purchased and located in the old gas house, which was repaired for that purpose. The following shows the purposes for which the appropriation was expended:

Paid for Buckeye automatic 35-horse power engine, in position	\$ 850.00
Paid for No. 4 Edison dynamo with capacity of 160 10-candle power lamps, placing same in position, removing old dynamo into new room and making all necessary connections	1,150.00
Paid for smoke stack	58.05
Paid for electric light fixtures	21.38
Paid for putting on new roof and ceiling, repairing floor and walls of engine house and repairing "plant"	220.57
	\$ 2,300.00

The committee placed the electric light system under the charge of the Steward, Captain J. R. Lincoln.

The appropriation of \$500 for supplying the chemical laboratory with gas works was found insufficient for that purpose. An agreement was, however, made with Mathews & Holt, of Chicago, to put in a machine of the required capacity for \$556, the balance over and above the State appropriation to be paid from the improvement fund. Trustee Yeomans, who had charge of the purchase, states in his report to the Board that the machine is entirely satisfactory, and that the expense of supplying gas to the laboratory is much less than by the old method.

The appropriation of \$2,500 "for general repairs and contingent fund," was intended to supplement the annual repair fund and to supply the means by which necessary expenses connected with the

management of the College endowment could be legally met. Expenses attending the sale of bonds, examination of the security of farm loans, settlement with financial agent, etc., have been charged to this account. The remainder of the fund has been expended, under the direction of Trustee Yeomans, in the repair and improvement of buildings. The following is a summary of the bills paid from this appropriation:

Expenses and per diem of committee selling bonds	\$ 382.34
Services and expenses of D. G. Edmunson, in selling bonds,	300.00
Expenses and per diem of committee, examining security of farm loans	88.78
Expenses of committee making settlement with financial agent	11.19
Expenses of committee on appropriations	16.00
Repair and improvement of mechanical buildings	346.90
Repair and improvement of chemical and physical laboratory	247.50
Repair and improvement of north hall	289.61
Repair and improvement of farm house	242.86
Repair and improvement of veterinary buildings	34.00
Repair and improvement of house occupied by professor of botany	91.87
Repair and improvement of house occupied by professor of chemistry	51.63
Repair and improvement of horticultural buildings	75.28
Repair of office building	1.50
Repair of sewer	2.80
Repair of water works	24.75
Out-house for sanitary building	62.46
Out-house for engineering hall	55.08
Out-house and coal-house of brick for office building	175.45
	\$ 2,500.00

At the beginning of the biennial period there was on hand of the annual appropriation of 1885 for repairs and management of land, a balance of \$57.47. This amount has been paid out for the following purposes:

Repairing residence of professor of botany	\$ 15.25
Repairing north hall	3.00
Repairing south hall	18.25
Repairing office building	8.65
Repairing farm buildings	4.37
Repairing museum	4.95
Expenses connected with management of lands	3.00
	\$ 57.47

The appropriations of 1886 and 1887 have been expended in great part under the supervision of Trustee Yeomans.

The following are the disbursements to date:

Repairing farm house.....	\$ 505.86
Repairing other farm buildings.....	246 35
Repairing chemical and physical laboratory.....	273.46
Repairing mechanical buildings.....	283.93
Repairing south hall.....	143 41
Repairing main building.....	81.51
Repairing north hall.....	45.20
Repairing veterinary buildings.....	29.13
Repairing horticultural buildings.....	11.53
Repairing house occupied by professor of chemistry.....	30.23
Repairing office building.....	3.16
Expenses connected with management of land department	142 95
Total.....	\$ 1,796.72

The balance to the credit of the fund is \$203.28. Of this amount \$107.63 is already appropriated by the board to the repair of student rooms, to replace an equal amount of room rent fund used for outside improvements. The balance available for other repairs which may become necessary before May next, is therefore only \$95.65. The annual fund of \$1,000 is altogether insufficient to keep the buildings belonging to the College in thorough repair.

It was ordered that funds for the repair of buildings be disbursed under the direction of the chairman of the building committee.

The annual fund of \$1,500.00 for experimentation is divided equally between the agricultural and horticultural departments, and the purposes for which it is used are stated in full in the reports of the heads of these departments in another part of this report.

The board decided that the following are among the most pressing needs of the College, and should be included in the list of appropriations asked of the Twenty-second General Assembly:

A ladies hall.....	\$70,000.00
Removing privies and water-closets from main building and placing the same in outside towers.....	3,500 00
Sinking wells so as to supply water to resident professors and to furnish water supply to hospital.....	500.00
Mechanical department improvements.....	500 00
Additional story to rear portion of office.....	350 00
Total.....	\$ 74,850.00

Also that the annual appropriation for the management of the land department and the repair of buildings be increased from \$1,000.00 to \$2,500.00, the same to be available for the repair and improvement of all College buildings.

Trustees Yeomans, Speer, Garner, Dunbar and Mott were authorized to represent the board in making all necessary explanation of the needs of the College to Legislative Committees.

ENDOWMENT FUND.

The endowment from which the College derives its support has been increased during the biennial period by the amount of \$7,350.00. Of this sum \$6,000.00 has been transferred from accumulated interest, and the balance of \$1,350.00 is due to the re-appraisal of forfeited land. The total endowment amounts to \$648,916.16, and has been derived from the following sources:

From congressional land grant	\$582,236.65
From the transfer and investment of interest fund.....	66,679.51
Total	\$648,916.16

A detailed statement of the present condition of the endowment fund is given in Exhibit A, attached to the secretary's report. This exhibit shows:

Investment in six per cent bonds.....	\$ 6,000.00
Investment in eight per cent farm mortgages	250,875.00
Investment in lands, eight per cent.....	\$249,045.91
Investment in seven per cent farm mortgages..	25,515 00
	374,560.91
Cash on hand awaiting investment	17,480 25
Total	\$648,916.16

ENDOWMENT FUND BONDS.

After the amendment of the national law permitting this State to invest the endowment of the College in farm mortgages, the Board decided to sell its five and six per cent bonds for the purpose of realizing the higher rate of interest to be obtained from farm loans. Trustee Wicks and Agent Sigler were appointed in January, 1885, a committee to negotiate such sale. Before the close of the year the committee, with the aid of the Executive Council, had disposed of bonds amounting to \$40,000, leaving on hand at the beginning of this biennial period a further amount of \$69,700. The committee

was continued by the Board with full power to dispose of these remaining securities as they should deem for the best interest of the College. In May, 1886, the committee reported that they had sold to the Security Loan and Trust Company, of Des Moines, at par and accrued interest the following bonds:

Afton Independent School District, bearing 6 per cent interest.....	\$ 9,900
Harlan Independent School District, bearing 5 per cent interest	11,400
Des Moines Independent School District, bearing 5 per cent interest	13,500
Ames Independent School District, bearing 5 per cent interest.....	10,000
Stuart Independent School District, bearing 6 per cent interest	4,000
Athens Township Independent School District, bearing 6 per cent interest	1,700
Poe Township Independent School District, bearing 6 per cent interest	600
Union Township Independent School District, bearing 6 per cent interest	400
Woodlawn Independent School District, bearing 7 per cent interest	200
Prairie Independent School District, bearing 6 per cent interest	2,400
Guthrie Center Independent School District, bearing 6 per cent interest	2,000
Stuart City bonds, bearing 6 per cent interest	2,000
Winnebago county bonds, bearing 6 per cent interest	5,800
	<hr/>
	\$63,700

The accumulated interest amounted to \$772.27, and was paid into the State treasury. In negotiating a sale of the bonds, the committee found it necessary to pay the Security Loan & Trust Company through D. G. Edmunson the sum of \$300. A majority of the different issues of bonds contained defects rendering them unsalable until cured. To make the sale absolute and have the Trust Company cure the defects at their own expense, the sum mentioned was allowed by the committee. Their action was approved by the Board.

The bonds unsold are as follows:

Security Loan and Trust Company, bonds bearing 6 per cent interest.....	\$ 5,500
Independent School District bonds of Maquoketa, bearing 6 per cent interest.....	500
	<hr/>
	\$ 6,000

ENDOWMENT FUND LOANS.

The financial transactions of the agent having charge of the investment of the endowment fund are set forth in detail in the report of that officer on page 139. The following summary is taken from the books of the Secretary of the Board of Trustees:

Investments in farm mortgages at the beginning of the biennial period	\$136,825
Investments during the last two years	\$117,950
Principal paid to State Treasurer	3,900
	<hr/>
Present investment	\$250,875

The principal of loan No. 19, amounting to \$1,200, has been paid to the State Treasurer since the close of the biennial period, making the present investment \$249,675, as reported by the agent. These investments bear eight per cent interest.

