

FOURTEENTH BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES

OF THE

Iowa State Agricultural College and Farm

MADE TO

THE GOVERNOR OF IOWA,

FOR THE YEARS 1890 AND 1891.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

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STATE AGRICULTURAL COLLEGE, }
AMES, IOWA, December 1, 1891. }

To his Excellency, HORACE BOIES:

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 Fourteenth Biennial Report of said Board.

E. W. STANTON, *Secretary.*

REPORT OF THE PRESIDENT.

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

GENTLEMEN—I have the honor to submit to you for his excellency, the governor, and for the citizens of this noble commonwealth, my first biennial report. Of this biennial period I have served but one year. I have only good things to say of my predecessors in this office. And the more I see of the responsibilities and obligations incident to the work of the presidency of this college, the more I appreciate the work in the history of everyone of its officers in the past.

The past year has been one of healthful struggle and growth. We have possessed enough land to encourage us and have still sufficient to do to require all there is of us for the year to come.

THE APPROPRIATIONS MADE BY THE LAST LEGISLATURE

were most timely and needful. The erection of Morrill Hall has enabled us to provide well for the work of zoology, entomology and geology. For these branches of science it provides ample recitation, laboratory and depository room. The basement is well utilized by a flourishing gymnasium and rooms for the preparation of subjects in natural history and the display of fishes. This building makes pleasing accommodation for the exhibit of the museum and scientific collections in geology and natural history. We have provided a gem of a chapel that aids greatly in the social, intellectual and moral phases of our college work. The crowning service of Morrill Hall is its provision for a most admirable library room. The room is well located, cheerfully lighted and tastefully furnished, making one of the most inviting rooms of the kind in the state. Morrill Hall has enabled us to make much desired

IMPROVEMENT IN THE MAIN BUILDING.

In place of the former library and museum rooms, have been fitted up living rooms for students and these are more than full already. By change of the chapel we were enabled to make a much needed provision

for dining room. The old chapel is converted into a commodious, tasteful and inviting dining room. Important additions of new floors and wood furnishings have been made in this building. A new coat of paint has added much to its preservation and graced the entire structure. The new gutterings of the roof came none too soon. A water main with hose ready for action upon each floor and excellent fire escapes have added much to the security of the building and safety of the students.

THE ADDITIONS TO THE PHYSICAL AND CHEMICAL LABORATORY

have given desirable room in that building for our new department of Electrical Engineering and the placement of new apparatus for electrical work. It also gives much desirable room for the chair of Chemistry. There is need of additional new shelving in the west basement of this building in order to properly store chemical supplies and apparatus. The entire heating system of this building is much in need of new fixtures. The new engine and boiler room came at an urgent time. The attendance in the Mechanical Engineering course has greatly increased and there is much demand for the additional room that this building affords the department of Mechanical Engineering. The appropriation made for the improvement of the farm buildings has added greatly to the utility and appearance of the entire farm department. The barns and out buildings have been painted with a comely coat of paint. The old fences have been repaired and painted and new ones built so that there is a general toning up of all the farm buildings. The farm house has also been greatly improved by a coat of paint. The new piggery makes commodious quarters for the swine and facilitates this important part of our farm work. The new dairy building, while built with good economy, presents an attractive appearance without and is most admirably arranged within for the purposes of the creamery and dairy schools. With the thorough equipment that is now placing in this building for the use of the dairy school the farmers of Iowa will have a service for the training of our young people in butter and cheese making such as is surpassed by no state in the union. The buildings and grounds have been greatly improved by the cement walks and some new graveled driveways all of which add greatly to the beauty of the grounds and the comfort of the people. There should be much additional work by way of cement walks connecting the main building with the other buildings adjoining. A good cement walk is economical in cost and outlasts any other ordinary walk that could be used.

STEAM MOTOR RAILWAY.

The completion of the steam motor railway connecting the college with Ames has greatly benefitted our work. It places the college in more intimate relation and sympathy with the town and enables us to have mutual interchange in the interests affecting college, town and State.

THE EXPERIMENT STATION,

combined with the college forces has done most practical and excellent work during the year. The station staff composed of the board of direction outline their work a year ahead and follow such definite lines of original investigation as prove most valuable and serviceable to the industries of the State.

The station staff and college forces have worked in hearty accord throughout the year.

DEPARTMENT OF AGRICULTURE.

The studies in Agriculture and Horticulture have been largely combined in the agricultural course and students taking this course are not privileged to omit any agricultural study. This is one of the very best courses of agriculture in the country. Provisions are also made for students who do not desire to pursue such a long course in agriculture. They may take a course of ten weeks or two years. The short course in agriculture is arranged for the winter months when the young Iowa farmer is most free to equip himself more scientifically and thoroughly for his chosen work. The course in dairying gives excellent facilities for a thorough training in butter and cheese making. The admirable arrangement of the new creamery building and its thorough equipment with five thousand dollars worth of new apparatus and officered by an efficient corps of instruction will greatly enhance this very important industry of Iowa.

The management and cultivation of the farm are such as to give the most improved methods of farming, the best ideas as to stock of all grades in breeding and rearing. We are now ready to supply any and every need in imparting agricultural education to the farming industry of Iowa. We pledge ourselves to do all within our power to promote the agricultural interests of Iowa and the nation.

THE WORK OF THE PROFESSORS AND TEACHERS.

In all courses and departments is characterized for the year by an earnestness and efficiency and worth that are commendable as will be seen by the respective reports herewith submitted.

MINING ENGINEERING.

Owing to the very important interests having to do with the mining industries of the State, we have found it necessary to provide a course in mining engineering. The course will provide efficient young men for these important interests of mining in the State.

GENERAL FINANCIAL CONDITION.

The general financial condition of the institution as seen by the reports of the secretary, steward and treasurer is most gratifying. You will notice that the total moneys yielding income are \$657,959.31, leaving the comparatively small amount of \$21,825.39 not yielding income. The income of the college for the year from State and National sources for buildings, experimentation, support and maintenance of the college is \$151,043.26. After the nation has so generously provided for the instruction and apparatus the State should make full provision for the new buildings and improvements that are now absolutely necessary in our work.

ATTENDANCE FOR THE YEAR

is 425, being eighty-nine more students than enrolled in any previous year of our college history. This large increase of students has more than filled the extra rooms provided by the last legislature, and has added to the demands of all the chairs in the Institution. We have filled to the fullest capacity the living rooms. They are overcrowded, and speedy and generous provision should be made for the comfortable living of our young people.

GENERAL REPAIRS.

The repairs to some of the buildings had been delayed so long that the appropriations made by the last legislature were not sufficient to improve all that should be done. Our present room for post-office, book room for students, etc., is in an out-of-the way place, and entirely too small, so that it should be changed at the earliest convenience. The main building is sadly in need of an assembly room for students during recreation hours. At present it is just like a large hotel would be without any lobby or large parlor. Such a room can be arranged conveniently over the boiler room. We did not have funds sufficient to fit up shelving, complete the basement rooms, and provide suitable heating facilities for the physical and chemical laboratory building. In this building the plumbing is worn and past successful patching, and must have attention. Our winter schools and general needs make it necessary to rearrange a number of the rooms in north hall. It must

be overhauled to make it more comfortable for our winter students in agriculture and dairying. The present office building should have a couple of additional rooms to make it adequate to our present demands and promote the work of the College. By advice of the architect the walls in Morrill Hall were left one year with just the first rough coat of plaster. These should now be finished with frescoe. The walls and rooms in Engineering hall are urgent for additional repairs and improvements. The sewerage system must have extra attention to insure the health and welfare of the College community. It is vitally important that the lives of our young people be carefully guarded by a most complete system of sewerage of the grounds. As a State, we cannot neglect provision of this character, and it is our duty. It is high noon for this system to be inaugurated at once. In addition there are a number of minor repairs just as important in their places as the things specified. For all these general repairs we should have an appropriation of not less than \$12,500.

ADDITION TO CREAMERY, INCLUDING DORMITORIES ON THE SECOND FLOOR AND REPAIR OF BARN.

The money already appropriated for creamery has been most judiciously expended, but the amount was not adequate to make sufficient room for instruction in all departments of dairying, and especially for the making of cheese. The foundation is in for an addition that will be adequate for cheese-making as well as butter-making. With small additional expense rooms can be fitted up in the second story of the creamery that will be quite convenient for the rooming of students. The second story adds much to the architectural effect of the building and affords room that will be quite desirable.

The barns will need additional repairs and rearranging. There should be a sufficient appropriation to bring this about.

A BUILDING FOR YOUNG LADIES AND THE DEPARTMENT OF DOMESTIC ECONOMY IS NEEDED.

Hitherto we have gotten along fairly well with our young ladies and young gentlemen in the same building, but with the over-crowded condition of this building it is highly important that we make more generous provision for the young women. We should have a first-class modern building, with all recent improvements and equipments, provided with commodious living rooms, reception rooms, bath rooms and dining room of sufficient capacity to give table board to a large number of young men. This building should have a capacity for one hundred ladies, and not be more than two stories in height. The

reception rooms would enable us to add to the social interchange of our young people seventy fold. There is no more important part of a young person's education than the reasonable refinement arising from the generous provisions in their social relations. We have been exceedingly fortunate hitherto in the good repute of our young people. It is not so much a question of the preservation of the integrity of their manhood and womanhood as it is to give them ample room for the development of their entire lives. With our present facilities, our reception room is no larger than many private families have in their own dwellings, and with several hundred students in the halls and rooms during the recreation hours is necessarily packed uncomfortably and undesirably. The daughters of Iowa are worthy of the very best building in the State. While the State is providing generously for the unfortunate, the infirm of body and the weak of mind, it should provide still more faithfully for the young women that are the pride, the strength and the great hope of our Iowa homes. The mistake of little pent-up rooms and ungenerous quarters in the living buildings of the college should be avoided forever. We are too far from town to do without a building for young ladies, and hence different in our demands by reason of our situation than other institutions of like character in the State. By having this building for young ladies it would enable us to supply most urgently needed rooms for our young men in the main building. We should have every one of these extra rooms at the earliest date possible. By providing near the kitchen of this new building a couple of rooms for domestic economy, it would free South hall as a much-needed building for the family of one of the professors.

NEW BUILDING FOR AGRICULTURE, HORTICULTURE AND VETERINARY SCIENCE.

The Agricultural and Horticultural departments have long been in need of more commodious rooms for recitation, offices and general purposes. These departments have to do with the most fundamental industries of our State, and as agriculture embraces one of the greatest leading purposes of our work we ought to provide for it most amply and generously. The enlargement of these departments and the consequent growth attendant with their interests makes urgent demand for a new building. In connection with this building there should be a green-house, made after the most approved plans so that the Horticultural department may not be in any way embarrassed from lack of provision from the green-house. The Professor of Horticulture has long deferred his needs in deference to other interests of

the institution. The time has come when all these needs should be met with necessary room.

The department of Veterinary medicine has outgrown its present limits and there would be a necessity for a new building in order to give facilities for instruction and dissection room to meet the large demands upon the department. Moreover the hospital is in great need of enlargement. We are often seriously embarrassed and the health of some of our young people endangered because of the crowded condition of our hospital. The Professor of Veterinary medicine could very properly carry on his work of instruction and original investigation in connection with the Agricultural and Horticultural departments. These departments are closely connected. This will save an extra building for the department of Veterinary science.

STEAM HEATING.

Our present means of heating by stoves and furnaces in the various buildings is not the most economic upon the one hand and not efficient upon the other. The heating apparatus of the main building, which is the chief system, will have to be replaced in any case by a new system and new piping and equipment throughout. The same is true of the building of Physical Science and Chemical Laboratory. Other buildings have only temporary heating. We should have a general central heating system connecting all of these buildings, thereby making janitor hire much less, diminishing the cost of fuel and adding greatly to the security of all of our buildings from fire, as well as contributing to the cleanliness and general culture of the whole institution.

FEED BARN AND HORSE STABLES.

The farm department is much in need of a feed barn and horse stables for experimental purposes. Much of the most profitable work in experimentation as to feeding, breeding and raising stock, derives its value from marked accuracies in the experiments. Such accuracy can only be secured most economically when we have good barns with suitable equipment for such purposes. At present our stable for horses is very inadequate, and especially is this true when it comes to handling valuable animals. This very vital part of our farm work will seriously suffer if we are not provided with feed barn and horse stables.

WATER SUPPLY.

With the number of inhabitants that we now have upon the grounds and the important necessity for water in the buildings on the campus,

for the providing of the green, and horticultural gardens with abundant water, we should have an economical and general water supply on the grounds. And most of all this is necessary to facilitate the sewerage of the grounds. With our rapidly increasing population it is absolutely necessary that we have a more complete sewerage system, and this cannot be done without an abundance of water. This means health and life to the young people of Iowa.

ADDITION TO VETERINARY HOSPITAL.

Our present veterinary hospital is outgrown, by reason of our additional attendance and the extra demands made upon the capacity of the hospital. There should be a building near the present veterinary hospital, to give more ample accommodation to sick patients, to afford greater room for the dissection and give greater capacity for the entire work of the veterinary department. It is imperative that a veterinary hospital be secured the coming year.

ARMORY AND GYMNASIUM.

One of the very important and practical parts of our work is that of military tactics. The instruction given is mostly excellent, and the work done is very satisfactory. Many parts of the year in spring and fall are unfavorable for outdoor drill and the large number of students makes it necessary for a room larger than anything we can provide in our present buildings. Moreover, there is needed room for the preservation of the arms and equipments of the military department. We are getting on temporarily with the gymnasium in the basement of Morrill Hall, but this room is too low and too cramped to meet the very vital needs for instruction in gymnastics. With the building of a good brain there must be the fundamental foundation of a strong body. We strengthen the brain by providing thoroughly for the development of the body. The department of military tactics should have an armory building of sufficient capacity to meet all these needs of physical culture, both for young ladies and gentlemen.

PROFESSORS' HOUSES.

We are much in need of more room for the families of the professors on the campus. Some of the professors have had to live down town, with quite a disadvantage to the work, and in an instance or two a couple of families have lived in the same house; some have taken rooms in the main building, and thus we have been compelled to shift as best we could for lack of more dwellings. There should be at least two new dwellings erected upon the campus the coming year.

GENERAL SUMMARY.

After careful consideration the Board of Trustees have unanimously agreed to ask appropriations of the coming legislature for the following purposes. These needs are condensed on consideration of the entire field of our wants and each and all very necessary for the greater efficiency and prosperity of our work.

Needed State appropriations:

1. General repairs.....	\$ 12,500
2. Completion of creamery, including dormitory room on second floor, and repair of barns.....	5,000
3. Ladies' hall, including room for domestic economy.....	75,000
4. Building for Agriculture, Horticulture and Veterinary Science, including green house.....	50,000
5. Central steam heating plant.....	25,000
6. Feed barn and horse stables.....	8,000
7. Water works.....	15,000
8. Addition to Veterinary Hospital.....	7,000
9. Armory.....	15,000
10. Two professors' houses.....	5,000
	<hr/> \$217,500

Some of the reasons why these appropriations should be granted:

1. They are all very much needed. We are asking simply for our legitimate needs and what we must have in order to allow our work its proper growth.