At the meeting of the Board in November, 1885, Trustees Mott and Wicks were appointed a committee to make an examination of the lands on which loans had been made by Agent Sigler, sufficient to enable them to judge as to the security of such loans. Trustee Wicks, on behalf of this committee, reported at the meeting of the Board in May, 1886, as follows:

To the Board of Trustees of the Iowa Agricultural College:

The undersigned, heretofore appointed to view and report upon the loans made by D. S. Sigler, the financial agent, begs leave to report as follows:

That he began his investigation of said loans on the 10th day of April, 1886, and finished on April 24th, occupying a part of the time during said period.

That he went first to the counties of Mills, Fremont, Montgomery and Adams, on the line of the Chicago, Burlington & Quincy Railroad. The loans in all of said counties are fine risks. I personally

inspected two loans in each of said counties and found them safe and within the limits of the regulations adopted by the Board. I especially commend the care of the financial agent in the placing of loans here. The loans in Fremont and Mills, as well as in Montgomery and Adams, are on the finest lands in those counties; and here the price of lands is so well established, both by reason of the settlement and improvement of the counties, as well as the fine soil, that it renders loans in these four counties the best securities to be had in the State. I made specific inquiry as to each piece of land, and can report all loans safe in these counties.

I also visited the one loan in Cass county, and find it safe, though the land is not as good as some in Mills and other counties mentioned.

I then proceeded to the counties of Clarke, Wayne, Decatur and Taylor, and also made inquiry as to all loans in Poweshiek and Appanoose counties. I will state that in all of the last mentioned counties the land is more smooth, and in many places too level, not affording sufficient drainage, and hence the country is not so good and lands worth less per acre than in the counties of Cass, Mills, Fremont and Montgomery—these last named counties being the finest corn lands in the State of Iowa.

But in the counties of Clarke, Wayne, Decatur and Taylor the loans are smaller than in the counties first mentioned, and all loans inspected in these counties (I inspected personally loans in Clarke, Decatur, Taylor and Wayne) I found safe. While the lands are lower in price, the bonus being less, the proportional value of lands to the loans is preserved in all of these counties, and all loans are secure, and the interests of the college fund well looked after.

Special attention was given to the character of the borrowers. In general, I found these, men of push and energy; in most instances the men taking loans have lived in their respective counties for many years and bear good reputations. The financial agent has had the good sense to combine in all his loans the two things necessary to make them safe, viz., men of push and energy and good security.

The lands in Shelby I personally know, and can state loans well placed.

I have taken a good deal of pains to find out all the facts connected with the loans in all counties mentioned, and am glad to be able to say that I am confident the financial agent has taken the same interest

in handling the funds and placing loans that a prudent man would exercise in his own private business.

I regret that I was unable to perform this duty imposed on me sooner, but am glad to be able now, at this late day, to say to the Board that the entire funds in all counties mentioned are safe and well placed, so far as a careful and hasty inspection enabled me to determine. All of which is respectfully submitted.

PLATT WICKS, *Committee*, WITH
D. W. MOTT.

Harlan, Iowa, April 29, 1886.

The foregoing report was approved by the Board. No further examination of the loans made in this department, has been deemed necessary.

The chairman of the Board was, at this meeting, authorized to approve the monthly bills of expenses of Agent Sigler, incurred in connection with the discharge of his duties as financial agent.

At a meeting of the Board of Trustees held in Des Moines, January, 1887, Trustees Mott, Yeomans and Garner were appointed a committee to consult with the Executive Council on matters relating to the financial agency. This committee recommended:

1. That no change be made in blank forms of notes, mortgages, etc., but that the agent be instructed to make all loans when possible for the term of not less than five years.
2. That the salary of the agent be reduced to \$1,000 per annum.
3. That the expenses of the agent payable by the State be limited to \$400 per annum.

The recommendations of the committee were adopted, and February 1, 1887, fixed as the date at which the changed salary of the agent should begin. By a vote of the Board it was ordered that in the selection of an agent, Mr. Sigler should be given the preference, provided he would accept. The chairman and the secretary of the Board were directed to complete and on behalf of the Board, sign the contract with the financial agent. The contract as thus completed and signed is as follows:

CONTRACT WITH AGENT SIGLER.

This contract by and between the Iowa State Agricultural College and Farm, and D. S. Sigler, witnesseth:

That the said Sigler having been appointed financial agent of said College and Farm by the trustees thereof by virtue of chapter 193, laws of the

Twentieth General Assembly, State of Iowa, he, the said Sigler, agrees to conduct said agency according to the terms of said statute and this agreement.

1. All loans negotiated shall be upon the following terms: The rate of interest shall be eight (8) per cent per annum, payable annually, principal and interest, payable to the order of said Board of Trustees at the office of the State Treasurer at Des Moines, Iowa; the principal to be due in not less than five nor more than ten years, provided, that in cases where the agent may find it necessary in order to make the loan, he is authorized to insert in the note a clause granting the borrower the privilege, after three years from date of maturity of the first interest coupon, to make payments of principal in sums of \$100, or multiples thereof, at such times as interest matures.

2. The said financial agent shall only use such forms of notes, bonds and mortgages, coupons and other papers, and observe such instructions as may be prepared by the Attorney-General under the directions of the executive council for the purposes of and pursuant to the fourth paragraph of section 2 of said statute aforesaid.

3. He, the said agent, shall not loan less than \$500 nor more than \$5,000 to any one person.

4. He, the said agent, shall draw from the State treasury the said endowment fund from time to time, as provided by section 7 of said statute, to enable him to make said loans, provided that he, at no one time, shall have in his possession, nor under his control, more than \$10,000. He shall exercise care and diligence in making said loans, and for any and all willful or negligent act of his in making said loans or selecting or retaining any one to assist him in preparing abstracts of title or the doing of any act in any way connected with said loans whereby any sum of money is lost or expense incurred, the said Sigler shall be fully liable to said trustees.

5. And the said agent shall also be liable for any want of diligence in making said loans, and for all moneys lying and being in his hands for an unreasonable time, or for any time where, by diligence or proper effort the same might or could have been loaned the said agent shall be liable for interest thereon at the rate of eight (8) per cent per annum.

6. He shall report to the secretary of said College and Farm semi-annually, or as much oftener as he may be required by said Board, his doings since his last report. He shall keep a complete abstract of each of said loans, and full and complete record and register of all his doings, and shall keep all letters received and press copies of all letters sent, all of which said records and correspondence shall be turned over to his successor in office, and at all times shall be open to the inspection of any member of the executive council, the Attorney-General, or any member of the Board of Trustees of said College and Farm. The agent shall forward to the secretary of the Board of Trustees all papers relating to such loans.

7. Once each year just prior to the time the penalty attaches for non-payment of taxes on real estate, he shall examine and ascertain whether all taxes are paid on the real estate covered by mortgage to secure any of said

loans. If the taxes are not paid he shall pay the same and the receipt therefor shall be his voucher for said amount of money, which amount the Board of Trustees do hereby agree shall be promptly repaid him.

8. He shall receive a salary of \$1,000 per annum, said salary to begin on the first day of February, A. D., 1887, and he shall also receive all necessary expenses while away from his office in the discharge of his official duties, provided that the amount of such expenses payable from the treasury of the State under the provisions of section (6) six of chapter 193 of the acts of the Twentieth General Assembly, shall not exceed the sum of four hundred (\$400.00) dollars per annum. All other expenses, including advertising and commission, etc., shall be borne by said agent.

9. Each loan shall be secured by a mortgage paramount to all other liens upon improved farm lands in the State of Iowa, and shall not exceed forty per cent of the cash value of the mortgaged premises, exclusive of buildings.

10. Both principal and interest of said loans, as the same shall fall due, shall be promptly collected by said agent, and remitted without costs to the State Treasurer.

11. The said Sigler shall at all times be subject to the orders and directions of said Board of Trustees.

12. The said Sigler shall hold his office as financial agent during the pleasure of said Board of Trustees.

In witness whereof this contract is executed in duplicate by the Iowa State Agricultural College and Farm, by the Chairman and the Secretary of the Board of Trustees, duly authorized so to act, and by the said D. S. Sigler in his own proper person, this first day of February, A. D., 1887.

D. W. MOTT,
Chairman Board of Trustees.

E. W. STANTON,
Secretary Board of Trustees.

D. S. SIGLER,
Financial Agent.

Trustees Clarkson and Wicks were appointed a committee to act with and assist the Secretary of the Board in effecting an accounting with Agent Sigler up to the date of the change of bondsmen and renewal of contract. Trustee Wicks and Secretary Stanton effected such accounting with the agent, the results of which are embodied in the following report:

To the Board of Trustees:

Your committee appointed to make an accounting with D. S. Sigler as financial agent of the Agricultural College, beg leave to report that from the date of his contract as such financial agent, August 21, 1884 to February 1, 1887, he drew from the State treasury the

sum of \$243,498.33, and that he collected the principal of loan No. 60, amounting to \$1,600, making a total charged against him of \$245,098.33. The agent has forwarded to the Secretary of the Board of Trustees, as shown by the register of loans kept by said Secretary, completed papers (except abstract to loan 168) covering loans dated prior to said first day of February, amounting to \$223,875.00, leaving on that date a balance of endowment fund charged against him of \$21,223.33. Your committee satisfied themselves that said balance was on hand on said first day of February, and that it is this sum with which the agent should be charged at the beginning of his new contract.

Interest on the loans mentioned was collected and remitted to the Treasurer to the amount of \$19,829.43, leaving on February 1, 1887, the following coupons recorded in the Secretary's register as due but not collected; coupons due October 1, 1886, on loans 102, 128, 140 and 147; coupons due January 1, 1887, on loans 19, 47, 53, 61, 76 and 78.

Respectfully submitted,

PLATT WICKS.
E. W. STANTON.

AMES, MAY 24, 1887.

The bond of Agent Sigler for \$50,000 was approved by the committee on bonds and the action of this committee was afterwards endorsed by the Board. The bond was also approved by the State Executive Council.

The following orders were adopted by the Board:

1. That Agent Sigler be directed not to foreclose mortgages in cases where security is considered by him sufficient to warrant delay.
2. That in all cases of foreclosure the Secretary is directed to approve an order of the agent upon the State Treasurer for the amount of the expenses of said foreclosure as shown by sheriff's certificate of sale and itemized bill of costs duly authenticated, and that such papers, after they have been properly recorded by the Secretary of the Board in his register of loans be forwarded by him to the Treasurer of State.
3. That the Chairman and the Secretary of the Board be authorized to sign orders upon the State Treasurer for the papers connected with loans to be foreclosed, when, in their judgment, they consider such foreclosure advisable.

4. That in the payment of delinquent taxes, redemption from tax sale or tender for such redemption, the Secretary, upon presentation of proper evidence, approve the order of the financial agent upon the State Treasurer for the amount of such payments, and that such evidence of payment be recorded by said secretary, and then forwarded to the Treasurer of State.

LAND DEPARTMENT.

At the beginning of the biennial term Mr. G. W. Bassett, of Fort Dodge, had charge of this department. Desiring to remove to Colorado, he tendered his resignation as agent to take effect June 1, 1886, to which time settlement was made of his accounts. In connection with his retirement the following resolution was adopted by the Board:

WHEREAS, Mr. George W. Bassett, who has been for more than twenty years the trusted land agent of the College has resigned his agency with a view of removing to Colorado. Therefore,

Resolved. That this board order spread upon their minutes their appreciation of the faithful and conscientious service rendered by him to the institution. Intrusted with the management of a land grant of over 200,000 acres, involving the collection of rental and principal exceeding a million dollars, he has by personal vigilance and good judgment so carefully guarded the interests of the College as to absolutely protect it from loss. His remittances have been promptly made and his accounts always found correct. His work has been in every way satisfactory to this board and worthy of its hearty commendation.

A committee was appointed to consider the advisability of transferring the agency to the College. This committee reporting in its favor, the Board ordered the transfer. Gen. James L. Geddes was elected agent. He was allowed the fees paid by lessees as compensation for his services, and a contract was made with him to this effect. His bond of \$10,000 was approved by the Board, and he entered upon his duties June 1, 1886.

In connection with the sale of land purchased with accumulated interest money, a question arose whether the proceeds of such sales should be treated the same as the regular endowment fund, be loaned by the financial agent and included in his contract and bond, or whether such fund should be kept separate and other provisions be made by the Board for its investment. The matter was referred by the State Treasurer to the Attorney-General, who returned the following opinion:

OFFICE OF ATTORNEY-GENERAL,
DES MOINES, IOWA, April 19, 1886. }

HON. V. P. TWOMBLY, *Treasurer of State.*

SIR—I am in receipt of your letter of the 15th inst. in which you say: "The law seems to authorize the Board of Trustees of the Agricultural College and Farm to loan or *purchase lands with interest that accumulates* in their hands over and above the needs of the College for which such interest fund can legally be used, and also lease and sell said lands so purchased as provided for the endowment funds and lands."

Now, *first*, does the loaning of said accumulated interest fund or the purchase of land with it change the character of it? Does it cease to belong to the interest fund of the College, and if so does it become endowment fund?

Second. When the principle of said accumulated interest fund is collected, or the lands purchased with it are sold by the College agent, to whom should he pay the same? If to the Treasurer of State to what fund should he (the Treasurer of State) credit the same, endowment fund or interest fund?

Third. If credited to the College interest account on the books of the Treasurer of State, shall he pay the same over to the College treasurer the same as other interest?

Answering the first question, I do not think the loaning of accumulated interest fund changes the character of the fund.

The money arising from the sale of the granted lands constitutes the endowment fund. That cannot be diverted. It must be kept intact as an endowment fund. This is required by the act of Congress making the grant and by the laws of the State. Nor does the interest fund or its accumulations cease to be interest fund. The law of the State, section 1622 of Code, specially forbids any of this money from being diverted from the fund to which it belongs.

Answering your second question, I am of the opinion that all interest collected in the ordinary way is payable directly to the board of trustees. That seems to me to be the meaning of section 1617 of Code. The money arising from sales of land is to be paid to the State Treasurer, and held for investment as required by law. The interest is paid to the trustees as well as rental for lands leased. Accumulations of this above the amount needed to pay the expenses of the College may be loaned by the board of trustees. Section 7 of chapter 193, laws of 1884, provided that "money collected from *delinquents* shall be paid at once into the State treasury." The treasurer shall keep the principal to be loaned out as by the act provides, and the interest part of such delinquent collections the treasurer shall pay to the treasurer of the College when he makes his monthly statement or report.

I understand that the money referred to in section 7 as "moneys collected from delinquents" has reference to section 6, and to collection made by suit and foreclosure. This would be paid into court, and from there go to the State Treasurer, but the ordinary collections when there are no such delinquencies, is in my opinion left as it is provided for in section 1617 of Code.

The last clause of the second question is fully answered by my answer to your first question.

To your third question I answer yes.

With respect, yours truly,

A. J. BAKER,
Attorney-General.

In accordance with the foregoing opinion of the Attorney-General the Board proceeded to provide for the loaning of accumulated interest, through an agreement with the land agent, to take charge of such fund. The contract made with him was similar to the one with Mr. Bassett, found in a previous biennial report. For the faithful performance of his duties in this regard the agent gave an additional bond of \$5,000, which was approved by the Board. Settlements under his contracts were made by the secretary of the Board with Agent Geddes at the close of the fiscal year of 1886. These settlements were carefully reviewed by the committee on College lands, and upon their recommendation adopted by the Board.

Upon the death of General Geddes, in February, 1887, Trustees Dysart and Garner were appointed a committee to make final settlements of his accounts. They made a thorough examination of his books, found the same correct, and the balances as determined by them, covered by cash on hand or in bank.

Herman Knapp was elected as the successor to Agent Geddes. The compensation voted him was the same as that previously allowed, viz., the fees paid by lessees and borrowers. The following is his contract:

CONTRACT WITH HERMAN KNAPP.

This agreement made this 1st day of March, 1887, between the Iowa Agricultural College and Farm, represented by the Board of Trustees and Herman Knapp, of Ames, Iowa, witnesseth: That said Herman Knapp is hereby appointed agent of the first party for a term commencing at the date hereof and continuing during the pleasure of said party of the first part. Said agent is empowered to take a general charge of the lands granted to the State of Iowa by an act of Congress approved July 2, 1862, entitled "an act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and mechanic arts;" also to take general charge of the lands purchased with accumulated interest fund, and designated for the purpose of identification as the "Sioux City Purchase;" to loan the money now in the hands of the treasurer of said College and that may hereafter come into his hands, derived from the sale of the lands last mentioned, and in addition thereto, such funds as have been

or may be hereafter transferred from interest fund. In the conduct of this agency said agent is empowered to receive and receipt for all sums paid as principal and interest or rents upon leases heretofore made and that may hereafter be made through the said agency, and to transfer the sum so collected to the treasurer of the said Iowa State Agricultural College and Farm. Said agent is also authorized to lease under the orders of the first party any or all the said lands remaining undisposed of, and any that may be hereafter forfeited for non-payment of principal or interest, as provided by statute, and to enter such forfeitures upon such failure of payment. Said agent is also authorized to loan the funds hereinbefore mentioned upon the following terms:

1. The rate of interest shall be seven (7) per cent per annum, payable annually, both principal and interest payable at the office of said agent, at Ames, Iowa. The time for which said loans may be made shall not be less than five years, and the amount shall not exceed \$2,000 in any one loan, unless said amount shall be increased by a further order of this Board.