2. The Nation has provided generously in behalf of the college, thereby putting the State under urgent obligations to carry out her part of the contract by providing ample buildings and suitable facilities for the successful prosecution of the work.

3. The Iowa State Agricultural College has made excellent use of what has already been entrusted to its care. It shows most careful husbanding of the funds and appropriations already bestowed upon it. It is the highest wisdom of the State to give freely to an institution that makes judicious use of what has already been given it.

4. As an institution we have no war to make against the appropriations of any other institution in the State. The State should provide liberally for the maintenance and growth of all the institutions under her care.

5. Ben Franklin's saying is most applicable for Iowa as well as an individual: "An investment in knowledge always pays the best interest."

6. Every live institution must make provisions for its immediate growth. The demands for enlarging the scope of our work at present are only those that the State can supply. We need more buildings

and greater capacity for the utilization of the funds given us by the Nation.

In conclusion, my sincerest appreciation and gratitude are expressed to all the professors, teaching assistants, office assistants, to the students, neighboring friends of our work, and to the patrons and friends of the Iowa State Agricultural College throughout the State, for their sympathy and support during the year. Especially do I give keenest appreciation to you, Gentlemen, composing the Board of Trustees, for your frank and generous treatment of the president, for your earnest and unanimous support of the executive management of the institution, and for the broad and liberal policy by which you conduct its affairs and in accord with which the college year has been made to me an evidence and an earnest of building here upon the prairies of Iowa, an institution of liberal and industrial education that will be the growing pride and strength of the good and the true in this best land of earth—America.

Very Respectfully,
W. M. BEARDSHEAR,
President.

REPORT OF THE DEPARTMENT OF AGRICULTURE.

JAMES WILSON, PROFESSOR.

The four years' course in agriculture and auxiliary sciences is designed to educate the sons and daughters of the farmers and others to the intellectual level of graduates of the best colleges in the land. The position of Iowa as foremost agricultural state in the nation demands that the farmer be trained in all the sciences that are related to his business, in all the arts by which it is conducted and in literature to sustain both, fitting him to act his part with the progressive scholars of his day. The future prosperity of the State will be measured by the intelligence of the tillers of the soil, of the managers of its flocks and herds, and the disposition of the products of the farm. Very many Iowa farmers are giving their children liberal education with a view to having them return to the industrial pursuits of life. The four years' course at this college is arranged for this class. They are trained in shop work, the origin, history, development and anatomy of our domestic animals, their breeding and management for meats, wools and dairy products; they study soils, rotations, and cropping throughout the seasons, experiments in field, stable, dairy, grove, nursery and orchard, the chemistry of the farm, in all its departments, mathematics, including drainage and surveying, English language, and literature, elocution, and military drill. The agricultural studies are all required, while options are permitted in the auxiliary studies.

At the beginning of the college year of 1891 the agricultural courses were separated from the course in science. A two years' course was provided, in which most of the agricultural studies are included, with as much science and literature as the time will permit.

A short course in agriculture was provided for, beginning December 1st, to continue ten weeks, in which dairying is a leading feature. Instruction in this course is given by all the professors in agriculture, horticulture, veterinary science, botany, and entomology, connected with the college, including shop work in the mechanical department.

Four thousand dollars were appropriated by the trustees to build the dairy, which is a model in all its appointments. The butter division, including office, receiving room and a succession of floors on the gravity system, with refrigerator and ice house, is thirty-six by ninety-six feet. The walls are stone and lime, above the level of the working floors; the floors are cement throughout. A two-story superstructure has fourteen rooms for students, that are greatly needed, and a students' room twenty by sixteen.

The boiler and engine house is twenty-six by thirty, with stone walls and iron roof. The four thousand dollars will enclose all this, and make it ready for operations when the dairy school convenes, but a cheese making and curing annex is necessary, that will require four thousand dollars more to build; including a sampling and testing room for the chemist, and the finishing of the rooms in the second story.

The farm buildings have been repaired and painted during the past summer, the old creamery remodeled into a house for the foreman of the farm. The new hog house provided for by the Board has been built, the silos have been repaired, and new fences erected, made necessary by building of the railway from Ames.

The farm needs a new feeding barn with cement floors, so that the liquid manure may be saved for experimental purposes, and for the health of the animals. Five thousand dollars will be necessary to build it. The farm and station will experiment in feeding domestic animals for all practical purposes, and a building adapted especially to that use is required.

There are more horses on the farm and station than there are conveniences for taking care of; an additional barn is needed that will cost three thousand dollars.

The crops of the past season have all been very heavy. They will be fed for experimental purposes as far as they will serve by sustenance of nature and development of young animals. These operations do not make money as commercial feeding does. The farm is being made more productive. An eighty acre bottom has been ditched and plowed for cropping the coming year. Records are being kept of the yields of the milk cows to the end that the herds may be improved by selection, and the least profitable disposed of. The farm, its animals and machinery are all at the disposal of the station for experimentation.

The courses of study closely allied with the farm are agriculture, including horticulture, and the course in veterinary science. All need more buildings for lecture courses, museums, offices and other uses, including a winter work room for horticulture and an auditorium for the agricultural department to illustrate instructions in live stock with living specimens, and for society rooms where students teach themselves. It would be economy for the State to build one fire proof building for all, and fifty thousand dollars would be necessary to erect it.

REPORT OF EXPERIMENT STATION.

JAMES WILSON, DIRECTOR.

The work of the farm section of the Experiment Station covers a wide field, and is continuous through the year. The experiment conducted jointly by the farm and chemical sections, bearing on the disputed question of the effect of feed on the quality of milk, is reported in Bulletin 14, where it will be seen that striking results were obtained, and that feed is an important factor in fixing the quality of milk. The calf feeding experiment, compared the value of skim milk and ground flax seed with that of whole milk for feeding young calves, makes a very satisfactory showing for the former ration, as will be seen by the report in Bulletin 14. An experiment to determine the expense of growing the different soiling crops, and the best methods and kinds, and their value for milk productions, has been in progress during the greater part of the season. The results will be published in the forthcoming bulletin, and will enable us to make a comparison of the soiling system with our present grazing system and to note the effect on the constituents of the milk produced. The value of skim milk, as a feed for milch cows, has also been tested, and will be reported. It is our intention to begin an experiment, at the close of the present term of school, to determine the value of skim milk as a part of a ration for wintering colts. Bulletin 14 records an experiment in feeding the sow and litter, in which the value of albuminous feeds in forming a part of the ration, is clearly set forth.

The sugar beet crop, consisting of one and three-tenths acres, has been carefully cultivated during the season, and all of the different conditions and results noted. The work covers tests of varieties, soils, fertilizers, date of planting, method of preparing soil, and cultivation. The results are very favorable, and the report will be valuable information concerning beet culture in Iowa. Thirty varieties of potatoes, eleven varieties of oats and a dozen varieties of winter wheat have been grown under experiment, and are being written up for the Bulletin. The best varieties of winter wheat have been resown, together with what other desirable varieties could be obtained, and are now in fine condition. As high as forty bushels of wheat per acre were obtained from one variety, and the average yield of potatoes reaches nearly two hundred bushels.

Six kinds of grass seed were sown each week for eight weeks in succession, and all conditions carefully noted during the season. According to

chemical analysis the years' cane crop is richer in sucrose than any former crop grown on the station grounds.

Corn growing has been studied extensively throughout the season. Variety tests, and different modes of cultivation, are some of the points investigated. We were handicapped at the outset in not knowing either the nature of the soil in different fields, or the kind of crops previously grown on the land, but the crops are creditable. Green manure, barnyard manure, liquid manure, and packing house fertilizer have been tried. This station is under obligation to C. B. Sutton, of Cedar Rapids, for two tons of tankage fertilizer. The effect of topping and detasseling corn will also be reported. A carefully prepared drawing has been made of the entire station grounds, showing the location and the exact area and kind of crop grown on each particular piece of land. A feeding experiment with three breeds of hogs and Shropshire lambs will soon be completed. Sheep feeding and breeding, for mutton and wool, is being made a special study. Thirty head of sheep, the best representatives of seven breeds that could be found in several adjoining states, have been purchased, at a net cost of \$1,055. Males of each breed were obtained, and the flock will rapidly increase. The stock is all registered and the surplus males will sell at a good profit. The following are the breeds represented: Oxford Down, South Down, Shropshire Down, Hampshire Down, Cotswold, Dickinson Mutton Merino, and Horned Dorset.

Twenty head of yearling steers of ten different breeds have been purchased, at a net cost of \$592. The breeds represented are Short Horn, Jersey, Holstein, Devon, Red Polled, Brown Swiss, Polled Angus, Galloway, Hereford, and Scrub. They will be fed for experimentation and breeds compared. The station herd of registered cattle, when we assumed charge in January, consisted of six bulls, thirteen cows and heifers, and one Polled Angus bull calf. The number has been increased by a Jersey bull calf, a Holstein bull calf, and a Red Polled heifer calf. The herd comprises the following breeds: Holstein, Jersey, Polled Angus, Galloway, Red Polled, and Short Horn.

The cows giving milk are used in experiments and a careful record of the expense of growing and maintaining the bulls is kept. The bulls are used for breeding the farm cows. A Poland China boar and fourteen Poland China sows were bought in February at a net cost of \$401.53. The farm department has had the management of the station hogs and receives the increase and receipts from sales of same. The station teams consist of two grade mares and two old mules. The bulletin mailing list has been revised and only the names of parties making application are continued on the list. The number of names was at first reduced by several thousand but is rapidly increasing and will soon be larger than before. The next bulletin will necessarily be a large one and the expense of publication will probably exceed a thousand dollars. This draws heavily on our station funds and we would suggest that the legislature be asked to print our bulletins in order that we may supply the demand and use the station funds for experimenting.

The work of the other sections of the Experiment Station is presented in the following reports of the professors at the head of each section.

CHEMICAL SECTION.

The section of Agricultural Chemistry has during the past year done work upon the following subjects:

I. *Sugar Beets*: Sugar beets grown in various parts of the State in 1890 were analyzed to ascertain their sugar content and purity. For comparison, a number of Nebraska grown beets were also analyzed. Average results showed a superiority of the Nebraska beets over those grown in Iowa of about two and one-half per cent sugar, i. e., about fifty pounds of sugar per ton of trimmed beets.

Believing that this difference might be due to the entire novelty of sugar beet growing (for anything beside cattle feed) among Iowa farmers and a consequent lack of knowledge concerning the needs of the crop, we presented in bulletin No. 12 an outline of the most approved European practice of growing the beet, and proposed to the farmers of Iowa a grand co-operative experiment for 1891, to be carried out jointly by themselves and this section of the station. It was proposed that the station should, so far as able, supply the farmers with beet seed of good quality and approved varieties, the farmers should grow the beets according to instructions given, make full report upon their part of the work, and at maturity of the crop send to the station for analysis samples of the beets grown; that this section should analyze said samples, report the results promptly to the respective growers, and finally unite all the results and all knowledge gained from growers' reports, in a full and complete report to the public. This proposal was made in the form of an offer or invitation to the farmers of the State. It met with hearty response. Scores of farmers joined in the work. The station was unable to furnish seed to all, so many obtained it from the United States Department of Agriculture, and other sources. The number of samples of beets received here and analyzed this autumn is nearly five hundred. The work will soon be completed and will be reported upon in the next bulletin (No. 15.)

II. *Sorghum*: The work (begun in 1888) of improving the quality of sorghum by seed selection based upon analysis of individual canes was continued in 1890; also in 1891. Report for 1890 was published in bulletin No. 12. As there stated the season was exceptionally adverse because of drought; and, probably as a result, there was no improvement in quality of the crop over that of the preceding year, but instead an actual decline, especially in respect to purity. Nevertheless, compared with the crop of 1888 (before propagation from selected seed was begun) there was still evident an improvement in quality; but the amount of the crop was much less than in preceding years, because of the drought. The work of the present season will be reported in a future bulletin.

III. *Effect of Feed upon the Quality (composition) of Milk Produced*: An investigation made jointly with the farm section, reported in bulletin No. 14. The feeds compared were corn and cob meal and "sugar meal" (from Marshalltown, Iowa), a by-product in the manufacture of glucose from corn. The grain rations per day per head were respectfully 10 lbs. sugar meal and 12½ lbs. C. & C. meal. Coarse fodders were alike. Results were summarized thus:

As to gross yields—

1. Sugar meal produced nearly eight per cent larger average milk yield than did corn and cob meal.
2. Sugar meal produced twenty-seven per cent larger average yield of butter fat than did corn and cob meal.
3. Sugar meal produced fourteen per cent larger average yield of milk solids (including fat) than did corn and cob meal; and of solids not fat scant nine per cent larger yield.

As to percentage composition of the milk—

1. Quality of milk, so far as measured by its percentage of fat, was changed by feed to a much greater degree than was quantity. Two-thirds of the increase in average gross yield of butter fat was due to improved quality of the milk, and only one-third to increased milk flow.
2. Sugar meal produced .58 of a pound more butter fat per one hundred pounds of milk than did corn and cob meal; this difference is seventeen per cent of the amount of fat in one hundred pounds of milk produced by corn and cob meal.
3. Sugar meal produced .73 of a pound more total solids per one hundred pounds of milk than did corn and cob meal; this difference is six per cent of the solids in one hundred pounds of milk produced by corn and cob meal.
4. As compared with corn and cob meal, sugar meal increased the ratio of fat to "solids not fat" from 396 to 457 per 1,000—an increase of over fifteen per cent.

IV. In an "experiment in feeding for milk" (bulletin No. 13) and a "Calf feeding experiment" (bulletin No. 14) this section co-operated with the farm section, making all analysis of feeds and milk. For results of these investigations see report of the farm section, *ante*.

V. A *Relative Value Table*, for valuing milk on the basis of its butter fat content, announced in bulletin No. 12. This table is a form of "ready reckoner" to make easy the valuing of milks containing different percentages of fat—the latter having been ascertained by any reliable mode of testing. It was published in sheet form (not in a bulletin) for convenience in use, and copies have been sent to a large number of applicants, chiefly creamery men in this and adjoining states.

BOTANICAL SECTION.