2. Said loans shall be secured by a mortgage upon improved farm lands, the actual cash value of which, exclusive of buildings, shall not be less than double the amount of the sum loaned. The borrower shall keep the buildings upon the mortgaged premises insured for the benefit of the said Iowa Agricultural College and Farm, and shall pay all taxes that may be assessed on such premises, and an attorney's fee in case of foreclosure. Said agent is not empowered to release the mortgages given to secure the loans hereinbefore mentioned, but with this exception he is authorized in general to do all acts necessary to accomplish the purposes of this agency as set forth in this contract. Said agent shall, at his office in Ames, receive and receipt for money tendered him in payment of principal, interest or rents due or to become due on account of leases or sales of the said lands; he shall conduct all necessary correspondence; shall, when ordered by said party of the first part, offer in the market such lands as remain unleased, and shall, to the best of his ability, promote the interests of the said department; he shall keep such books and accounts as may be necessary to show at all times the condition of the several funds in his hands. He shall pay over to the treasurer of the Iowa State Agricultural College and Farm, monthly, all money in his hands, rendering separate accounts of principal and interest, and of the several permanent funds, and shall transmit to the secretary of said first party detailed statements of these accounts in the form heretofore adopted.

He shall receive and deliver to purchasers patents of said lands which may come into his hands in the course of his agency, first preparing and transmitting to the Secretary of said College certificates of purchase for the purpose of procuring said patents. He shall also report to the party of the first part for re-appraisal such tracts of land as may hereafter be forfeited. He shall also receive at his office in Ames the annual interest accruing from loans already made or which shall be hereafter made by him, and also the principal sums as they shall fall due and shall remit the same to the said College monthly and shall also make monthly reports to the Secretary of said Board of Trustees, setting forth in detail the collections so made. Said

agent shall also provide for his own use the blanks necessary for such loans. In consideration of said services and expenses, said second party as full compensation therefor shall be entitled to charge and collect the following fees and commissions:

For leasing a quarter section or less subdivision fourteen dollars.

For correspondence and services in procuring renewals of leases and expenses incurred, five dollars for each renewal.

Also, the sum of one dollar per annum on each lease as a collection fee, and the sum of two dollars for obtaining a patent as provided in leases heretofore made; in all of the above cases the said fees to be paid by the lessee or purchaser, to the end that the management of the lands included in this agency shall be without expense to the said Iowa Agricultural College except as hereinafter provided.

The agent is also authorized upon each loan made under the provisions of this contract to charge and collect from the borrower a commission not to exceed five per cent upon the amount of each loan, payable at the time said loan is made, and also all costs incurred in procuring abstracts and in the preparation, execution and recording of all necessary instruments of conveyance.

It is further agreed that the party of the first part will at its own charge provide for the use of said agency such permanent books of record as may be necessary in conducting said agency, including interest receipt books, and shall provide blank leases and certificates of purchase.

The authority granted by this contract to loan the accumulated interest fund may be revoked by the Board of Trustees at any time upon notice given to said agent; but it shall be the duty of said agent to receive and remit to the Treasurer of said College the annual interest and the principal of all loans then made and outstanding at the time of such notice.

Upon filing with the Secretary of said Board of Trustees a note secured by mortgage properly executed and recorded, together with an abstract of title of the mortgaged premises, the said Secretary shall issue to said agent an order on the Treasurer of said College for the amount of such loan, payable out of said fund, and the Treasurer shall on presentation of said order remit the amount thereof to said agent at Ames, Iowa.

It is agreed by the party of the first part that monthly comparisons shall be made by the Secretary of the Board of Trustees of the books of his office with the books and accounts of the agent, and that said Secretary shall further examine annually the accounts of said agent to the end that full and complete settlement may be made annually of said accounts.

Such additional examination shall be made by the Board of Trustees as said Board shall deem necessary. Said agent shall make annual report to the Board of Trustees of all proceedings under this contract. Said agent shall, before entering upon his duties, file with the committee of the Board of Trustees appointed to examine and approve the same, a bond in the penal sum of ten thousand dollars, with sureties to be approved by said commit-

tee; said bond to be conditioned for the faithful performance of all the requirements of this contract.

In witness whereof, the said Board of Trustees have caused the said contract to be entered of record and these presents to be executed by J. W. Garner and Joseph Dysart, duly authorized so to act, and the seal of said Iowa State Agricultural College to be hereto affixed, and said Herman Knapp has hereunto affixed his signature.

J. W. GARNER.
JOSEPH DYSART.
HERMAN KNAPP.

Agent Knapp's bond, which was fixed at \$15,000, was approved by the committee on bonds. The annual settlement of the Secretary with the agent, covering the fiscal year of 1887, was examined and approved by the Board. The report of the agent gives in detail the transactions of the office for the entire biennial period. The report is found on page 125.

The following land has been forfeited during the last two years:

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Old price.
se qr.....	26	93	36	160	\$ 3.00
sw qr.....	36	95	27	160	4.00
ne qr.....	30	96	33	160	5.50

The following has been reappraised:

ENDOWMENT FUND LAND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Old price.	New price.
se qr.....	28	99	48	160	\$ 3.50	\$ 3.00
ne qr of se qr and s hf of se qr.....	21	99	48	120	4.00	3.00
e hf of se qr.....	31	94	37	80	5.00	5.00

CONTINGENT FUND LAND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Old price.	New price.
sw qr.....	26	93	36	160	\$ 5.00	\$10.00
ne qr.....	36	93	36	160	5.00	5.00
se qr.....	26	93	36	160	3.00	9.00

For a time the above land was withdrawn from market. The agent is now, however, authorized to lease it at the valuation fixed by the Board.

At the meeting in May, 1887, the Board authorized a loan to Richard Jones from the accumulated interest fund of \$2,850, provided the security offered by him should prove ample and the agent be responsible for the loan the same as for other loans made under his contract.

Trustee Morrison and Secretary Stanton were given full power to take such action in the matter of the Atwood lease, No. 776, as they might deem for the best interest of the College.

At the beginning of the biennial period the

Land owned by the College was valued at....	\$397,298.46
Increase during the two years by re-valuation of forfeited lands.....	\$ 1,560.00
Less value of s hf of ne qr, 29, 95, 30, decided to be swamp land.....	210.00
	1,350.00
	<u>\$398,648.46</u>
Sales during the biennial period.....	49,602.55
Present investment in land.....	\$349,045.91
Present investment in farm mortgages, bearing 7 per cent interest.....	25,515.00
Total funds controlled by land agent...	<u>\$374,560.91</u>

INCOME OF THE COLLEGE AND ITS EXPENDITURE.

The funds derived from the College endowment fund, available for the support of the institution during the biennial period, have been as follows:

Cash on hand at beginning of biennial term.....	\$ 1,562.79
Sale notes belonging to interest fund paid.....	350.00—\$ 1,912.79
Income from endowment during fiscal year 1886.....	\$ 45,355.43
Income from endowment during fiscal year 1887.....	49,669.94
Total available funds	\$ 96,938.16

This amount is accounted for as follows.

Expenditures during fiscal year 1886 as per exhibit "B," p'g 104	\$ 41,543.91
Expenditures during fiscal year 1886 as per exhibit "C," p'g 106	46,094.65
Transferred to endowment for investment.....	6,000.00
Invested in sale notes	35 00
Cash balance on hand	3,264.60
Total	\$ 96,938.16

The income for the fiscal year of 1888 is estimated by the Secretary at \$47,500. The appropriations by the Board to meet the expenses of the different departments for that year are as follows:

FROM INTEREST FUND.

For salaries	\$ 28,625.00
For farm department—	
For general farm expenses	\$ 840.00
For experiments.....	400.00
For permanent improvements.....	500.00
For foreman.....	800.00
	\$ 2,540.00
For horticultural department—	
For current expenses and apparatus.....	1,450.00
For mechanical department—	
For current expenses and apparatus	\$ 1,450.00
For salary of foreman.....	1,000.00
	\$ 2,450.00
For veterinary department—	
For current expenses.....	\$ 400.00
For lecturers for 1887.....	50.00
For salary of house surgeon	200.00
	\$ 650.00
For department of chemistry—	
For current expenses and apparatus.....	\$ 500.00
For salary of assistant	300.00
	\$ 800.00
For department of civil engineering.....	350.00
For department of botany	375.00
For department of zoology and entomology.....	900.00
For department of physics	1,000.00
For department of military tactics.....	225.00
For department of domestic economy.....	200.00

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For library—	
For current expenses and purchases.....	\$ 1,000.00
For assistant.....	75.00
	\$ 1,075.00
For public grounds.....	650.00
For public rooms—	
For heating, lighting and cleaning public rooms, in main building	\$ 1,125.00
For heating, lighting and cleaning office building ..	225.00
For heating, lighting and cleaning north hall	125.00
For heating chemical and physical laboratory	150.00
	1,625.00
For Sabbath services and public lectures.....	150.00
For department bulletins.....	300.00
For contingent expenses—	
For catalogues	\$ 350.00
For stationery, printing and advertising	600.00
For telephone service	90.00
For President's clerk.....	120.00
For ringing bell for recitations.....	75 00
For bus to Ames during the year.....	225.00
For proctor and chapel roll.....	325.00
For music at public services.....	200.00
For assistant to preceptress.....	75.00
For advertising in <i>Aurora</i>	30.00
For pumping organ.....	15.00
For tuning organ.....	20.00
For type writer.....	120.00
For visitor's attendant.....	50.00
For rent of grand piano.....	80.00
For address before Trustees.....	55.00
For subscription toward expenses connected with experiment bill.....	30.00
For expenses of President Chamberlain attending meeting at Washington, D. C., in interest of experiment bill.....	90.00
For expenses of persons connected with College attending farmers' institutes.....	150.00
For emergency fund subject to President's order.....	100.00
For advertising in <i>Farm Journal</i> in 1887.....	70.00
For expenses of President Chamberlain and Secretary Stanton reading proof on catalogue and report	40.00
	2,910.00
Total	\$ 46,275.00

In addition to the above there was appropriated to the departments the proceeds of the ordinary sales.

All appropriations are subject to the provision that only so much thereof as may be necessary shall be expended.

Appropriations for the departments are expended under the direction of the President who is ordered to retain each year in the treasury one-tenth of all the appropriations until he shall definitely assure himself that the same can be expended without danger of financial embarrassment to the institution.

No officer, member of the faculty or employe is allowed to contract any debt or obligation or incur any expense on behalf of the College unless the same is first authorized by a recorded vote of the Trustees in session.

Whenever an appropriation for a department is made, either for improvements, repairs, instruction, or for any purpose whatever, it is the duty of the professor or head of the department, before he makes the improvement or purchase or expends any of the funds so appropriated, to call on the Secretary for a statement in writing of the amount of such appropriation and all conditions connected with its expenditure.

Questions having arisen in regard to the legality of using the income or interest fund of the College for certain purposes, the following letter was addressed by the Secretary of the Board to the Attorney-General:

HON. A. J. BAKER, *Attorney-General, Des Moines, Iowa:*

DEAR SIR—The act of Congress granting lands to the States and Territories for the establishment of Colleges of Agriculture and Mechanic Arts, provides "that no portion of said [endowment] fund, nor the interest thereon, shall be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings." Under this law can the interest on the College endowment fund be legally applied to the construction or repair of any or all of the following:

1. Steam heating pipes and apparatus.
2. Water pipes in building.
3. Water pipes connecting College building with spring.
4. Boiler, pumps, etc., situated in pump-house and used for supplying College building with water.
5. Shafting in workshop.
6. Work-benches in workshop (a) spiked fast to building; (b) fastened to building by bolts.
7. Boiler for shop and foundation for same.

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8. Laboratory desks containing sink, shelves, doors, etc., and with gas and water pipes fitted into same.

9. Cases for holding apparatus, the wall forming back of case, glass front set in frame nailed to floor.

I am, with great respect,

Very truly yours,

E. W. STANTON,
Secretary.

Ames, May 17, 1887.

To which letter the Attorney General replied as follows:

OFFICE OF THE ATTORNEY-GENERAL, }
DES MOINES, May 23, 1887. }

PROF. E. W. STANTON, *Secretary of Board of Trustees State Agricultural College:*

DEAR SIR—Answering the enclosed letter, I am of opinion that the interest of the investment derived from sale of Agricultural College lands cannot be used for any of the purposes therein named. To my mind the clear intent of the law was to provide that the interest should be used as a fund to support the school as distinguished from the school appliances. It was expected and intended that the State would supply all the buildings and all the appliances that were required to make them effectual for the purposes designed.

Yours, etc.,

A. J. BAKER,
Attorney-General.

FACULTY.

A full list of the faculty of the College for 1886, as far as determined at the time, was given in the last biennial report. In March of that year, under the old Board, Miss Mary A. Blood was elected preceptress and teacher of elocution, and Mrs. Ida M. Riley was chosen librarian and assistant in mathematics. The salary of the former was fixed at \$1,000 and of the latter at \$800 per annum, the services of both to commence March 1, 1886.

At the same meeting President Leigh Hunt tendered his resignation, to take effect as soon as his successor was elected and could arrange to take charge of the College. The resignation was accepted in the adoption of the following resolution:

Resolved, That the resignation of President Hunt is herewith accepted with a deep feeling of regret, both for the resignation and the cause of ill health that alone induces it. That it be spread upon the records of the Board, and that in doing so the Trustees of the College desire to make, in this lasting and conspicuous form, an expression of their gratitude to him for the value and efficiency of his work while President, for his fidelity to the interests of the College in all the trusts committed to his care, and for the excellence of his administration in every respect.

The election of a successor to President Hunt was postponed until the May meeting, and Trustees Clarkson and Dysart were appointed a committee to conduct the necessary correspondence and investigation, and to recommend to the Board a suitable person for the position. The committee reported at the May meeting, heartily recommending Mr. W. I. Chamberlain, Secretary of the State Board of Agriculture of Ohio, as a man in every way competent to fill the vacancy. By a unanimous vote of the Board, he was elected President of the College, Professor of Moral Science and Lecturer on Practical Agriculture. His salary was fixed at \$3,000 a year, and a house furnished, or \$300 allowed as rent until a house could be provided, his services and salary to begin July 1, 1886.

At this May meeting, Mrs. Van Etten, teacher of vocal and instrumental music, resigned, to take effect at the close of the term.

President Chamberlain was authorized to employ a teacher to fill the vacancy.

Miss Elizabeth Gowdy, of Des Moines, was elected teacher of free-hand drawing at a salary of \$300 and expenses, the latter not to exceed \$150 a year.

At the annual meeting of the Board in November, 1886, the following action was taken:

Dr. Welch was granted leave of absence for the first four weeks of the next school year.

The President's recommendation that Mrs. Riley be made a member of the faculty was concurred in.

The class in free-hand drawing was divided into divisions, and Miss Gowdy, the teacher in this department was allowed an increase in salary of \$100 per annum.

Capt. Lincoln was granted additional time for military drill and instruction, and \$200 was added to his annual salary as compensation for such extra work.

Analytical mechanics was added to the chair of physics for two years, and in view thereof the salary of Professor Hainer was increased \$100 per annum.

The sum of \$150 was allowed Miss Blood for extra work in teaching free-hand drawing in the spring of 1886, and her annual salary as preceptress and teacher of elocution was increased \$100.

The house occupied by Professor Wynn was assigned to Professor Bennett.

The sum of \$350 per annum was allowed President Chamberlain in

lieu of the house which the Board at the time of his election agreed to furnish him.

The resignation of S. A. Knapp, professor of practical agriculture, tendered through Trustee Dysart, was accepted, and a vote of thanks for his past efficient services ordered entered on the minutes.

Herman Knapp was elected assistant professor of agriculture, at a salary of \$1,200 per annum, and half of the farm house for winter's work. He was given charge of the department until such time as a professor of agriculture should be elected. The president of the College and Trustee Speer were appointed a committee to recommend a suitable person for such chair at the spring or summer meeting of the board.

Prof. W. H. Wynn having resigned the chair of English literature, history and latin, to take effect at the close of the school year of 1886, the following, offered by Trustee Clarkson, chairman of the committee on faculty and courses of study, was adopted by unanimous vote:

"At the conclusion of his sixteen years of faithful and devoted work in the College, the board of trustees desire to place in the enduring form of its records an expression of its thanks to Prof. W. H. Wynn for the value and the fidelity of his labors here. In resigning his place in this College we hope that he shall not leave the rank of educators, but that in some other institution of high rank and usefulness he may continue in a vocation to which his life has been devoted, and for which he has so many qualifications and such long experience to fit him for useful and superior work."

The employment of a professor to take the chair vacated by Professor Wynn, was left to a committee consisting of the President of the College and Trustees Garner and Dysart. This committee made report to the Board at its meeting in the following January, presenting in connection therewith the applications and testimonials of various parties, but making no recommendation.