Since my last biennial report I have been made botanist of the section and my time has been divided between the two lines of work. I have been ably assisted in this by the botanical assistant, Mr. P. H. Rolfs. He has looked after details of some work besides giving help in the laboratory. He has also looked up the matter of seeds and their adulteration. In a large number of grass seeds he found not only the seeds of bad weeds but also chaff, sand, etc., which increased the weight. In Burnet (*Poterium Sanguisorba*) he found forty-seven per cent of sanfoin. Sanfoin sells at six cents per pound while burnet at sixteen. In 1890 I began a series of experiments in treating fungus diseases of plants, leaf blight of pear, spot diseases of currants and spot disease of cherries. These have been reported in bulletin No. 13, Iowa Experiment Station. The results with fungicides were very gratifying. The past year I have taken up the matter but on a much larger

scale, although the season was especially favorable for the development of parasitic fungi the results are more gratifying than in 1890. There is no doubt that if the horticulturists will use fungicides they can save thousands of dollars of their nursery stock every year. At a low estimate I believe that 5,000 cherry seedlings treated with ammoniacal carbonate of copper on the horticultural grounds are enhanced in value at least fifty dollars. Without this treatment they would be almost worthless. I have also called attention to several destructive diseases of plants which have not received attention from botanists. One of them threatens to do very serious injury to the cherry and plum, causing brown or olive spots on the fruit. This same disease has been reported to me from Virginia and Canada by one of the former students of the College, Professor Craig. I have also found it quite common throughout the State. I hope to make a series of experiments the coming year in preventing this fungus. A very destructive root-rot disease has also appeared on sugar beets. This is now being investigated. Some attention has been given to the treatment of corn smut but the results have been more or less negative. All of these matters will be reported on in coming bulletins.

The matter of diseases of forage plants has also received considerable attention. In bulletin No. 13 the subject of red clover rust was considered. This fungus occurs especially on "rowen" or second crop clover. The fungus spreads chiefly by the uredo spores. Fields containing much of the fungus should be plowed or burned over. It is not advisable to plant crimson clover. We have also started a series of experiments to prevent bunt in wheat. Though similar experiments have been made elsewhere we believe it wise to verify results. Active operations are being made to prosecute the study of germs, which are important in the work of the dairy. Some germs have been isolated. We hope soon to cultivate a large number of germs that cause the ripening of cream, cheese and milk. If we succeed this work will be of great importance to the dairy interests of the State.

ENTOMOLOGICAL SECTION.

The work of the Entomological section of the Experiment station has been carried out on the lines indicated in the outline submitted in the early part of the season and the reports in the two bulletins already published will show the results obtained so far. The most important work of the season has been that upon the insects affecting grasses and clover and we believe that our studies in this line are well timed and trust that the results secured may assist in preventing injuries to these very important crops that seem especially threatened at present.

The clover-seed midge, which from our previous observation, we felt was likely to prove destructive this year has occurred so abundantly in some parts of the State as to very greatly reduce the crop of clover seed and in some cases to destroy it entirely. Another clover pest appeared in considerable numbers here and in other parts of the State and from our studies of it we found that the larvæ were destroyed effectually in all clover hay stored after cutting while the larvæ were in the clover heads. And it is evident that general adoption of this treatment would very greatly aid in securing a good crop of seed later in the summer. This species is treated in detail in Bulletin No. 14 while the clover seed midge is treated in Bulletin No. 13.

The grass leaf-hoppers received attention, a number of species being described and figured in Bulletin No. 13, and reports of experiments on their destruction being detailed in Bulletin No. 14. It was found that a simple strip of sheet iron coated with coal tar and drawn over the ground by cords at each end captured the insect very effectually, and in an experimental plot the difference in favor of the area once treated was thirty-four per cent, or an addition of over one-third to the crop harvested.

Attention was also called to the horn fly and the apple maggot as species which the people of the State should be ready to meet when they appear, and other species received less prominent notice. Aside from these species reported upon, our studies have covered a number of species affecting various crops and which will be reported on as they are completed, or as their importance may require.

The collection has been increased by the addition of many specimens, and is proving more and more valuable in the determination of insects sent in from over the State.

It will be recognized at once that the correct identification of insects sent here for that purpose is one of the most important duties of the entomologist, and for this purpose it is important that our reference collection should be made as complete as possible. The correspondence in this direction, and for making inquiries as to the treatment of common pests has increased rapidly during the year, and at some times, especially during the outbreaks of plant lice upon plum trees and upon wheat, was such as to occupy a great deal of time. This portion of our work we believe especially important and consider it essential to give it close attention and to encourage it as far as possible. In no other way can we keep informed of the needs of the State or more directly reach people who are to be benefitted by our work.

We had planned the beginning of an apiary, but did not find any desirable bees to procure near home, and as the season proved unfavorable for bees it was deemed wise to defer purchase of the necessary colonies until another season. The plan is not abandoned but it seemed better to wait in starting until conditions are reasonably favorable.

HORTICULTURAL SECTION.

The urgent and imperative need of a hardier list of the orchard fruits, and of ornamental trees and shrubs, has naturally led our experimental work in the direction of introducing from the like climates and soils of the world a hardier race of trees and shrubs, and crossing and hybridizing them with the best varieties originating in more favored climes. The soil of the college farm is not favorable to the growth of the half-hardy varieties doing well in parts of the State, and the recent summers and winters have been peculiarly trying. Hence, during the past twelve years we have been able to test, in connection with our hundreds of trial stations in the west and cold north, the hardiness, bearing habits and real value of many varieties of east European and Asiatic fruits, and to thoroughly test many promising crosses originating on our grounds and at other points. The results have been made public in our Bulletins of the college and experiment station, and in the horticultural reports and periodicals of this and other states. That we have been able to rapidly advance the horticultural interests of the prairie states, and the north districts of fruit culture across the continent, is now conceded

by many who first opposed such extended innovations and changes in established lists. The demand for our promising trees and shrubs has been so great that the department has been nearly self-supporting, though the small price of plants has little exceeded the cost of production. As stated in circular letter, the limited nurseries on the college grounds are intended

(1.) To familiarize students with the modes and methods of propagation and culture.

(2.) To furnish object lessons as to variations in leaf, bud and habit of growth of varieties and species.

(3.) To test and send out for trial the hardiest known and most promising new sorts of apple, pear, cherry, plum, apricot, peach, forest trees, ornamental trees, shrubs, etc.

Our union of class and station work is needed for the perfect application of the expressive motto of our college, "Theory with Practice."

VETERINARY SECTION.

We beg leave to report as follows in regard to the work of the veterinary department of the experiment station:

The rooms set aside for our use in north hall by the Board have been equipped for bacteriological work. This work being of the utmost importance in the study of animal diseases. A large tank has been put in the attic to furnish a water supply, and a gas machine put in to supply the necessary gas for laboratory uses. Work tables have been placed in position where needed, and other laboratory apparatus secured. Owing to the lateness in getting the gas machine in place and the necessary plumbing done, we have been considerably delayed in beginning work. There is also delay in securing most of the bacteriological apparatus, as it had to be ordered from Germany. Through the kindness of Professor Pammel we have been able to begin work on a small scale by using some apparatus he had on hand. With our present equipment we can prepare the necessary media for the cultivation of disease organisms and are thus able to grow them in the laboratory and make inoculation experiments on small animals, etc. When the material ordered from Germany arrives the laboratory will be well equipped for the work we propose to undertake. In regard to the character of this work we will quote from a report made to the director (Prof. Wilson) a short time ago.

"The work of the veterinary department of the experiment station will consist of a study of animal diseases with a view of preventing their ravages. While the etiology of many maladies which cause great loss to our live stock is well understood, some diseases which occur frequently are not so well understood; for example, the so-called 'corn stalk disease', 'Hydrophobia' of cattle and enzootic abortion in mares and cows. Our efforts will be directed largely to the study of the exciting cause of such diseases, for it is only by knowing this that preventive treatment can be carried on with intelligence. As many of the diseases causing the greatest loss are practically incurable, it is only by preventing them that the loss can be lessened. After determining the exciting cause of an enzootic or epizootic disease we are in a position to recommend sanitary measures which can be carried out by the stock owner himself. In connection with the

study of etiology of certain diseases we hope to do some work in regard to preventative inoculation. From what has already been done along this line by frequent investigations we are led to believe that in this way many diseases can be successfully combatted. From some recent experiments we learn that the products of green growth (the poisons produced by the growth of pathogenic microbes) may not only be used to prevent disease but in some instances may have value as therapeutical agents if given after the disease symptoms appear.

Besides the work mentioned several other kinds of work will be undertaken from time to time, as opportunity offers. For example, the action of new drugs on the horse, the action of disinfectants on pathogenic bacteria, etc. While such experiments will not, at first glance, seem to interest the individual stock-owner, they will be important to the veterinary practitioner, and anything which enables the veterinarians to more successfully cope with diseases of domestic animals, is a benefit to the farm.

The plan of work in regard to disease outbreaks, which are not understood, is as follows: Whenever such an outbreak is reported the locality is visited, and such full observations as are necessary are made, material is collected, taken to the laboratory, and thoroughly worked up. Thus it will be seen that both field and laboratory work are carried on conjointly.

At present a study of the so-called hydrophobia of cows is being made. Several outbreaks of this occurred during the past summer, causing considerable loss. We hope to be able to discover the exciting cause, and thus be in a position to recommend preventive measures.

The "corn stalk" disease will be studied as soon as cases can be obtained for examination. It is important to learn whether it be a germ disease, and in any way connected with Burrill's disease of corn.

Experiments showing the action of disinfectants on pathogenic microbes have been begun, and will be continued during the winter.

In addition to the equipments we already possess we are greatly in need of a building and grounds for experimental animals of different kinds. In fact, but little can be done in the most important lines of work until this want is supplied. In the study of the cause of bacterial diseases and the study of protective inoculations experimental inoculations must be made. We hope that some arrangement can be made which will enable us to carry out this part of the work whenever necessary.

FINANCIAL STATEMENT.

THE IOWA AGRICULTURAL COLLEGE EXPERIMENT STATION IN ACCOUNT
WITH THE UNITED STATES APPROPRIATION.
1889-1890.

RECEIPTS.

Amount received from United States Treasurer, as per appropriation for the year ending June 30, 1890, under Act of Congress approved March 2, 1887	\$ 15,000.00
Amount received from the sale of stock and produce belonging to the station.....	631.81
Total receipts.....	\$ 15,631.81

EXPENDITURES.

Paid for Buildings—	
On the improvement and repair of the station building.....	\$ 537.77
On the erection of a laborer's cottage for the station.....	212.23
	\$ 750.00
Paid for Salaries—	
Director.....	\$ 2,300.00
Chemist.....	2,000.00
Entomologist.....	1,600.00
Assistant to Chemist (part of the year).....	189.73
Treasurer.....	250.00
	6,239.73
Paid for Labor—	
General field and office work.....	1,370.79
Paid for Apparatus and Library—	
Office fixtures.....	\$ 64.40
Books, periodicals and binding.....	296.34
Apparatus for laboratories.....	228.71
	589.45
Paid for Equipments—	
Machinery.....	\$ 547.75
Tools.....	92.85
Thoroughbred cattle.....	2,800.00
	3,440.60

Paid for Supplies and Expenses—

Traveling expenses of Director	\$ 206.79
Traveling expenses of Chemist	28.75
Traveling expenses of Entomologist ..	19.52
Expenses of helper at fair	12.50
Mileage and per diem of committee ..	284.45
Interest on borrowed money	80.71
Carrying the mail	50.00
Rent of land	200.00
Feed and care of horses and mules ..	158.93
Seeds, trees, etc	105.16
Supplies for laboratories	215.14
Supplies for field experiments and propagating house	116.41
Supplies for office	71.93
Coal and gasoline	282.89
Freight and express	391.36
	<u>2,224.54</u>

Paid for Bulletins—

Printing of same	1,016.70
	<u>\$ 15,631.81</u> <u>\$ 15,631.81</u>

1890-1891.

RECEIPTS.

Amount received from United States Treasurer as per appropriation for the year ending June 30, 1891, under Act of Congress, approved March 2, 1887	\$ 15,000.00
Amount received from the sale of stock and produce belonging to the station	359.43
Total receipts	<u>\$ 15,359.43</u>

EXPENDITURES.

Paid for Buildings—

On the erection of a laborer's cottage ..	\$ 735.82
Repairs on station buildings75
	<u>\$ 736.57</u>

Paid for Salaries—

Director to February 1st	\$ 1,283.33
Director from February 1st	953.87
Assistant director from January 20th ..	760.24
Chemist	1,099.97
Entomologist to January 20th	888.88
Treasurer	249.98
Assistant veterinarian	166.64
Assistants to Chemist	516.44
Assistants to Botanist	393.32
Assistants to Entomologist	133.32
	<u>7,345.99</u>

Paid for Labor—

General field and office work	\$ 1,448.66
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Paid for Apparatus and Library—

Books, periodicals and binding	\$ 210.00
Apparatus for laboratories	395.63
Engraving and electrotypes	116.35
	<u>721.98</u>

Paid for Equipment—

Machinery	\$ 190.75
Tools	42.35
Thoroughbred stock	991.53
	<u>1,224.63</u>

Paid for Supplies and Expenses—

Traveling expenses of Directors	\$ 85.60
Traveling expenses of Chemist	66.70
Traveling expenses of assistant director	71.63
Traveling expenses of Entomologist ..	2.72
Traveling expenses of assistant in Chemistry	5.96
Traveling expenses of agent to purchase hogs	50.14
Per diem of committee	7.00
Carrying the mail	21.78
Feed for stock	413.49
Seeds, trees, etc	147.47
Supplies for laboratories	95.94
Supplies for field experiments, stock experiments and greenhouse	357.66
Supplies for office	219.19
Coal	58.44
Gasoline and oil	82.03
Freight, express and messages	229.05
	<u>1,914.60</u>

Paid for Bulletins—

Printing of same	\$ 1,966.80
	<u>1,966.80</u>
	<u>\$ 15,359.43</u> <u>\$ 15,359.43</u>

The foregoing statement of the receipts and expenditures of the experiment station for the two years ending June 30, 1891, was prepared by Herman Knapp, treasurer of the station, from the books in his office. It should be noted that it covers the fiscal years of the national government and that these do not correspond with those of the college. This fact renders, of course, any comparison of the amount in this statement with those in the reports of the treasurer and secretary impracticable.

HORTICULTURE AND FORESTRY.

J. L. BUDD, PROFESSOR.

As our Bulletins and articles for the press only refer to the extended and varied experimental work of the Department the impression appears to be quite general that class room instruction in these lines has been mainly or wholly neglected.

That this is not true is shown by the record that in 1890 we had a total of ninety-five students in the Freshman, Sophomore and Junior classes in practical and theoretic Horticulture and Forestry, and in 1891 we have had a total of sixty-seven students, distributed as follows: In the Freshman class, sixteen; Sophomore class, thirty; Junior class, six.

With the establishment during the past year of a distinctive Agricultural course the numbers of students has been reduced, but the time allotted to each class has been increased, and the study is continued into the Senior year. As an optional study Horticulture has also been introduced into the Ladies' course.

With the growth and development of the Agricultural course we have reason to hope for an increase of numbers in the technical lines of study. In the Freshman and Sophomore years, instruction is given by lectures, as we have as yet no suitable text books. In these lectures extended use is made of the object lessons of the grounds, museum, laboratories, etc., and the lessons are impressed by note taking, recitations and frequent reviews.

In the Junior and Senior years text books are used to some extent to impress the principles and practice as applied in varied climates and on varied soils over the world.

The interest taken in the study is indicated by the fact that a number of our graduates, and undergraduates, are now doing creditable work for themselves and the College, as professors of horticulture, experimental station horticulturists, officers in horticultural and forestry associations, writers for the press and, not least, as local leaders and teachers of "The art which does mend nature" across the continent.