President Chamberlain strongly urged the election of Prof. A. C. Barrows, and on ballot he was chosen to fill the vacancy.

The President of the College and the Secretary of the Board were authorized to temporarily fill all vacancies which might occur in the list of teachers when the Board was not in session; *provided*, the expense should not exceed the sum appropriated for that purpose.

At the meeting of the Board, in May, 1887, Miss Gowdy resigned, to take effect at the close of the spring term. Her resignation was

accepted and the President of the College and the Secretary of the Board were authorized to provide instruction in drawing during the second term, assigning said work to Professor Bassett, if they should deem the same advisable. If the work were thus assigned, the sum of \$200, an amount equal to the salary hitherto paid for free-hand drawing, was ordered appropriated to the mechanical department for current expenses; but it was provided that no personal claim for the services thus rendered should be allowed.

Mrs. Ewing, professor of domestic economy, presented her resignation, to take effect at the close of the term. The resignation was referred to the executive and finance committee, who reported that in the opinion of the committee Mrs. Ewing was obligated to furnish instruction in domestic economy during two months of the fall term, and they therefore recommended that her resignation be accepted to take effect upon the completion of her contract; that the President of the College be authorized to so arrange the time of giving instruction during the second term as should be most convenient in his judgment to the College and Mrs. Ewing, and that the sum of \$50 be allowed Mrs. Ewing as house-rent, provided she vacate south hall by July 1st. The recommendation of the committee was adopted, a satisfactory arrangement was made by the President in regard to time, and the instruction required was given by Mrs. Ewing.

The west half of the farm house was assigned to Professor Barrows, possession to be taken by him upon the completion of the repairs upon said house, and the allowance to the professor of \$200 per annum for house rent to be then discontinued.

The committee to recommend a suitable person for the chair of agriculture reported at this meeting.

Trustee Speer favored the election of two associate professors of agriculture, one of whom should be strong on the side of field work and the other strong on the side of the domestic animals. He recommended as such professors Mr. T. L. Brunk, of Tonica, Illinois, and L. W. Smith, of Trumansburg, N. Y.

President Chamberlain considered the division of the chair of agriculture unwise, and recommended the election of Professor E. M. Shelton, Professor of Agriculture in the Kansas Agricultural College.

After discussion it was resolved by the Board that only one professor of agriculture should be elected. Professor Shelton was offered the position at a salary of \$1,800 as professor of agriculture,

and \$500 and the use of the east half of the farm house, as general manager of the farm and farm experiments.

The committee was continued and instructed, in case Professor Shelton should not consent to serve, to present the name of some other person for consideration by the Board at the November meeting.

Professor Shelton not accepting, the committee at the November meeting, united in recommending Loren P. Smith, M. Sc., of Trumansburg, N. Y., a graduate of Cornell University, for the vacant position. He was elected upon the following conditions:

1. That his salary begin November 15, 1887, and be \$1,600 and the free rent of the east half of the farm house.

2. That he be granted necessary room and feed for a horse for his private use, under condition that it be used also, under his direction, as may be necessary, for farm errands and business.

3. That he have entire control of and responsibility for the farm, the hired help, the farm buildings, the live stock, the tools, implements and machinery, their care, use and repair, and of the instruction and lectures in the chair of agriculture, except so far as all the chairs and departments come by the rules of the Board under the general supervision of the President of the College.

4. That the election be with the expectation and understanding of permanence during successful service, under the general rule adopted by the Board some two years ago.

The position offered was accepted by Mr. Smith with the above understanding.

The election, in February, of Professor Herman Knapp, as treasurer and land agent, terminated his services as assistant professor of agriculture. In the absence, however, of any regular professor in that department Professor Knapp continued to give instruction in the agricultural studies and to assist the President of the College in the management of the farm. For his services in this regard during the school year he was allowed \$400 by the Board. Mr. Frank Schoenleber, foreman of the farm, was also voted \$200 for extra work in the department.

Miss Blood, preceptress and teacher of elocution, resigning at the close of the spring term, the President of the College and the Secretary of the Board, under the authority given them by the resolution passed at the January meeting, employed Miss Elizabeth W. Eaton, a graduate of Mt. Holyoke Seminary, and a resident of Palmyra,

N. Y., to fill the vacancy for the remainder of the school year, paying her the same salary as that allowed Miss Blood. Miss Eaton rendered acceptable service, but at the close of the year refused to consider an offer to continue the work. The Board at its November meeting joined French and German to the preceptress' chair, advanced the salary to \$1,200 per annum, and appointed the President and Secretary a committee to fill the position for the coming year, the salary to be divided as follows: \$500 for the first half year and \$700 for the second half, provided the lady stays through the year. Mrs. Ida M. Riley was elected librarian and teacher of elocution, at a salary of \$1,000 per annum. Under this re-arrangement of work the services of Miss Stockmann, teacher of French and German, were discontinued.

Mrs. Ewing, at the request of President Chamberlain, submitted to the Board the following proposition in regard to instruction in domestic economy for 1888:

"I will give such instruction from May 1st to the close of the first term, and from August 1st to September 30th, for the compensation now paid me, viz., \$500 and unobstructed use of south hall during the periods named; and will devote twice the amount of time now allowed to the different classes each week, if it can be so arranged that I can hold them that length of time without interfering with their other studies."

This proposition was referred to the standing committee on domestic economy, who reported in favor of the employment of an instructor in this department whose entire time during the school year should be devoted to the work. The recommendation of the committee was adopted by the Board and Trustees Yeomans and Dysart appointed to secure such instructor in time for the commencement of the next term. The committee has engaged the services of Mrs. Eliza Owens, at a salary of \$800 per annum.

Free hand drawing was assigned permanently to Professor Bassett, the President being authorized to assign to Professor Hainer such part of the instruction formerly given by Professor Bassett as shall enable the latter to do the work above assigned to him and equalize the work of the two instructors.

Miss Anna Gaff resigned her place as music teacher in September, the position being acceptably filled for the unexpired term by her sister. The President, Trustee Clarkson and Secretary Stanton were appointed a committee to secure a new music teacher.

In order that Dr. Welch might carry both classes of freshman English composition and rhetoric he was allowed a post-graduate clerk at \$125.00 per year, the same graduate to be employed if necessary at a total salary not to exceed \$300.00 per annum to teach any sub-freshman classes which the College may be forced to form.

The committee on domestic economy was authorized to allow Dr. Welch to occupy south hall until the same should be needed for the purposes of the department.

The salary list for 1888, for the payment of which an appropriation was made by the Board of Trustees from the interest fund is as follows:

- W. I. CHAMBERLAIN, PRESIDENT,
Ethics and Lecturer on Agriculture.
Salary \$3,350.
- A. S. WELCH,
Psychology, History of Civilization and Rhetoric.
Salary \$1,800.
- M. STALKER,
Veterinary Science.
Salary \$1,600.
- J. L. BUDD,
Horticulture.
Salary \$1,800.
- E. W. STANTON,
Mathematics, Political Economy, Commercial Law and Secretary Board of Trustees.
Salary \$2,000.
- D. S. FAIRCHILD,
Pathology, Histology, Therapeutics and Comparative Anatomy.
Salary \$1,000.
- C. F. MOUNT,
Civil Engineering.
Salary \$1,400.
- J. R. LINCOLN,
Military Science and Tactics.
Salary \$500.
- B. D. HALSTED,
Botany.
Salary \$1,600.
- N. C. BASSETT,
Mechanical Engineering.
Salary \$1,800.

A. A. BENNETT,

Chemistry.

Salary \$1,600.

HERBERT OSBORN,

Zoology and Entomology.

Salary \$1,200.

J. C. HAINER,

Physics and Astronomy.

Salary \$1,500.

MRS. IDA M. RILEY,

Library and Elocution.

Salary \$1,000.

A. C. BARROWS,

English Literature, Latin and History.

Salary \$1,600.

LOREN P. SMITH,

Agriculture and Farm Superintendent.

Salary \$1,600.

ELIZA OWENS,

Domestic Economy.

Salary \$800.

HERMAN KNAPP,

Treasurer and Recorder.

Salary \$700.

.....,
Preceptress, French and German.

Salary \$1,200.

.....,
English and Sub-Freshman Studies.

Salary \$300.

Total amount of salaries, \$28,350.

Houses on the College grounds are occupied by Professors Budd, Stanton, Lincoln, Halsted, Bennett, Osborn, Barrows and Smith.

These professors are required as a condition of such occupancy to keep the inside of said houses in first-class repair. No bills for repairing the outside of said houses are allowed except when such repairs are authorized by the Board or building committee.

Under an order of the Board no furniture is purchased or furnished by the College for any room occupied by a professor, teacher or other employe of the College.

It is a regulation of the Board that professors and employes of the College shall not be absent from duty during the terms of school

without permission of the proper authorities, and a pro-rata deduction from their salaries is ordered for the time thus lost.

COLLEGE TREASURER.

Gen. James L. Geddes held the position of treasurer during the fiscal year of 1886, receiving as treasurer and recorder a salary of \$1,150. His report for the year will be found on page 109. Monthly settlements were made with him by the secretary, and at the close of the year a special committee appointed by the Board thoroughly examined his accounts. The committee reported as follows:

To the Honorable Board of Trustees:

Your committee appointed to make settlement with the College treasurer would report that they have very carefully gone over all the vouchers in his office, comparing them with his credits, and with the exception of a few bills paid so recently as to prevent a proper voucher from being returned, we find the two to agree. We have also compared the duplicate receipts filed in the secretary's office with his debits and have found them to agree also. We have made such tests of the computations as to satisfy ourselves of their correctness.

We have also had him fully account for all cash balances in his hands as shown by the balances on his books, and do certify that we have found everything correct.

All of which is respectfully submitted.

A. D. PECK.

CHAS. M. DUNBAR.

The report of the committee was adopted by the Board, and General Geddes re-elected treasurer at the same salary as that paid him in 1886.

General Geddes died in February, 1887. At the time of his death his books as examined by Secretary Stanton and Trustees Dysart and Garner showed a balance of \$18,643.13 to be accounted for. This amount and a few cents over were found in bank and safe. No stronger testimony could be borne to the faithfulness of an officer who through many years had rendered efficient service to the institution.

The following resolution was adopted by the Board and ordered spread upon the minutes.

WHEREAS, Since the last meeting of this Board, Gen. J. L. Geddes, holding the positions of Treasurer, Recorder and Land Agent, has died, we desire to place upon the pages of our official records a testimony to his value and faithfulness as an official, and to his worth as a man. He served

the public in these capacities as faithfully and as efficiently as he had before served his country as a patriot and a soldier. In long connection with the College he had served it in various capacities and in all of them he served it with equal fidelity. He was one of the men who helped to lay the foundation of the College and to shape it into its permanent course. In doing so he rendered to the State and to society such quality of service as will perpetuate his name in Iowa, and add a new cause of gratitude to the large and grateful esteem in which the people of the State held him before for the greatness of his service as a soldier in the Union army. He endeared himself to the students of the College as only the best men can ever endear themselves to individuals or to the public. In spreading this resolution of appreciation upon the records, we know we express the feeling and the gratitude of all connected with the College, past or present, as well as ourselves. He wrought the good work of a faithful servant of conspicuous merit, and is entitled to the praise and the gratitude which follow the works of all good men.

In consideration of extra services rendered by General Geddes the sum of \$150.00 was voted to his family.

Herman Knapp was elected to fill the vacancy caused by the death of General Geddes. His salary as treasurer and recorder was fixed at \$700 per annum. Upon entering on the discharge of his duties, he receipted to Trustees Dysart and Garner for the following:

Cash.....	\$ 18,648.13
Mortgages receivable.....	20,665 00
Bills receivable.....	842 25
Personal accounts.....	476.95

Annual settlement of the Treasurer's accounts was made at the close of the fiscal year in November, 1887. The following is the report of the committee, which was adopted by the Board:

To the Honorable Board of Trustees:

Your committee appointed to examine the books and accounts of the Treasurer, report that they have performed the duty assigned them by carefully comparing the vouchers with the entries, both debit and credit in his books, and by testing the accuracy of the computations therein, and find them correct. The Treasurer has fully accounted for all balances remaining in his hands.

Respectfully submitted,

A. D. PECK.
C. M. DUNBAR.

The report of the treasurer for the fiscal year will be found on page 114. Herman Knapp was re-elected treasurer for 1888, his salary remaining unchanged.

The treasurer was directed not to receive payments of money from the heads of departments unless the same are accompanied with itemized cash reports as provided for by the orders of the Board.

COLLEGE DEPARTMENTS.

President Chamberlain and Professors Budd and Knapp having been appointed a committee to systematize the agricultural and horticultural departments, and re-plat the farm and public grounds in a systematic manner, reported that they had agreed upon a line of division between the departments and had decided that the farm, the horticultural department and the steward's department should, before May 1, 1887, build and pay for, and keep in order thereafter, one-half of a good five-strand wire fence run between them, just as if the three were individual owners of the land thus set apart to them. The report, which gives in detail the line of division between the departments, was adopted by the Board, and will be found on page 510 of their minutes.

The farm committee was instructed to ascertain upon what terms the north farm could be sold and other land, more advantageously situated and of better quality, purchased, with a view of securing from the legislature authority to make such re-adjustment of the farm as will be of greatest benefit to the College.

The farm committee and President Chamberlain were appointed a committee to transfer the water works' boiler and engine to the new pump house. The transfer was made, and, with repairs, cost \$223.12.

The professor of agriculture was directed to move the hen house and re-arrange and repair the same in such manner as to fit it for use as a swine house.

The following orders were adopted:

1. That in all cases where animals or other products of the farm, trees or plants of the horticultural department, machines or articles of the workshop (not required for the use of the department), are held for sale, the head of the department shall at the beginning of each month file with the board of audit a list of such articles with the value of each attached. Said board shall approve the price at which the same shall be offered for sale, and shall report any failure to comply with this order to the Board of Trustees.
2. That in addition to the reports required to be made to the treasurer,

the heads of departments, making sales of productions or articles no longer necessary, shall lay before the Board of Trustees at the close of each year, fully itemized reports of all such sales for approval.

3. That all departments employing labor be required to keep a permanent and itemized book account of dates of all services, character of service and hours employed each day, to be open on call to the inspection of the board of audit.

4. That all assistants and foremen shall be employed by the President on the recommendation of the heads of the various departments, and shall be responsible to the heads of departments and finally to the President.

5. That all the janitors and helpers shall be employed on consultation with the President and shall be finally responsible to him.

6. That no dogs, pigs or poultry belonging to any professor, or employe, shall be permitted on the College grounds. Cows belonging to private parties shall not be pastured on land belonging to the College except with the consent of the parties in charge of the department in which said land is situated.

EXPERIMENT STATIONS.

Congress at its last session passed a bill to establish experiment stations in connection with the Agricultural Colleges. The following is the full text of the bill:

AN ACT to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July 2, 1862, and of the acts supplementary thereto.

SECTION 1. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled; That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established under direction of the college or colleges, or agricultural department of colleges, in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July 2, 1862, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designated as an "agricultural experiment station:" Provided, That in any State or territory in which two such colleges have been or may be so established, the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the Legislature of such State or Territory shall otherwise direct.

SEC. 2. That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with

the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches and experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

SEC. 3. That in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigation or experiments; to indicate, from time to time, such lines of inquiry as to him shall seem most important; and, in general, to furnish such advice and assistance as will best promote the purposes of this act. It shall be the duty of each of said stations, annually, on or before the first day of February, to make to the Governor of the State or Territory in which it is located, a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the said Commissioner of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster-General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of fifteen thousand dollars per annum is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each Territory entitled under the provisions of section eight of this act, out of any money in the treasury proceeding from the sales of public lands, to be paid in equal quarterly payments, on the first day of January, April, July and October in each year, to the Treasurer or other officer duly appointed by the governing boards of said colleges to receive the same, the first payment to be made on the first day of October, eighteen hundred and eighty-seven: *Provided, however,* That out of the first annual appropriation so received by any station an amount not exceeding one-fifth may be expended in the erection, en-

largement, or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per centum of such annual appropriation may be so expended.

SEC. 6. That whenever it shall appear to the Secretary of the Treasury from the annual statement of receipts and expenditures of any of said stations that a portion of the preceding annual appropriation remains unexpended, such amount shall be deducted from the next succeeding annual appropriation to such station, in order that the amount of money appropriated to any station shall not exceed the amount actually and necessarily required for its maintenance and support.

SEC. 7. That nothing in this act shall be construed to impair or modify the legal relation existing between any of the said colleges and the government of the States or Territories in which they are respectively located.

SEC. 8. That in States having colleges entitled under this section to the benefits of this act and having also agricultural experiment stations established by law separate from said colleges, such States shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established under the provisions of said act of July second aforesaid, an agricultural department or experimental station, in connection with any university, college or institution not distinctively an agricultural college or school, and such State shall have established or shall hereafter establish a separate agricultural college or school, which shall have connected therewith an experimental farm or station, the legislature of such State may apply in whole or in part the appropriation by this act made, to such separate agricultural college or school, and no legislature shall by contract express or implied disable itself from so doing.