PUBLIC GROUNDS.

In laying out and planting the public grounds the thought has been kept in mind of combining landscape effect and practical instruction to students and visitors. In the form of groups and isolated specimens we now have about every tree and shrub that will succeed fairly well in our climate. Or

the campus, and over the horticultural grounds, varieties and species are labelled and constitute a constant object lesson on a large scale for the study of students and visitors. Taken as a whole the trees and shrubs of the grounds form the best arboretum found west of the Arnold arboretum at Boston. With a larger available fund to keep the grounds in order, and provide needed embellishments, we could soon say that, as a park and landscape garden, our public grounds are not equalled in the west.

During the two past years much needed work has been done in the way of grading, paving and general completion, and only the lack of needed funds has prevented the improvements on part of the grounds which still invite criticism.

DEPARTMENT NEEDS.

During the past eight years the statement repeated in our biennial reports that the small, cheap wooden building in which the horticultural work has been done during the past fourteen years is wholly destitute of needed room and facilities. Indeed, when first erected fourteen years ago, it was a cheap make-shift, unsuited to our needs in every respect.

The Agricultural Department, Experiment Station and Veterinary Department are almost wholly destitute of needed room and facilities, and the conclusion has been reached that a combination of these main technical divisions in one building would prove best for interests of the State, the college and the departments interested.

Such a building, with a greenhouse and propagating rooms, such as are used by other leading agricultural colleges, will cost, if put up in a durable and fire proof manner, the sum of \$50,000. If erected separately the cost of the much needed room would be increased fully fifty per cent.

REPORT OF THE SCHOOL OF VETERINARY SCIENCE.

M. STALKER, PROFESSOR.

GENTLEMEN—It gives me pleasure to report a steady and substantial growth in the numbers and work of this department during the last two years. The enrollment of special students for the present year, is thirty-seven, aside from those of other courses who take a portion of the veterinary work. In point of preparation for beginning the work, there is a marked improvement over the scholarship of those who made application to enter the course a few years ago. Indications point to a more rapid increase in the number of students taking the work of this course in the coming years, than in the past. It is found already that our present numbers are too large for the facilities we are able to offer in some of the lines of work, and with the prospects for increasing numbers from year to year, it will be quite impossible to satisfy the needs of our students without additional accommodations. I have submitted to your honorable body, plans and specifications for a building which would meet an urgent need in one direction. I have made the plans as small and the construction as inexpensive as possible consistent with absolute needs. With the addition of such a building as I have planned, and the proposed alterations in the building now in use, the hospital department would be well equipped for practical work.

The department is sadly in want of larger and more convenient quarters for its work of theoretical instruction. Our class room accommodations are entirely inadequate, the museum is overcrowded, the offices insufficient and the laboratory facilities such as to render it impossible to do justice to the subjects taught. I most earnestly recommend that you should use your endeavors to secure an appropriation from the next general assembly, sufficient to erect a building for the accommodation of the agricultural, horticultural and veterinary departments. An appropriation of not less than \$50,000 should be made for this purpose. If this is to be an agricultural and otherwise industrial college of the highest rank, the departments which represent this line of work in an especial degree, should be provided with facilities that, to say the least, are not inferior to those provided for other departments of the College. Such a building as suggested would furnish adequate room for the three departments for years to come. Besides, the sanitary work, or the student's hospital department, requires the whole of

the building now occupied in part by that work. This plan would solve a difficult problem for the three departments directly interested, and at the same time provide a proper home for the sanitary work. I commend the plan to your thoughtful attention.

The additional help given to the teaching force by the election of Dr. W. B. Niles, has greatly strengthened the work of the department. With the additional facilities afforded by the proposed building, I feel confident the influence of the Veterinary department would be second to no similar institution in this country, if, indeed, it is so now.

DEPARTMENT OF MECHANICAL ENGINEERING.

C. W. SCRIBNER, PROFESSOR.

Very few changes have been made in the studies of the course since the biennial report of 1888, and it has been possible to add but little to our equipment. But I am happy to be able to state that very great progress has been made in our standard and in the thoroughness of instruction, as the actual standard of work done fully coincides with what is announced even in our catalogue for this year. Much progress has also been made in the order and care with which our purchases and other business are conducted. A careful inventory of our equipment is kept, our letters, pamphlets and drawings are neatly filed and a system of book-keeping and record keeping has been started, much more complete than what was needed or could have existed before.

Last of all, our freshmen class has increased over three hundred and thirty per cent, and our total enrollment, two hundred and forty per cent since our report of two years ago.

The last biennial report closed with the following, "the students taking this course for the past year (1889) numbered, as follows:"

Seniors	4
Juniors	7
Sophomores	8
Freshmen	14
Total	33

For the year 1891, we have

Seniors	6
Juniors	7
Sophomores	18
Freshmen	47
Total	78

This indicates the enrollment of mechanical engineers, and shows the actual growth in that direction, a total increase of from thirty-three to seventy-eight. It is true, that during this year just past, the course in electrical engineering has been inaugurated, and many who entered as mechanical engineers, with a view toward electrical work mainly, have enrolled

under that course. The fact of our having this electrical course, will hereafter draw very many more students. All of these, however, take about three-fourths of their work with the mechanical engineers, and it will be necessary hereafter in estimating the needs of this department to include those enrolled as electrical engineers in all cases where they work with this department.

The rapid growth in our numbers may be accounted for, perhaps, to some extent, by the demand for young men in engineering work, but largely because the fitting for their work, which our graduates have obtained, has enabled them to command very desirable positions. The changes in the course of study have been made only in advancing the grade of work, by putting more time in the first of the course into mathematics, drawing and the study of mechanics.

Thus the student at the end of his sophomore year is far better fitted for subsequent work than before. This admits of a more advanced and thorough treatment of the work of the last two years. To do this it was necessary to omit French from the freshmen year, for the sake of advanced algebra in the second term, allowing at the same time for the introduction of history, and making German, (as better adapted than French to the needs of the mechanical engineer), an elective study in the junior year. Little else has been changed save the transfer of certain subjects to parts of the course where they could be more efficiently handled. Along with our growth in numbers great progress has been made in the nature of the matter taught, owing largely to the fact that our upper classes have now the advantage of having had a much better training earlier in their course, but owing also to somewhat increased facilities of instruction and a greatly needed increase in our teaching force.

MECHANIC ARTS IMPORTANT.

It may be here noted that our school is essentially the Iowa State College of Agriculture and Mechanic Arts, the last part of this title being recognized as equally important with the agriculture. In fact, many young farmers very much need a certain amount of thorough instruction in the mechanic arts, carpentry and forge work, while the graduating mechanical engineer should have had as complete and thorough a course in the mechanic arts as the agricultural student in the art of agricultural, and as complete as can be had in any of our eastern schools where the young man of means is willing and glad to pay \$150 or \$200 tuition for a similar training. Our whole college with all its branches should grow together. But the department of the mechanic arts should not be allowed to fall behind for want of a few thousand dollars which the State of Iowa can well afford to pay, since her sons trained by the best teachers and with the best equipment in the mechanic arts, will bring back to our State many fold the thousands so expended, by their ability to develop her resources.

This is no mere speculation. The Agricultural College graduates in engineering within the last few years have on account of their ability and training, filled many responsible places, where they could earn large salaries, and have successfully competed with others in practical work in mechanic arts. Surely this great State can ill afford to let any of her insti-

tutions languish when in many of our neighboring States the State colleges of mechanic arts are doing so much.

Our aims, then, are to make a place where any young man of the State of Iowa can obtain free of charge the very best possible instruction in mechanical engineering, and the mechanic art which fall into that course; where the facilities are such that every day of the four years spent in studying engineering shall be used to the very best advantage to the student, and where a thorough training not only in the principles, but also in the practice of engineering, will enable him to use his powers to the greatest advantage in the practical engineering world.

The methods employed combine drill in those foundation principles with their practical application in working out engineering problems, chiefly those of every day occurrence, the wrong solution of which so frequently entails commercial and at times fatal disaster. The principles taught are illustrated in the class room by practical problems. The students are taught to work out such practical problems by themselves—to embody them in designs in the drafting room—and having first been trained in the manipulation of tools and machinery, to take the drawings of their designs into the shops where they put them into material forms in wood and iron. The machine thus constructed must be tested for its efficiency and adaptability to the work it is intended to do, and the students are drilled in making such practical tests, having first learned to test or calibrate the very instruments used in making those trials.

By such eminently practical means are the young men, when once they have mastered the theoretical principles on which such work is founded, made to grasp, and become familiar with their chosen professional work. But to carry out such a plan we must have buildings, equipment, teachers.

Our United States government has furnished means for paying our teachers and for some of the equipments, enough perhaps to maintain the department in a good and efficient condition when once the needed buildings and the essential equipment for a good start are well provided. Let us have as ample and as thoroughly constructed buildings for such purpose as shall meet the needs and shall benefit our State institutions. Let us have the equipment so greatly needed to carry out these plans already formed and even set in motion.

The students are here, too many of them. The teachers are here, thoroughly trained for their work. The course of study is carefully made out and has stood trial. The plans for future progress are already thought out, based on the well tried experience of our older and more fortunate institutions. Only liberal financial aid is wanted to make the grand start we have already gotten, a thoroughly practical success as the very best State school of the mechanic arts in the country.

DEPARTMENT OF CIVIL ENGINEERING.

D. W. CHURCH.

The course is intended to prepare students for professional work in all the leading specialties of civil engineering practice, such as the design and construction of roads, bridges, railways, canals, river improvement works, harbors, docks, water works, sewerage, irrigation and drainage, and the conducting of surveys of every description.

The studies which should form the basis of an engineer's education, viz.: mathematics, mechanics, physics, chemistry, descriptive geometry and stereotomy, are the leading studies of the first three years. Their application to professional work is taken up as early as possible in the course. During the sophomore and junior years the student studies general surveying, railway surveying, spherical astronomy and geodesy, resistance of materials, the steam engine and railway engineering. In the various branches of surveying, field practice (for which the facilities are exceptionally good) is an important part of the course of instruction.

In railway surveying the student actually performs all the engineering operations required in the survey, location and construction of a railway, making in the junior year a complete survey for a short road, staking out and calculating the earth work, making the necessary plans and profiles and a topographical map of the line.

The drawing of the first three years consists in the freshman year of mechanical and free hand drawing, and in the sophomore and junior years, in making finished plats of about fifty problems in descriptive geometry, and of numerous problems in lineal perspective, shades and shadows, and stone cutting, besides plans, profiles, and topographical maps of surveys made during the course.

In the senior year the students are almost entirely in the line of direct application to engineering work of the studies of the first three years. They include the calculation of stresses in framed structures, such as bridges, roofs, and viaducts, studied both by analytical and graphical methods, the proportioning of the parts of such structures, and the designing of details and connections, masonry structures, bridge piers and abutments, arch bridges, buildings, retaining walls and masonry dams, ordinary foundations, pile driving and deep foundations, hydraulics, the flow of water

in pipes and in open channels, hydraulic motors, sanitary engineering, thermodynamics and the steam engine.

In designing, the student is given instruction in applying the results of previous studies to making designs for engineering works. In bridge work, each student makes a complete design of a bridge and the necessary detail drawings for constructing it.

In addition to the other work of the senior year each student is required to prepare a thesis on some subject of immediate relation to the studies of his course.

The number of students now taking the course in civil engineering is fifty, with eight in the graduating class of 1891.

REPORT OF THE DEPARTMENT OF BOTANY.

BY L. H. PAMMEL, PROFESSOR.

I have the honor of submitting through you to the Honorable Board of Trustees my second biennial report. In my report to the president I have indicated the needs of the department. Since my last report very substantial improvements and additions have been made. The Board has greatly facilitated the work of the department by setting aside a small amount of money to maintain a wild garden. It is my earnest desire that this should be enlarged and properly maintained. The State, it seems to me, could do no better thing than to maintain a botanic garden in which shall be grown various plants native to Iowa and the West. Such a garden should contain plants useful in the arts and industries. Textile fibers, such as flax, hemp, cotton, jute, ramie, sisal, etc. Also plants useful for their oils, foods, foders, etc., all arranged and grouped by themselves. Additions have been made to the bacteriological laboratory. The lower rooms of north hall have been fitted up and set aside for this work. This has become a joint laboratory in which the veterinary as well as the botanical department do their work. The larger room is used as a bacteriological laboratory for students while two other rooms have been fitted up, one each for the departments of botany and veterinary science. Some additional apparatus has also been purchased and as soon as funds will permit a culture room will be added. We shall also place new cases in the rooms to make them more attractive and the work more convenient.

THE HERBARIUM.

There have been many additions to the herbarium, especially Iowa plants, we have been promised a large set of plants from the department of agriculture, Washington. I had hoped at this time to give you a complete account of the plants in the herbarium, but other duties have prevented me from doing so. I must defer that till the publication of the Catalogue of Iowa Flora. To make the catalogue as full and complete as possible I have myself collected in various parts of the State—Dubuque, Webster City and Cedar Rapids. Mr. Rolfs has collected some at Keokuk, LeClaire and Jewell Junction. While Messrs. Stewart, J. A. Rolfs and others have collected at Marshalltown and elsewhere.

The college is greatly indebted to Mr. F. C. Reppert of Muscatine for a fine collection of native plants from that place, also a lot from Iowa and elsewhere from Mr. Burgess.

The additions to the collection this year will probably amount to something over two thousand specimens. The Agricultural College owns, I

think, the best collection in the State with the exception of the Parry collection at Davenport. It owns without doubt one of the best cryptogamic collections in the West. Much credit should be given to Profs. Bessey and Halsted in building up these valuable collections.

CLASS ROOM WORK.

During the college year much time has been given to instruction. The instruction has embraced such work as would essentially aid the student to understand such topics as are uppermost in the eyes of practical people. It is of course essential that there should be a beginning, and in this work we aim to teach the student first principles. Not only are the terms used in descriptive botany dwelt upon, but we aim also to impress on the student biological facts. Thus the subjects of pollination and fertilization of flowers and dissemination of plants are taken up. Later the student can better comprehend the questions that underlie the great physiological problems of plants, assimilation, respiration, nutrition, growth and reproduction. After having studied normal conditions of plants their diseases are appropriately taken up. In this work such fungi as "rusts," "smuts," "mildews," "rots," "moulds," are studied and the various measures to prevent these diseases. Bacteriology has become so important in many directions that it has seemed to me to be a wise feature to clearly separate the study of bacteria from other low plants. The student becomes familiar with the method of cultivating germs and their action in different nutrient media. Each year adds new proofs that germs are not only the cause of serious and fatal diseases in man but in plants also. But we also learn that they are great benefactors. Bacteria are not only the principal agents in decomposition of organic matter, but they collect the nitrogen from the atmosphere in leguminous plants and thus restore fertility. Milk, butter, cream and cheese need the active work of these germs. The general student, unless he wishes to continue his work further, finishes by studying the origin of cultivated plants. He is shown the evidence of the American origin of corn, beans and potatoes, and the evidence of European origin of the apple, etc. In taking up these plants the various foods are taken up microscopically so that adulterations may be detected. Seeds and grasses and vegetable pathology, two senior studies complete the course in botany as outlined in the catalogue. Forage plants are studied with special reference to the needs of the Iowa farmer. In all of this instruction the laboratory work is an important feature. The department being well equipped for the work.

During the year 218 students have been distributed as follows:

Elementary botany.....	82
Systematic and physiological.....	47
Cryptogamic.....	27
Bacteriology.....	35
Microscopic structure of woods.....	8
Seeds and grasses.....	3
Vegetable pathology.....	3
Microscopic examination of foods.....	8
Special.....	3
Post graduate.....	2

Total..... 218

OTHER WORK OF THE DEPARTMENT.

Numerous correspondents have sent plants for identification, these are mostly classed as weeds, i. e., "plants out of place." While these have not required looking up or any investigation, they have been mostly answered through the press, as the *Iowa State Register*, *Iowa Homestead* and *Orange Judd Farmer*.

SCIENTIFIC INVESTIGATION.

Aside from the work which is in the line of agriculture several extended scientific papers have been prepared; root-rot of cotton for the Department of Agriculture which contains an extended bibliography. On the seed coats of the genus *euphorbia*, published in transactions of the St. Louis Academy of Sciences. This also contains a bibliography on seeds and fruits which produce mucilage; a paper on the absorption of fluids by plants read at the Washington meeting of the American Association for the Advancement of Science; Mr. J. S. Chamberlain's thesis on a comparative study of the styles of *Compositæ* has been published in bulletin of the Torrey Botanical club. Other theses to be published in scientific journals are: Microbes of pus by Mr. Whitbeck, and seed coats of *malvaceæ* by Prof. P. H. Rolfs. It has been my aim to get students to prepare such theses as are worthy of publication. A student's work ought to be of use to some one else. In addition to this work short articles and papers have been published in *Vis Medicatrix*, *Iowa Monthly Weather and Crop Service Bulletin*, *American Agriculturist*, *Report of Iowa Horticultural Society*, etc. This editorial and newspaper work has been done in the evening, and has served to bring before the people some of the advancements in scientific work as well as topics which are of interest in connection with agriculture.

DEPARTMENT OF ZOOLOGY, ENTOMOLOGY AND GEOLOGY.

HERBERT OSBORN, PROFESSOR.

The course of study in this department has been changed but little since the statements of the last biennial report.

Work with the general students and students in the agricultural course in this department begins in the fall term of the freshman year, when a course of lectures and class exercises, with field studies in economic entomology, is given. This is intended not only to acquaint the student with the more important injurious insects and the methods of treating them, but also to give him an elementary knowledge of insect structure, metamorphosis, and the methods of observing and studying animal life. Zoology begins in the fall term of the sophomore year, with laboratory studies of typical forms of animal life, and deals mainly with morphology. Class work embraces recitation from text-book, occasional lectures, and quiz on laboratory work. This term is preparatory to, and is followed by, a full term's work in spring of junior year on a study of the different groups of the animal kingdom. Laboratory and class work are associated, and the student acquires familiarity with the animals of different groups by actual study with microscope, or by dissection. Special attention is given to origin and affinities of domestic animals.

In the fall term of the junior year students prepared for the work may elect a full term's work in entomology, embracing a systematic study of insects, and furnishing also additional drill in methods of study in gross and minute anatomy and a further knowledge of the life history and habits of injurious species. Advanced, or special work, may be elected in the senior year, which may consist of vertebrate dissection or elements of embryology, and special studies on selected forms or groups with preparation of thesis. Candidates for the second degree may continue such work with opportunities to pursue original investigations.

Geology is taught to the seniors in the spring term, and embraces a study of the principles as presented in LeConte's Elements, the preparation of rock sections, essays on economic geology, geological maps, a study of typical fossils and a review of the geology of Iowa.

Students in the veterinary course are given two exercises per week, second term of first year, and three exercises per week in the first term of

the second year, in zoology and two exercises per week, second term of second year on animal parasites.

EQUIPMENT.

The laboratory is supplied with twenty-six microscopes, various microtomes, including a Thoma, and other apparatus for microscopical work and gross dissections. A supply of marine animals, properly preserved for laboratory work furnishes means for study of forms otherwise inaccessible to inland students.

The new rooms, which were generously provided by the last General Assembly and which occupy the north end of Morrill Hall have given the department the space which it has so long needed, and the great advantage of having all the work of the department in close connection is already apparent.

The room containing the general zoological collection occupies the upper or third floor, and is a large room with high ceiling and with windows so arranged as to give an equal distribution of light. The second floor contains a large room for geology and mineralogy, another for a collection of Iowa animals, and a third which is occupied by a collection of casts of fossils. The first floor contains the lecture room, laboratories, and insect room, while the basement is devoted to rooms for insect rearing, taxidermy, Osteology, alcoholic collections and preservative materials.

The collections have been much enriched during the past two years and especially the past year the liberal appropriations made for pushing this work having enabled us to secure a number of choice collections. The most important of these are a collection of mammals, including such important species as black bear, lemur, peccary, tapir, fruit bat, great ant eater, great kangaroo, koala, wombat, sloth and others; a number of birds, including an ostrich, great penguin, hornbill, apteryx, albatross; also the Keyes collection of Iowa birds (an especially important addition, since it is the collection which is the basis for the catalogue of Iowa birds by Keyes & Williams. This addition was, in part, a donation, as Mr. Keyes desired to place it where it could be permanently preserved for reference, and put the price far below its actual value); a collection of marine shells and corals, one of the most attractive yet secured, and a collection of echinoderms, which is one of the most complete to be obtained; a series of minerals representing all the most important species, and, with our former set, making a very serviceable collection in this line; a collection of fishes from Arkansas, and additions to the collections of Iowa fishes from Prof. Meek. Aside from these larger collections, which have been procured in part or entirely, by purchase, there have been a number of additions by donation from students and others, and of these I may mention particularly a collection of fossils from Mr. Stewart, of Monmouth, Jackson county; a collection of Louisiana mollusks from Mr. Vaughn, of New Lebanon, Louisiana, and some fine Pacific coast starfishes from Prof. Stalker.

As the collections now stand they form a most useful equipment for the study of all branches of the animal kingdom and all departments of geology and mineralogy. Every important group of animals is represented and, in many cases, by full and perfect series. For instance in the echinoderms we

have a set of four species of living crinoids, among them the extremely rare stalked crinoid *Pentacrinus caput medusae*, while the other classes are fully as well represented.

The insect collections have been much enlarged and some of the material rearranged in shape for most ready reference. The correspondence of the department has been greater than ever before, and shows that the people of the State are inclined to avail themselves more of the opportunity to get information as to birds, insects and other animals that interest them. I believe this feature of our work very important, and consider it wise to encourage in every way this interest on the part of the people of the State. Our collections enable us to identify almost any animal to be found in the State, and especially in birds and insects are very complete, and we believe that the more these can be used by the people of the State the better.

In conclusion I may say that the past biennial period has been marked by a steady growth, for which we may thank your constant interest and generous support, and I believe the return to the students and State will fully justify your action.

PHYSICS AND ELECTRICAL ENGINEERING.

PROFESSOR J. C. HAINER.

I have the honor to submit the biennial report of the department of physics and electrical engineering for the years 1890 and 1891.

The department has, during the past year, shared the general prosperity of the college. The classes in physics have been larger than in any previous year; the work done by them fully up to the average; while the facilities for laboratory instruction have been vastly improved.

The great want of the department has at last been met, the physical laboratory is provided. The last general assembly appropriated two thousand dollars to raise the west wing of the chemical and physical hall one story, and fit it up as a physical laboratory. This has now been done and will be ready for class use at our spring opening. The floor space thus rendered available is 60 x 40 feet. The room is well lighted and when properly heated will admirably serve the purpose for which it was intended.

Three brick piers which rise from the basement, entirely disconnected from the intervening floors, each capped with a smooth stone slab, will serve as supports for apparatus which, for purposes of investigation, must be free from the vibrations of the building.

A small room 9x15 feet, in the southeast corner, is completely set off from the rest of the building. This room is intended for experiments in light. It will be painted black on its interior surface; and arrangements have been made by which all natural illumination can be excluded or admitted at pleasure.

The north and the south walls of the large room are furnished with shelves made of oak, two feet wide, supported on wooden brackets built firmly into the wall. The room is further provided with ten oak tables, 72x40 inches top; these are built in substantial manner, and serve as desks for experimental purposes. This room can easily accommodate thirty students at once.

A part of the appropriation was used to fit up a dynamo room 19x28 feet, in the basement. This room has cement floor, ceiled overhead, and has three windows to the east and two windows to the west, thus insuring pure air and plenty of light.

There are three brick foundations in this room. One bears the six-horse power Shipman steam engine, using kerosene as fuel; another the six-arc light Thomson-Houston dynamo; while the third, the 3000 Watt Thomson

Houston incandescent dynamo. This room is readily accessible by a stairway from the main hall in first floor.

In November, 1890, the board appropriated from the "Morrill Support Fund" \$3,000, for the purpose of purchasing needed apparatus for the course in electrical engineering, ordered by the board of trustees to be established.

The following list includes the more valuable and important apparatus purchased with this money:

1 6-arc light, 2,000 c. p. Thomson-Houston dynamo, including self-regulator, 2 lighting arresters, am-metre, and sub-base.	
1 35 16 c. p. Thomson-Houston incandescent dynamo, including rheostat, am. metre, potential indicator, ground detector, and sub-base.	
5 single and 1 double-arc lamp.	
35 16 c. p. incandescent lamps, including bases and sockets.	
1 water metre.	
1 1-h. p. Crocker-Wheeler electro-motor, including rheostat.	
All.....	\$ 1,150.00
1 6-h. p. Shipman engine.....	470.00
1 Westinghouse 8-pole pony alternator.....	200.00
1 standard resistance coil and Wheatstone bridge (Ritchie & Sons).....	160.00
1 Weston volt-metre.....	75.00
1 Weston ampere-metre.....	65.00
1 Ballistic galvanometer (from Nalder Bros., London)....	150.00
1 Siemen's electro-dynamometer.....	70.00
1 Carden volt-metre.....	56.00
1 $\frac{1}{2}$ micro-farad condenser.....	45.00
2 reflecting galvanometers.....	90.00
1 dead beat galvanometer.....	60.00
1 Deprez D'Arsonval galvanometer.....	40.00
1 photometer (portable).....	30.00
1 resistance set and bridge.....	40.00
1 standard Ohm.....	8.00
1 Carhart-Clark standard cell.....	15.00
10 laboratory tables, oak, 72"x42" top.....	150.00
1 80 barrel cistern.....	60.00
Shafting, clutch pulleys and belting for dynamos.....	156.00
1 electro-calopmeter.....	35.00
1 observatory barometer.....	100.00
1 reading telescope.....	25.00
1 standard thermometer (Green).....	25.00
Total.....	\$ 3,155.00

Several smaller pieces of apparatus were added during the year, but the above shows the *character* of the instrument additions for the year 1891.

During the three years previous to 1891, the following are the more important additions:

1 standard physical balance.....	\$ 125.00
1 Cathetometer (from Geneva Society).....	212.00
1 Kew-magnetometer.....	125.00
1 chronograph.....	150.00
1 Sir William Thomson's potential galvanometer.....	120.00
1 calorimeter.....	20.00
1 standard metre bar.....	25.00
2 reading microscopes.....	50.00
1 2-prism Browning spectroscope.....	80.00
1 Thomson reflecting low-resistance galvanometer.....	75.00
1 Thomson reflecting high-resistance galvanometer.....	150.00
1 Microfarad Condenser (Elliott Bro.'s).....	75.00
1 Bailey's testing set (portable).....	60.00
1 Mascart electrometer.....	75.00
1 Ritchie electrometer.....	25.00
1 Siren (Helenholtz pattern).....	95.00
1 Sine-tangent galvanometer.....	35.00
1 single ring tangent galvanometer.....	45.00
1 B. A. ohm (Elliott Bros.'s).....	20.00
Total.....	\$ 1,552.00

The value of apparatus now in possession of the department is \$10,000, and as above shown is of modern style and approved make; a large portion of the standard apparatus above named being imported from well-known European firms.

At their January (1891) meeting, the board ordered "That electrical engineering be added to the department of physics; and that the professor of physics and electrical engineering should sustain the same relation to the course of study in electrical engineering as the heads of the departments of mechanical and civil engineering sustain to the courses of study in those departments, respectively."

Acting under this general authority, the following four year course of study in electrical engineering was proposed by me to the faculty, and recommended by that body to the board for approval. The course was adopted by the board at their May meeting (1891), and went into operation at the opening of our fall term (July, 1891).

THE COURSE IN ELECTRICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.	SECOND TERM.
Algebra—5.	Algebra, Advanced—3.
Elocution—1.	Elocution—1.
English Language—5.	Geometry—5.
History—5.	Kinematics—1.
Mechanical Drawing—2.	Mechanical Drawing—2.
Military Drill—2.	Military Drill—2.
Shop Practice—8 hours.	Rhetoric—3.
	Library Work—1.
	Shop Practice—8 hours.

SOPHOMORE YEAR.

FIRST TERM.	SECOND TERM.
Descriptive Geometry—4.	Analytical Geometry—5.
Kinematics—1.	Chemistry—5.
Mechanical Drawing—1.	Laboratory Practice—3.
Military Drill—2.	Mechanical Drawing—2.
Physics, Mechanics—5.	Military Drill—2.
Trigonometry, Plane and Spherical—5.	Physics, Heat—3.
Shop Practice—8 hours.	Shop Practice—8 hours.

JUNIOR YEAR.

FIRST TERM.	SECOND YEAR.
Physics, Electricity and Magnetism—3.	Dynamo Electric Machinery—4.
Laboratory Practice—2.	Laboratory Practice—2.
Calculus—5.	Economic Science—5.
Analytical Mechanics—4.	Resistance of Materials—4.
Military Science and Drill (optional)	Military Science and Drill (optional)
—1.	—1.
a American Literature—3, or	Steam Engine—2.
b { Mechanical Drawing—2.	Mechanical Drawing—2.
{ Commercial Law—2.	Engineering Laboratory—1.

SENIOR YEAR.

FIRST TERM.	SECOND TERM.
Physics, Alternate Current Transformer—4.	Physics, Electro Motors—4.
Laboratory Practice—2.	Laboratory Practice—2.
Thermodynamics—4.	Physics, Light and Sound—3.
Mechanics of Machinery—3.	Designing—2.
Military Science and Drill (optional)	Military Science and Drill (optional)
—1.	—1.
Designing—2.	Mechanical Laboratory—2.
a Psychology—5, or	Mechanics of Machinery (under 3.75 rule)—4.
b Hydraulics—3.	Thesis—3.