SEC. 9. That the grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purposes of said grants: *Provided*, That payment of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of its legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof duly certified to the Secretary of the Treasury.

SEC. 10. Nothing in this act shall be held or construed as binding the United States to continue any payments from the Treasury to any or all the States or institutions mentioned in this act, but Congress may at any time amend, suspend or repeal any or all the provisions of this act.

Approved, March 2, 1887.

Owing to a failure upon the part of Congress to make the necessary appropriation to give effect to the bill, the College has derived no benefit therefrom during the past year. It is expected that this appropriation will be made by Congress during the present session.

Trustees Speer, Clarkson and Dysart and President Chamberlain were appointed a committee to take action in regard to the establishment of the station, provided the fund for the same be secured. The

committee was given full power to act in the place of the Board in all matters relating to the station.

FARMERS' INSTITUTES.

At the meeting of the Board in May, 1887, Trustees Speer and Yeomans, President Chamberlain and Secretary Stanton were appointed a committee to confer with the State Agricultural Society and the State Horticultural Society in regard to the establishment of farmers' institutes and the procuring from the Legislature of an appropriation to meet the expenses of conducting them.

This committee reported to the Board in November that they had held a conference with committees appointed by the agricultural and horticultural societies, that these societies had each made appropriations to assist in establishing institutes, and that an organization had been effected for commencing the work during the coming winter. It was directed that the sum of \$150, or so much thereof as may be necessary, be appropriated from interest fund to defray the necessary traveling expenses of persons connected with the College in attending farmers' institutes, the same being deemed a means of advertising the College and advancing its interests. These expenses were ordered paid upon itemized bills approved by the board of audit.

SCHOOL-BOOK DEPARTMENT.

This department is not supported in any way by College funds. It is managed by the Board of Trustees for the benefit of the students, and all its expenses are met from the income derived from the sales of books and stationery. During the last two years it has been under the charge of the treasurer, who is allowed \$100 per annum as compensation for such service, and who gives a bond approved by the Board in the penal sum of \$1,000. The following summary shows its financial condition:

INVENTORY NOVEMBER, 1885.

Live stock on hand.....	\$894.92
Dead stock on hand	70.35
Total.....	\$965.27

CASH ACCOUNT.

DR.

Cash on hand at the beginning of the biennial period\$ 303.71
 Cash received from sales, express and drayage..... 6,988.02

CR.

Cash paid for school-books, stationery, express,
 drayage, salary and clerk hire.....\$6,502.37
 Cash now on hand..... 739.36
 Total\$7,241.73 \$7,241.73

PRESENT INVENTORY.

Live stock on hand.....\$ 902.54
 Dead stock on hand..... 126 50
 Total\$1,029.04

SUMMARY.

Total assets at the beginning of the biennial period.....\$1,268.95
 Total assets at the close of the biennial period.... 1,768.40

Treasurer Knapp is continued in charge of the department at the salary hitherto allowed.

BOARDING DEPARTMENT.

The Board of Trustees elect the steward, approve his bond and examine his accounts. The funds of the boarding department, are, however, kept separate from those of the College, and do not enter into the accounts of the treasurer. The department is not strictly a College department, but is managed by the Board, in trust for the students. During the past two years it has been under the charge of Capt. J. R. Lincoln, who receives therefor a salary of \$1,000 and board during the school year. He gives a bond of \$5,000 for the faithful performance of his duties, one of the conditions of which is that he shall keep the expenditures within the income.

Trustees Garner and Morrison, who examined the books and vouchers of the department at the close of the fiscal year of 1886, reported to the Board, that they found the same correct, the affairs

of the department in good order and a cash balance of \$2,177.77 on hand.

The steward reported the year 1887 as one of unusual difficulty for the department on account of the much greater cost of all supplies and the scarcity of vegetables caused by the drought. The following statement gives the financial condition of the department at the close of the year.

	DEBIT.	CREDIT.
Cash on hand.....	\$ 1,130.23	
Fires and lights.....	271.10	
Baker, J. A.....	28.15	
Parvin, W.....	25.00	
College boarding account.....		\$ 1,129.08
Cottage boarding account.....		301.62
Incidental account.....		2.49
Bus.....		.29
	\$ 1,453.48	\$ 1,453.48

The committee of the Board appointed to examine the accounts of this year reported as follows:

To the Honorable Board of Trustees:

Your committee to examine the books of the steward's department, beg leave to report that they have examined his books and accounts, and compared his vouchers with the same. We find a cash balance of \$1,130.23 on hand, and find that the steward has accounted for all balances remaining in his hands. We commend the neatness and accuracy with which the accounts of the department are kept.

Respectfully submitted,

J. W. GARNER,
 JOHN MORRISON.

Capt. Lincoln was continued as steward, to hold his position during the pleasure of the Board of Trustees.

Upon the recommendation of the steward the regulation granting a reduction of ten cents per week to students paying in advance was repealed.

By order of the Board there was set apart to the department a garden of eight acres, situated immediately northwest of the main college building.

he commendation of the steward Professors Hainer and

Bennett were appointed a committee to take charge of the heating of the chemical and physical laboratory.

The following orders were passed by the Board :

1. That the removal of any furniture from its proper room without the consent of the president and the steward of the College be forbidden.
2. That the cottage proctors be paid out of College funds.
3. That board at the cottages be \$2.00 and fires and lights 25 cents, making \$2 25 per week in place of \$2.10 as now.
4. That board be charged from time of arrival to end of term unless absence is unavoidable.
5. That the faculty make such rules in relation to lights other than electric in main building and cottages as they may deem necessary, and designate the proper officer to enforce them.
6. That room rent fund be used only for repair of inside of main building and cottages.
7. That no student, veterinary or others, be permitted to room outside the college buildings except for a sufficient reason and on vote of the faculty and the consent of the president and steward.

MATTERS RELATING TO STUDENTS.

It was ordered by the Board that students in the veterinary school be charged for material used.

A rule was adopted declaring the defacing of public buildings or destruction of property a misdemeanor justifying suspension and, in aggravated cases, expulsion as the judgment of the faculty might determine.

The order passed November 13, 1885, making the government of the College an executive government was rescinded and on the recommendation of President Chamberlain it was directed that the government hereafter shall be that which is known as faculty government.

The courses of study as revised by the faculty during the school year of 1887 were approved by the Board. These courses are printed in the catalogue of the present year.

Students were graduated in the different College courses, during the biennial period as follows :

	1886.	1887.
In the course in sciences related to the industries.....	10	11
In the course in agriculture	4	5
In the course in mechanical engineering.....	..	2
In the course in civil engineering	4	6
In the ladies' course .....	..	3
In the course in veterinary science.....	8	12
Total	24	39

Appropriate degrees were conferred by the Board upon these graduates. The College certificate in Horticulture was granted to J. Craig and the certificate in Mechanical Engineering to M. Mendenhall. The post-graduate degree of Master of Domestic Economy (M. D. E.) was conferred on Mrs. Clara J. Hays and Miss Nellie E. Rawson; the degree of Master of Science (M. Sc.) upon A. S. Hitchcock of the class of 1884, and G. F. Goodno of the class of 1885; and the degree of Master of Scientific Agriculture (M. S. A.) upon F. S. Schoenleber of the class of 1885.

The following honorary degrees were conferred: the degree of Master of Science (M. Sc.) upon Professors M. Stalker, A. A. Bennett and E. W. Stanton and the degree of Master of Scientific Agriculture upon Prof. W. R. Lazear of the Ohio State University, Prof. Geo. W. Curtis of the Agricultural and Mechanical College of Texas and Prof. Luther Foster of the Dakota Agricultural College.

E. W. STANTON,
Secretary.

CALENDAR FOR 1888.

Term opens	-	-	-	-	-	Wednesday, February 29.
Entrance Examinations	-	-	-	-	}	Wednesday, February 29.
						Thursday, March 1.
Recitations begin	-	-	-	-	-	Friday, March 2.
Term Examination	-	-	-	-	-	June 14 to 20.
Junior Exhibition	-	-	-	-	-	Wednesday, June 20.
Second Term begins	-	-	-	-	-	Wednesday, July 18.
Entrance Examination	-	-	-	-	}	Wednesday, July 18.
						Thursday, July 19.
Recitations begin	-	-	-	-	-	Friday, July 20.
Term Examinations	-	-	-	-	-	November 7 to 14.
Baccalaureate Sermon	-	-	-	-	-	Sunday, November 11.
Address before Trustees	-	-	-	-	-	Tuesday, evening, Nov. 13.
Commencement Exercises	-	-	-	-	-	Wednesday, November 14.
Winter vacation from November 15, 1888, to February 28, 1889.						

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