The plan and scope of instruction in this course may be gathered from the following analysis and outline:

This course is designed to meet the wants of those who wish to devote themselves to the profession of electrical engineering. The course combines, in due proportions, the following fundamental features:

- (a) A thorough preparation in Mathematics, covering two and one-half years.
- (b) A complete course in Elementary Physics, covering two years.
- (c) A course of two years in shop work and practice.
- (d) A three years' course in Mechanical Drawing.
- (e) A course of two years in Applied Mechanics, Steam Engine and Thermodynamics and Engineering Laboratory Work.
- (f) A two year course in the study of the applications of electricity, electrical machinery, and the generation, transmission and distribution of electrical energy.
- (g) A two years' course in the physical and electrical laboratory.

In order to accomplish all this in four years, it has been found necessary to omit everything from the course which does not bear directly on the result to be reached—an electrical engineer. It is believed that the course combines a prudent amount of specialization in the closing years with a thorough grounding in the fundamentals in the earlier years, and in carrying this out it endeavors to make its mathematical and theoretical and supporting studies strong in the earlier years, and its applied studies strong in the later years.

For remarks on (a) see mathematics. For remarks on (b), (c), (d) and (e) see the corresponding headings under the course in mechanical engineering.

The student begins the study of Physics with the Sophomore year and continues the study through the remainder of the course. In all the engineering courses five recitations per week during the first term of Sophomore year are devoted to elementary mechanics, and three recitations per week of the second term of same year to heat. These subjects are presented from the mathematical rather than from the experimental point of view, though experimental demonstrations are given illustrating the fundamental facts are demonstrated experimentally before the class, and the entire subject is presented from the standpoint of the conservation of energy. The fundamental facts are demonstrated experimentally before the class, and the

entire subject is presented from the standpoint of the conservation of energy. The main topics studied are: the magnetic field and its properties; the theory of potential and the relation of potential to work; the relation of magnetism to electricity as shown in the phenomena of electro-magnetic induction; the relation of electrical energy to heat and to mechanical power; primary batteries and the chemical action of the current; the fundamental principles of electrical and magnetic measurements, including a study of a few of the typical modern instruments used in these measurements; the c. g. s. system of units, the derivation of their dimensions, and their relations to the practical units,—these are the main topics studied.

In the second term of the junior year dynamo-electric machinery is begun. This term's work is based on Thompson's *Dynamo Electric machinery*. Four recitations per week on the above text, supplemented by lectures on special topics, constitutes this term's work. Special attention is given to the fundamental principles involved in the dynamo as a generator, and a few typical dynamos, both arc and incandescent, are exhaustively studied. The winding of armatures and field magnets to fulfill specified conditions of current and potential are discussed, and the principles of the subject developed. About three weeks of this term are devoted to electric lighting arithmetic, including, among other topics, the principles of wiring for arc and incandescent circuits.

The above work of the Junior year, of the electrical engineering course, is the work taken by the mechanical engineers in their Senior year, while the civil engineers take but the first term's work in their first term Senior year, and have an option between the above work and that of light and sound in their last term, Senior year. Similar remarks apply to the laboratory work of the students in these two courses.

The first term, Senior year, is devoted to the study of the alternating system, including the alternating generator and the transformer. Fleming's *Alternate Current Transformer* is used as the text-book, supplemented by lectures on special topics. The work calls for four recitations per week. The theory of self and mutual induction, and that of simple and periodic currents is carefully examined and mathematically discussed, and the results applied practically to the study of the transformer, and theoretically to construct a consistent dynamical theory of current induction. The construction of transformer cores and the winding of step-down and step-up transformers are also studied.

The last term of the Senior year is devoted to the important topics; electro-motors, electro-motor machinery, the electrical transmission of energy and its distribution, the designing of electric light and power plants for isolated and central stations. This work will be presented mainly by lectures, the student filling out his lecture notes by a course of parallel reading in the standard works of Kapp, Hopkinson, Martin & Wetzler, Hering, Thompson and in the following periodicals: *Electrician*, *Electrical World* and *Electrical Engineer*.

It is impossible to enumerate all the topics that will be brought to the notice of the student during the course, but the telephone and the telegraph will receive that time and attention which their importance demands.

The laboratory work in this course begins with the junior year and extends through the remainder of the course. Two afternoons per week,

of three hours each, are required of each student. While the quality and character of the work done in the laboratory receives the first consideration, yet the amount performed by each student also will be considered in his standing. In other words, it will not be considered sufficient to entitle a student to a mark on his term's laboratory work because he has put in at such work the prescribed number of hours, but he must, in addition thereto, show by the character and amount of his work that he is fairly entitled to his grade. No student will be permitted to take a greater number of hours' work per week than the maximum number of hours as set down in the course for that term; and advanced work cannot be taken until the preceding study has been satisfactorily passed.

The examinations for promotion are written, and will test the student's knowledge of the subject rather than his knowledge of a particular book on that subject.

The laboratory will, as far as possible, run parallel to the corresponding class-room work; the theory of the class-room being illustrated and demonstrated by the practice of the laboratory. This work is wholly quantitative, covering the range of topics presented in the course. The work will include the theory, use, construction and design of instruments of precision and their calibration; the determination of physical constants; the measurement of special physical properties of bodies, such as specific heats, moments of inertia, resistance, electromotive forces, refractive indices, coefficients of elasticity and torsion, etc.; the testing of dynamos and motors; the determination of their characteristics and efficiencies; the candle power of lamps; how to set up and manage an electric light and power plant; the winding of armatures of generators and motors, and of the fields of dynamos.

EQUIPMENT.

The physical laboratory has sufficient instrumental equipment to do all the work outlined above, though only a few duplicate pieces occur. In classes, not too large, this will present no special difficulty, but necessitates rotation work. (See list of apparatus named on page 45.) During the present year \$3,500 worth of standard electrical apparatus has been added to the physical department. This insures the same thoroughness in the practice as is sought to be attained in the theory, and thus these two branches of the same science, theory and practice, mutually assist, supplement and strengthen each other.

Any student on completing the course will be entitled to the degree of Bachelor of Science in electrical engineering.

The course in general physics has been materially modified during the past year, as has also the course in astronomy. These changes briefly noted are as follows: The students in the engineering classes, during the sophomore year form one division, while the students in the other four year college classes, in the same year, form another division. The engineers recite five times per week, first term sophomore year in mechanics; and three times per week in fall term in thermodynamics; while the other students, recite five times per week during the first-term sophomore year on mechanics and heat, and do not have physics during the fall term sophomore year.

These two divisions unite as one during the first term junior year in the study of electricity and magnetism. Astronomy being introduced into the fall term junior year of the course in civil engineering, has necessitated a separate class for these students; as manifestly an engineer wants to pursue the subject from a radically different point of view than does the student who seeks general information as to the structure and system of worlds in which we live.

These changes are described at large in the remarks on the course in electrical engineering, when compared with the statements, made in the following plan and scope of instruction in general physics and astronomy following:

Reference to the various courses of study outlines the work in physics. The order in which the study should be taken is as laid down. The necessary antecedent studies are: Algebra (complete) and plane geometry. The subject is taught by lectures, text-books, and recitations thereon.

For remarks on physics in the engineering courses, see the course in electrical engineering. The following remarks apply to the other courses:

The study begins with the sophomore year. Five recitations during the first term are devoted to mechanics and heat. Required in the course in sciences as related to the industries, and in the agricultural course, but optional in the ladies' course. The mechanics of solids, liquids and gases are carefully studied. The laws of motion, work and energy necessarily form the basis of instruction. The subject is studied from the experimental point of view, careful deductions being made from the evidence with the minimum use of mathematics. The application of the physical laws and principles in the arts and industries are commented upon, and, as far as possible, illustrated by class-room experiments.

The work in heat includes the careful study of thermometry, calorimetry and specific heats; the laws of fusion, boiling and vaporization generally; the doctrine of latent heat; hygrometry and the fundamentals of meteorology; conduction and convection; the modes of transference of heat; particularly the relations of water in its three forms to heat; a brief study of the historical development of this subject, including the labors of the founders and promoters of the present dynamical view as to the nature of heat, and hence that heat is practically a branch of the science of energy.

The work in the first term junior year is elective and is identical with that outlined in the course in electrical engineering.

In the second term of the junior year, light and sound are studied. This is a three hour elective; required of the senior electrical engineers. The wave theory forms the basis of instruction. Deschanel's Light and Sound will be used as the text. Particular attention will be paid to the laws of reflection, refraction and dispersion of light, both ordinary and polarized; and the application of these principles in the construction of optical apparatus, from the simple microscope to the sugar polariscope.

Spherical astronomy and Geodesy is a required three hour study in the junior fall term of the course in civil engineering. The main topics studied are: the various systems of spherical coördinates and the transformation of one system to another; the principles involved in, and the use and adjustment of the sextant and transit; the practical determination of time, latitude and longitude; the form of the earth; interpolation; and a brief study of

the errors of observation, and the application of the principles of least squares to the reduction and discussion of observations.

In the senior fall term, in the science course, and in the ladies' course, general astronomy is a five hour elective. A text book is used. Young's Briefer Course or Newcomb & Holder's Astronomy is the fair equivalent of the ground covered. As aids to the study the department has a fine celestial globe thirty-two inches in diameter; a sextant reading to ten seconds of arc; a telescope of two and one-half inch objective, equatorially mounted, right ascension and declension circles attached, and a two prism Browning spectroscope.

The physical laboratory, including the apparatus, and the recitation rooms, occupies the second story of the chemical and physical hall. The dynamo room is in the basement, and is 19 x 28 feet, and contains the 6 H. P. Shipman engine and dynamos.

The usual meteorological observations have been continued, and during the greater part of the present year, the observations have been recorded by a student detailed for that purpose, but working under my supervision and direction. This part of the work has been in co-operation with the Iowa Weather Service, J. R. Sage, director, monthly reports being sent to him, while duplicate copies are on file in my office in the physical laboratory.

REPORT OF THE DEPARTMENT OF DOMESTIC ECONOMY.

MRS. ELISA OWENS, PROFESSOR.

All students classified in the course of study for ladies have entered the classes in this department, and during the past year many young women taking optional courses at the college have received instruction in this department.

This voluntary taking up of the work shows an increase of interest on the part of intelligent young women in matters pertaining to household economy, and a desire to learn general principles, accurate methods, together with the reason for the adoption of these methods and the claim they have upon natural laws to be called accurate.

The educated and thoughtful women of to-day realize that woman's part of the work to be done in and for the house has too long been carried on by guesses and by experiments, resulting in a great loss of time, material, strength and patience. They know that woman's carelessness, ignorance or indifference to matters sanitary in home life have led to much suffering and the death of those whom she cherished and for whom she labored, in love, but too often with misdirected energy. They realize that women in general are ignorant of their own physical structure and prodigal of their strength.

As the head of the department of domestic economy is confident that the demands for instruction in her department are along these lines, culinary, sanitary and physical, she has labored to adapt the class work to these demands. The laboratory work is necessarily confined to a practical application of the best authorized theories of dietetics, and the adaptation of our daily food to the climate, age, occupation and means of the consumers; together with the cooking by the students themselves, under the personal supervision of the head of the department, of the various foods in daily use, according to the best established culinary methods and the serving of meals.

This enumeration of the subjects taken up in the class room, and of the work done in the laboratory, is given here for the reason that there is a very ill-defined notion, generally, of the work done by a department of this kind.

The department is at present very comfortably located, during the summer months, in one of the houses on the college campus, formerly used as a dwelling. The practical work, under these circumstances, can be made quite home like.

By action of the Board of Trustees materials for use in the cooking classes are furnished free of charge to the students belonging to these classes, and paid for out of the interest fund of the college. Ample appropriation has so far been made each year for keeping the department equipped with the most improved and labor-saving household utensils, and the defraying of current expenses.

DEPARTMENT OF MILITARY SCIENCE AND TACTICS.

JAMES RUSH LINCOLN, PROFESSOR.

In making this, my fourth biennial report as Professor of Military Science and Tactics, I, of necessity, must cover much of the same ground as heretofore, in calling attention to the needs of my department. To accomplish work in the military department, as in any other, one of the greatest needs is a place in which to work. The weather, during the past few years, has enabled us to do a large amount of work in the field, so we have not felt the need of an armory as greatly as we should, had the past seasons been more stormy. An armory at least sixty by one hundred and twenty feet is needed to give necessary room for the instruction of the number of students taking military drill. This building would be used also as a gymnasium for physical culture, classes having been started this year in that work, and already good results from regular, healthful exercise is apparent in the carriage and general health of the students.

The new drill regulations of the United States Army have been used during the entire year, and fourteen officers in the class of '91, leave our institution thoroughly drilled and capable of instructing in the new system, now to be introduced for the government of the regular and citizen soldiery of the country. Our college is the first institution in the United States to use the new drill regulations, and we feel a justifiable pride in being in the advance in this line. The demand for educated military men is increasing, modern war calling for a higher and more complete equipment in the officers than the old systems of the past. Advancement is nowhere more apparent and rapid than in the profession of arms, and ignorance to-day will bar any man from military preferment. But outside of the war value to our country of an educated body of young college bred men, the mental and physical benefits to the students themselves, are most apparent and but few young men seek exemption from the drill.

The young ladies' company has grown to a battalion of two companies, and their exercises are healthful, beautiful and attractive.

The increasing number of colleges in Iowa introducing military drill, clearly points to the fact that such work is demanded, and emphasizes the need of our own college being thoroughly equipped to carry on work in this line successfully.

DEPARTMENT OF CHEMISTRY.

A. A. BENNETT, PROFESSOR.

The Department of Chemistry has made a steady growth during the biennial period just closed. The development has been along three lines, namely: in the number of students electing work in this department; in the amount and value of the apparatus and facilities provided for these students; and in the room or working space. A new laboratory room 14 x 48 feet has been added to the working space and when it is fitted up will furnish room for special students in industrial chemistry. There has also been added a large store room which has been needed by the department for several years. When this room is properly shelved it will provide store room for many years to come.

The work offered to the student can best be understood by a brief descriptive outline. For this purpose the work is conveniently grouped under the following heads: (a) general chemistry; (b) analytical chemistry; (c) organic chemistry; (d) special methods of analysis; (e) preparation of compounds and mixtures.

(a) General chemistry—

This work is introductory to chemical science and is based on laboratory study. The student is furnished with material and apparatus and is led to discover and determine all of the facts and principles that his manipulative skill will enable him to do. He studies the more difficult experimentation in the class room, i. e., such cases as require delicate or costly apparatus and experienced manipulation.

The attempt is to have the student approach the subject experimentally from the side of discovery as much as is possible and not wholly from the side of the verification of the works of others. The laboratory work forms a large part of the class room recitation. The student thus comes to understand a scientific experiment in its true meaning. A development of manual dexterity accompanies mental development.

(b) Analytical chemistry—

A study of analytical chemistry follows the work described under (a). It consists of the qualitative analysis of a large number of substances, followed by the quantitative analysis of many of the same or similar substances. Such substances as iron and steel, iron and other ores, coal, limestone, baking

powders, mineral and sanitary analysis of waters, etc., are among those studied. The recitations are devoted to the chemical principles upon which the methods of analysis used are based. The student is required to make a special study of some one commercial substance, and to prepare an essay upon its methods of preparation and chemical analysis.

A course of lectures is given to the civil and mechanical engineers on the metallurgy of the important metals. Particular attention is paid to iron and steel, viz., to a study of their chemical composition and to the effect that the impurities common to them have on their chemical and physical properties.

(c.) Organic chemistry—

The introductory study of organic chemistry is intended to give the student a fairly complete outline of the theory of the structure and formation of organic compounds, but attention is directed to those compounds that are of industrial importance. He prepares in the laboratory many of the most important manufactured organic substances. He makes a careful study of such substances as the alcohols, vinegar, sugars, petroleum and its products, glycerine, soaps, etc.

The work included under (d) and (e) is done during the senior year of students in the young women's course and those in the course in the sciences related to the industries. It consists largely of laboratory study, with sufficient recitation and explanation to make clear the laboratory work. The department is equipped for work in organic analysis, ultimate and proximate; advanced qualitative and quantitative analysis in a variety of lines of study.

The facilities for instruction in this department are ample and increasing from year to year. Room is provided for one hundred and twenty students working at one time. The expenses are actual cost of material used and the apparatus destroyed in the prosecution of the work.

DEPARTMENT OF AGRICULTURAL CHEMISTRY.

G. E. PATRICK, PROFESSOR.

As the Chair of Agricultural Chemistry was created only ten months ago (Jan. 1891), this report covers only the present collegiate year to date. During the year I have given instruction by lectures to classes of Juniors and Seniors, on the following subjects:

The chemistry of soils and soil analysis.

The chemistry of plants and plant nutrition.

Fertilizers, natural and artificial.

The chemistry of animal nutrition, including the principles of economic stock feeding—for growth, fattening, milk production and work; also practice in computing and "balancing" rations.

The chemistry of the atmosphere; of rain and soil waters.

Accumulation and conservation of nitrogen in the soil.

The chemistry of all the dairy products.

Influence of feed and other conditions upon the amount and composition of milk and butter.

Analysis of milk, butter and butter substitutes.

Milk testing by the rapid methods.

Detection of adulterants in butter by microscopic and chemical means.

In addition to lectures the work has included laboratory instruction, as the above program implies. The interest manifested by the students has been gratifying to me and it is believed that the course will prove profitable to them. Another year the course will be even broader than this year, including among its new features the chemistry of sugars, sugar production and sugar bearing plants. This branch of agricultural chemistry now promises to become of great importance in the northwest and it is believed that a short course in "sugar chemistry," presented in a practical manner, will be appreciated and of benefit.

This department is well equipped for its work, having an excellent laboratory, provided with water, gas, suction and blast apparatus, two balances of great precision, and all the usual accessories of a first-class chemical laboratory; a convenient and well-lighted lecture room, needing but little to make it complete; a special room or laboratory for instruction in milk-

testing, provided with the best known appliances for that purpose; a special room for testing sorghum and sugar beets, fitted up with a small sorghum mill, a beet pulper, screw press, and a very costly and exact polariscope. In fact, there are but few forms of apparatus desirable in this branch of applied science with which the department is not provided. One such, however, is the refractometer, a most useful instrument, especially in detecting adulteration in butter—so useful, in fact, that the department should not longer be without it, and will, doubtless, in the near future be enabled to purchase one.

Preparations are now making for laboratory and lecture instruction in the winter school.

DEPARTMENT OF MATHEMATICS, POLITICAL ECONOMY AND COMMERCIAL LAW.

E. W. STANTON, PROFESSOR.

The following is a brief synopsis of the work in the department during the biennial period.

In the establishment of a preparatory course in 1890 arrangements were made by which students in this course might devote the fall term to beginning algebra, thus fitting themselves to take up the freshman mathematics in the following spring. The work during the first fall under Mr. Shoemaker, and the second under Miss Roberts, was well and thoroughly done and the standard of the freshman class greatly benefited thereby. It is in every way desirable that students should have thoroughly mastered algebra through equations of the first degree before commencing their regular college course. Any marked deficiency in this regard is an almost insurmountable obstacle to future good work in mathematics. Prior to the present year there were only two divisions in algebra. Our increasing numbers this year compelled the establishment of a third division, and even then one of the divisions contained sixty-nine students. All of these divisions are given a thorough review of the fundamental principles, including factoring, greatest common divisor, least common multiple, and the solution of simple equations and problems. Evolution, involution, radicals, quadratics, ratio and proportion, arithmetical and geometrical progression and the binomial theorem are then taken up in order. In all of the work a clear understanding of the principles involved is first required of the student, after which he is thoroughly drilled in their application.

Advanced algebra was this year introduced into the second term of the freshman year of the engineering courses. There were forty-five students in the class. The first part of the term was devoted to making the students quick and accurate in those algebraic processes necessary to success in higher mathematical work. To this end they were required to solve a large number of examples and problems of the character they will meet with in the advanced studies of their course. The latter part of the term was devoted to the study of series, undetermined co-efficients, the theory and use of logarithms, and the theory of equations.

Geometry is studied during the second term of the freshman year by all students in the four-year college courses. In 1890 the class was divided into two divisions, one of which was taught by Mr. Shoemaker and the other by myself. This year three divisions were necessary, the first of which was under my instruction and the other two under the instruction of Miss Roberts, thus increasing her duties by one full class for the term. Considerable time is devoted at the beginning of the work in geometry to the proper method of studying and mastering a geometrical proposition.

The necessity of understanding each step in the logical process and seeing clearly how these steps taken together prove the proposition, is strongly urged upon the student. Independence of the text-book is taught by requiring him to demonstrate original propositions. Since only one term is given to both plane and solid geometry the student is forced to adopt correct habits of study or fall by the wayside. Under the pressure the great majority of students come into line and easily master the study. In my division, numbering this year sixty-three, only seven failed to pass.

Plane trigonometry, which has hitherto been joined to surveying and taught by the professor of civil engineering, was this year added to my department. Instruction was given during the first ten weeks of the spring term to all students in the sophomore year. The class was drilled in the nature and use of trigonometric functions and the solution of right and oblique triangles. This year there were seventy students in the class; next year the number will be largely increased, necessitating a division of the class into at least two divisions. During the last seven weeks of the spring term students in the mechanical and electrical engineering courses pursue the study of spherical trigonometry; this class during the last year numbered nineteen.

Analytic geometry is pursued by members of the sophomore class in the engineering courses and by such students in the ladies' and general course as may desire to take the higher lines of mathematical work. It presupposes a working knowledge of the nature and use of trigonometric functions. The course of instruction involves a thorough study of the representation of magnitudes by equations and the solution of a large number of problems connected therewith. A full examination of the conic sections is made. The nature of the work and the number classifying this year in the study rendered two sections necessary.

Instruction in calculus is given during the spring term of the junior year. Twelve weeks are devoted to differential and the remainder of the term to integral calculus. The theory of *limits* is employed, and also that of *rates*. Instruction is given by daily recitation and lectures, with a review of the week's work each Friday. It aims to give the student not only a clear understanding of the principles of this method of mathematical investigation, but such ready familiarity with its intricate machinery as will enable him to use it to advantage in his work in physics and engineering.

COMMERCIAL LAW AND POLITICAL ECONOMY.

Commercial law is an optional study in the first term of the junior year. The aim in the instruction given is to present the general principles of law relating to ordinary business transactions. Contracts, agency, partnership,

sale of goods, commercial paper and real estate are studied. The changes in the common law, made by the statutes of the states, are set forth by lectures. Particular attention is given to the forms of notes, bills, drafts, checks, etc., and by reviews and examinations the student is made familiar with the requisites of the more common business papers.

Political economy follows commercial law.

In 1890 the class was divided into two divisions, one of which recited three and the other five times a week. Those in the first division used a text book, while those in the second employed the method of study known as the library method, using the library as their laboratory, and preparing themselves each day to give the views of different authors upon the economic questions under consideration. As the course of study is now arranged, all students electing to take political economy are assigned to the same class, which recites five times per week during the first ten weeks of the second term. Walker's political economy is used as a text book, and the time allowed is fully occupied in a study of the leading principles of the science. At the expiration of the ten weeks the engineers take up other work, while the remainder of the class continue the study during the balance of the term. This portion of the class is able to devote considerable time to the consideration of practical economic problems; land tenure, taxation, banking, bimetallicism, protection and free trade being some of the subjects studied. For the ten weeks there were forty-two in the class; during the remainder of the term twenty seven.

Students in the Senior year are allowed to elect advanced work in economic science. In 1890 and 1891 eight availed themselves of this election. The subject is here viewed from the historical standpoint and treated in accordance with the historical method now almost universally employed in advanced work in the social sciences. The development of economic thought is traced through the ancient, the mediæval and the modern world. The successive economic schools are taken up; their doctrines are considered in connection with industrial conditions; their gradual modification and displacement by other systems is noted; and thus, through a study of the growth of economic thought, the student is led to a clearer understanding and better judgment of the economic theories and practical industrial problems of the present time. The History of Political Economy, by Ingram, is used as a text book; also Blanqui's History of Political Economy.

The department has partaken of the general prosperity of the college and has largely increased in numbers in all of its classes. No small share of the credit for work accomplished in the line of mathematics is due to my assistants, in 1890 Mr. Shoemaker and in 1891 Miss Roberts. The increased work of the present year has compelled me to assign additional class work to my assistant. I consider that \$600 would be small compensation for the efficient service rendered by Miss Roberts.

The following classes have been under my instruction:

CLASSES AND NUMBER OF RECITATIONS PER WEEK.	No. of students,	
	1890.	1891.
FIRST TERM—		
Algebra, first division, five recitations per week.....	53	69
Algebra, second division, five recitations per week.....	40	46
Plane Trigonometry, ten weeks, five recitations per week.....		70
Spherical Trigonometry, seven weeks, five recitations per week.....		19
Calculus, five recitations per week.....	30	26
Political Economy, five recitations per week.....		8
Commercial Law, two recitations per week.....	26	34
SECOND TERM—		
Geometry, first division, five recitations per week.....	48	63
Advanced Algebra, three recitations per week.....		45
Analytics, first division, five recitations per week.....		17
Analytics, second division, five recitations per week.....	30	18
Political Economy, Junior, ten weeks, five recitations per week.....	33	42
Political Economy, Junior, six weeks, five recitations per week.....	9	27
Political Economy, Senior, five recitations per week.....	7	..

TAUGHT BY MY ASSISTANT.

FIRST TERM—		
Algebra, third division, five recitations per week.....		..
SECOND TERM—		
Geometry, second division, five recitations per week.....	32	18
Geometry, third division, five recitations per week.....		40
Algebra, Preparatory Class, five recitations per week.....	24	31

RHETORIC AND LATIN.

MARGARET DOOLITTLE, PROFESSOR.

I herewith present the first report of the department formed by the union of rhetoric and Latin. This combination was made in February, 1890, and was made into a college department the middle of the current year, 1891. There is a good interest in both divisions of the work.

RHETORIC.

The study of the mother tongue is required in all of the courses during the first term (half year) of the freshman year.

The object of the term's work is to familiarize the student with the principles of correct and effective expression. A knowledge of English grammar is required for entrance, but there is a practical review of the more important principles, including punctuation and capitals.

This term gives especial attention to clearness and aptness of speech; this involves considerable drill in the building of words from roots, and also in the discrimination of synonyms. The work of the text book is supplemented by library references and lectures pertinent to the work, together with a brief history of the language. Letter writing is studied during this term, and such written exercises as are practical, are prepared.

The second term (half year) all freshmen, except of the veterinary course, pursue the study, entering somewhat philosophically into the properties of style, with a view to an effective use of words, and also to an appreciation of good literature. For this last, and preparatory to the study of literature studied later in the course, the principles of criticism are studied. The more prominent kinds of oral and written discourse are studied, analyzed and produced. All written exercises are critically examined, and the most of them returned to the student for further work. Oral and written reviews are so planned as to both be a test of matter learned and a drill in expression.

A large part of this term's work is done by outlines and lecture notes that require individual investigation of the topics from the library books.

The sophomores and juniors of the Ladies' course write one paper each term under the supervision of this department. The criticisms of these and other literary exercises of students require considerable time in addition to regular class exercises.

The study of the English language has been extended into the first half of the sophomore year and made a five hour study in the freshman year. This change will take effect next year.

LATIN.

The work in Latin is not much changed. It is studied two years chiefly as a supplement to the English language and to the sciences, and is therefore limited to those courses related to these studies.

DEPARTMENT OF ENGLISH LITERATURE AND HISTORY.

A. C. BARROWS, PROFESSOR.

Herewith I respectfully submit my report of work done in my departments during the year 1891.

I have conducted worship and preached on seventeen Sundays, and have occasionally officiated at daily chapel services. I wish to express my pleasure in view of the spirit that seems to prevail in these religious services.

HISTORY.

I have had four courses of history, viz.:

1. A course in the History of Civilization, five hours each week, fall term, class of thirteen seniors. After an introductory course of lectures the class studied the civilization of the Egyptians, Mesopotamians, Hebrews, Phoenicians, Greeks and Romans, by considering topically their physical, political, military, religious, educational, literary, artistic and social advantages, work and institutions. Then we investigated the introduction and spread of Christianity, the rise of the Papacy of Islam, of the feudal system and chivalry, and followed the fortunes of these various elements of civilization as they have shaped the life of men down to the French revolution. The students used Myer's two volume history as a special reference book. I furnished them, as often as I could, a written syllabus of the lesson, to be used partly as a reference guide and partly as a brief lecture.
2. A course in the development of the United States, three hours each week, spring term, class of eleven seniors. We first studied the origin and development of the American town, county, State and Nation; then investigated topically our geographical expansion, political life, commerce, education, religion, industries and cities. I believe that this course, now first introduced, was decidedly profitable, but, to make it all that it might be, large additions must be made to the library. To this I return below.
3. A course in general history, in three sections, a section of sophomore ladies, two hours each week through the year, and two sections of freshmen of the course in science, five hours each week of the spring term. There were seventy-two students in the three sections. The course comprised a

survey of the history of Rome down to the fifth century, and thence forward of the history of England to the reign of Victoria. Special attention was directed to the bearing of the events investigated upon the institutions of the United States.

4. A course in the history of the United States, with a class of forty-nine preparatory students, filled during the former half of the fall term; three during the latter half, five hours each week.

In literature I have had two courses.

1. American literature: class of thirty-eight juniors, three hours each week, spring term.

I lectured upon the development of literary activity in this country, required the class to write up, on a prescribed plan, biographies of our most important writers and reports upon their works, and we studied together, selected extracts from their writings. Each student entered the results of his study in a note book, so as to have a course written mainly by himself.

2. English literature; class of seventeen juniors five hours each week, fall term. This course was conducted on the same general plan as the course in American literature.

DEPARTMENT OF FRENCH AND GERMAN.

STEPHANIE MARX, PROFESSOR.

Herewith I respectfully submit the report of the department of French and German for the year 1891:

FRENCH.

During the past year the work in the department has been limited to two classes—the beginner's class, composed of students in the freshman year of the course for ladies, the course in mechanical engineering, and the course in civil engineering, and the advanced class, composed of sophomores in the in the first named of these courses.

The aim has been to give the students a sufficient knowledge of the structure of the language to enable them to construe French scientific books and journals.

The training in the second year has been in the more idiomatic French of literature.

GERMAN.

Students in the course for ladies, in the course of civil engineering and in the course in sciences related to the industries, have had opportunity for elementary work in German. The advanced work has been confined to seniors in the first and the last of the above-named courses.

The nature and aim of the work done by the first year students corresponded to that of the first year class in French.

The second year's work consisted of a rapid review of the principles of grammar, translation from English into German, writing from dictation, translation at sight, reading of short stories, poems and novels, as well as three plays of Lessing, two plays of Schiller, and two of Goethe's longer poems. Essays on the three authors were part of the work of the last term.

The enthusiasm of the students has contributed largely to the successful work of the year.

ELOCUTION.

FANNY THOMAS, PROFESSOR.

The system of instruction followed in elocution is that taught in the Emerson College of Oratory, Boston. The course is arranged to meet the needs of each student.

Exercises in physical and voice work are given throughout the course. The gesture drill not only increases the health and strength of the individual, but develops the body and prepares it to express thoughts and emotions more truthfully. The object of the cultivation of the voice is to gain volume, flexibility, sympathy, and to enable the speaker to express his ideas consistently and with power.

The aim of all instruction in this department is the development of natural, graceful and effective oratory—to make good speakers and ready debaters. Special attention is given to extemporaneous speaking. The student is taught to think while standing before an audience. To familiarize him with public exercises regular recitals are given in the college chapel, one evening in each month, to which the public are invited.

LIBRARY.

FANNY THOMAS, LIBRARIAN.

The library work laid down in the College curriculum for the freshmen class during the second term is proving to be a marked help to students. It is proposed to make the best methods of reading an important factor in the College course. Besides personal efforts, the library furnishes guides and reader's manuals which have been found most valuable in directing the reader.

A course of lectures are prepared for classes on the following subjects: How to use the Library, The Classification, The Best General Reference Books and Their Use, The Best Reference Books in Each Department. Students are trained to make their own researches—Independent of librarian or professor—and are required to become familiar with the library arrangement. They have unrestricted access to all catalogues, indexes and shelves. The subject catalogue, with the analysis on cards, together with the cross-references shows at once all the library contains on any subject called for.

LIBRARY HOURS.

Five days of the week the library is open to visitors the following hours: From 8:00 to 12:00 A. M.; from 1:00 to 5:15 and 7:00 to 9:30 P. M. On Saturday visitors are admitted from 1:00 to 5:30 P. M.; on Sunday from 8:00 A. M. to 9:30 P. M.

ACCESSION BOOK.

During the last two years the total number of books added was 1,124. As to the means of accession, 558 were acquired by purchase; 164 consisted of periodicals which had been bound and placed on the shelves and the remaining 402 volumes were given to the library; 28 by individuals; 374 by societies, State and United States departments. The number of books repaired were 23.

The majority of books have been accessioned, classified and card catalogued as received. Bulletins of accessions are published on every Friday.

The *Aurora* and *Student* have kindly invited us to become regular correspondents of their papers so that in the future, lists of our new books and systematic reports can be furnished fortnightly and monthly.

The Accession Book is perhaps the most permanent of all library records. It contains a record of every volume as it comes to the library and shows

the number of the accession, class, book and volume numbers, author's name, the title of the book, publisher, with place and date of publishing, the number of pages in the book, its size, binding, source—stating whether donated or purchased, with cost, and a column for remarks so that if a book is lost, worn out, rebound or withdrawn for any purpose it can be so stated.

From this record can be seen at once just how fast the library is growing and the history of every volume can be traced if this book is accurately kept.

REFERENCE DEPARTMENT.

This department has been enriched by the purchase of the "Century Dictionary," six volumes; "Appleton's Cyclopædia of American Biography," six volumes; "Stedman's Library of American Literature," ten volumes, and a complete set of the "New Englander Magazine," forty-eight volumes. At present the library contains 1,734 bound volumes of periodicals, to which Poole's Index offers easy reference. All books of reference are on the shelves, and are arranged so as to be most accessible to students.

The department of History has added to its list the valuable work of Justin Winsor, *A Narrative and Critical History of America*, eight volumes, which is the best guide for such students as wish to make original investigations.

CATALOGUE.

Since the last biennial report the card catalogue has been completed, including an author, title and subject catalogue.

It is hardly necessary to say that every library should have a card catalogue, instead of any of the various substitutes. Already professors and students realize its enormous advantage over other systems, and anyone familiar with the library will not raise a question as to whether the card catalogue was the best form for the official record by authors and titles. Recognizing the vast importance of securing the best model after deciding that the card system should be adopted, Miss Crawford, our cataloguer, recommended the Dewey system, which has been faithfully studied and carefully followed by her. Whatever else is done the card catalogue must be kept up to date. In this way we can guard against buying duplicates and answer most directly and promptly "Is such a book in the library?"

Beside the regular card catalogue there is a complete and minute classification on the shelves by subjects, with shelf guides.

Books published anonymously, government publications, transactions of societies, and all works where some other word takes the place of the author's name, will be included in the index, which will be a complete alphabetical record of the contents of the library. The volumes in our library are now doing double the good that was being done by the same under the old conditions and poorer methods.

The library contains at present 8,260 volumes and 1,900 pamphlets.

Among the donations we note the following: "Life and Times of Hon. A. B. F. Hildreth, Charles City, Iowa." This is a biography of one of the early and most prominent journalists of this State. Mr. Hildreth was a member of the old board of education (1852-1863) which expired by constitutional limitation in 1864. He was the author of the measure providing for

the co-education of the sexes in the State university. He was a member of the General Assembly (1864), where he distinguished himself by his efficient labor in securing a land grant to aid the building of the railroad from McGregor west across the State.

Mr. C. L. Gabrilson presented the library with an English Bible, printed in 1685. During the cholera epidemic in Milwaukee, Wis., in 1854, the books of a Norse clergyman, who died, were thrown into the street and burned, and Mr. Gabrilson picked the Bible up before the fire had reached it.

READING ROOM.

One hundred and two periodicals are purchased for use in the library, four dailies, twenty-five weeklies, forty-seven monthlies, and twenty-six quarterlies.

Special boxes have been prepared and next year we hope to have every county in the State represented by at least two newspapers. This has not been encouraged in the past because there was not a place to arrange them systematically and where students could reach them.

The State papers—*Iowa State Register*, *Des Moines Leader*, *Cedar Rapids Republican*, together with the *Chicago Tribune* and *New York Tribune* are kept on file in the reading room one week, after which time they are sewed together, dated and placed in a store room for future reference.

The number of daily visitors to the library is estimated at 125.

DEPARTMENT OF MUSIC.

MARIE LEWIS CHAMBERS, DIRECTOR.

Within the past two years the amount of work done in this department has greatly increased and also broadened in character. There are now three teachers of music where formerly there was but one. The director gives special attention to voice culture and to all the vocal music of the college. Mr. George Backus to piano and pipe organ, and Miss Jennie Gratz to violin and theory. Each has given years of careful study, under the best masters, to his own specialty and is exceptionally well qualified to instruct in it. The course of study provided in voice, piano, organ, violin and theory are thorough, comprehensive, strictly classical in character, given with the most effective modern method and may be completed in such time as the ability and application of the student permits—generally within the limits of the four years college curriculum.

About one hundred private pupils have registered within the last year. A large number of the freshman have availed themselves of the free lessons in sight singing. A choir of twenty-four voices has been constantly under careful training and have sung creditably at all the public religious services of the college. The choral club of mixed voices has also added to the pleasure of several public occasions, notably the dedication of Morrill Hall. Public concerts have been given by the instructors in the department at the opening of each term and at commencement, and pupils' recitals the last Friday evening of each month. These programs have all been attended with large and enthusiastic audiences and a growing interest in them is manifest in college and community. Free and obligatory nomenclature classes have been formed for pupils in instrumental music.

A new baby grand piano has, within the last year, been added to the number already in possession of the college. The old pipe organ has recently been sold. It is desirable that a new one be placed in the loft provided for it in the new chapel as soon as possible, and also that other much needed facilities for the furtherance of the department's work be made as soon as practical.

HEALTH REPORT OF THE IOWA AGRICULTURAL COLLEGE FOR THE YEARS 1890-1891.

D. S. FAIRCHILD, COLLEGE PHYSICIAN.

The following are the cases treated at the College hospital during the college year of 1890:

March,	Follicular tonsillitis.....	3
April,	Follicular tonsillitis, 8; erysipelas, 1; catarrh, 1; rheumatism, 1; typhlitis, 1.....	12
May,	Bronchitis, 1; sciatica, 1; general debility, 1.....	3
July,	Dysentery.....	1
August,	Dysentery, 1; mumps, 1.....	2
September,	Malarial fever, 4; mumps, 2.....	6
October,	Follicular tonsillitis, 1; malarial fever, 1; catarrh, 1.....	3
Total.....		30

It will be seen from this report that the greatest number of cases of sickness occurred during the months of March, April and September. Eliminating the cases of tonsillitis, mumps and malarial fever (twenty cases), which appear to be associated with climatic or special influences, the number of cases of sickness is very small and of a mild character.

During the college year of 1891, forty-three cases were treated at the hospital, as follows:

February,	Measles.....	1
March,	Measles, 18; pneumonia following measles, 1; general debility, 1; rheumatism, 1; injury, 1.....	22
April,	Measles, 5; rheumatism, 3; injury, 2.....	10
May,	Appendicitis.....	1
August,	Malarial fever.....	1
September,	Appendicitis.....	1
October,	Malarial fever.....	7
Total.....		43

We were unfortunate this year in having an outbreak of measles, twenty-four cases. A young man was taken with this disease on the day of his

arrival, and exposed many, which resulted in an epidemic, seriously embarrassing the school and entailing great loss of time to the unprotected.

Rheumatism afflicted four students, causing much loss of time and suffering; all, however, recovered without sequela. Two cases of appendicitis of the recurrent form, occurred, which caused us great anxiety; one of them required an operation.

Four of the cases of malaria were quite severe, and assumed the continued form.

While we had an unusual number of cases of sickness this year, and of unusual severity, it is gratifying to state that they all recovered.

FINANCIAL REPORTS.

REPORT OF THE SECRETARY.

AMES, IOWA, November 11, 1891.

To the Honorable Board of Trustees:

It will be remembered that the financial machinery of the college is now so arranged that a record is kept in this office of every transaction connected with the college funds. I am thus able to report to you the condition of the college endowment fund and give you from my books a full statement of the income and expenditures of the institution in all of its departments.

ENDOWMENT FUND.

During the past biennial period the endowment fund of the college has been increased as follows:

By the re-appraisal of forfeited lands.....	\$ 7,388.54
By the transfer of accumulated interest fund.....	23,000.00
Total	\$ 30,388.54

The total present endowment is \$679,784.70, or in round numbers \$680,000.

This fund has been derived from the following sources:

From the congressional land grant.....	\$ 590,105.19
From the transfer and investment of interest fund.....	89,679.51
Total.	\$ 679,784.70

The fund is invested and managed by the board through the following agencies:

- (1) THE FINANCIAL AGENCY, *W. A. Helsell*, Agent.

This agency has charge of the investment in farm mortgages of the proceeds of the sales of land belonging to the congressional grant.

- (2) THE LAND AND LOAN AGENCY, *Herman Knapp*, Agent.

Agent Knapp has charge—

- (a) Of the land belonging to the congressional grant.
- (b) Of the land obtained by the foreclosure of endowment fund land.
- (c) Of the land purchased with accumulated interest fund.
- (d) Of the investment in farm mortgages of accumulated interest.

(3) THE BOND DEPARTMENT.

Which includes the investment of original endowment fund in loan and trust company bonds, and other bonds managed directly by the Board.

Taking up these agencies in their order:

(1) THE FINANCIAL AGENCY.

At the beginning of the biennial period the uninvested balance of the congressional endowment fund amounted to.....\$ 14,973.86
Loans have been paid during the two years amounting to..... 112,078.98
The proceeds of the sales of land have increased the loanable funds of the agency by..... 99,207.52

Making a total to be invested of.....\$ 226,260.36

Of this amount there has been loaned—

By Agent Sigler.....\$ 171,528.98
Agent Helsell..... 35,200.00
Total.....\$ 206,728.98

Leaving a present uninvested balance of.....\$ 19,531.38

In hands of financial agent.....\$ 10,000.00

In hands of State treasurer..... 9,531.38

The total fund charged to the agency is accounted for as follows:

Invested in farm mortgages bearing 8 per cent.....\$ 125,250.00
Invested in farm mortgages bearing 7 per cent..... 269,200.00
Awaiting investment..... 19,531.38

Making total of.....413,981.38

(2) LAND AND LOAN AGENCY.

At the beginning of the biennial period the agency stood charged with, acres.....88,044.83

There has been patented during the biennial period, land belonging to the Congressional land grant, acres.....30,506.96

Land purchased with interest fund, acres.....3,760.
34,266.96

Leaving as the land now owned by the College, acres.....53,777.87

The receipts from the sale of the above land are as follows:

From land belonging to the Congressional grant.....\$ 99,207.52
From land purchased with interest fund..... 13,080.00

Total.....\$ 112,287.52

The first amount, \$99,207.52, was remitted as the law directs, to the State Treasurer, and became, as has been already shown, a part of the loanable fund of the financial agency. The second amount, \$13,080, though first

remitted in accordance with law to the State Treasurer, was returned by him to the agent, to be invested in farm mortgages.

The following is the showing for the biennial period of the loan department of the agency.

Balance uninvested at the beginning of the biennial period... \$ 75.00
Received from land sold as stated above\$ 13,080.00
Received from loans paid..... 8,200.00
Received from transfer of interest fund..... 23,000.00
44,280.00

Total to be invested\$ 44,355.00
Loaned by agent..... 43,350.00

Balance uninvested.....\$ 1,005.00

The amount and condition of the College endowment controlled by Agent Knapp, are as follows:

Land under lease, 8 per cent.....\$ 183,694.31
Farm mortgages, 7 per cent..... 74,315.00
\$ 258,009.31
Land not under lease.....\$ 1,289.01
Cash balance awaiting investment..... 1,005.00
2,294.01
Total.....\$ 260,303.32

(3) BOND DEPARTMENT.

The amount invested in bonds remains the same as during the last biennial period, and is as follows:

Des Moines Security, Loan and Trust Company's bonds bearing 6 per cent interest.....\$ 5,500.00

I have carefully compared the accounts of all officers in any way connected with the management of the College endowment fund with the books of my office, and find them to agree. The endowment fund is thus fully accounted for. Summarizing these accounts I find the amounts controlled by the different agencies, and the condition of the whole to be as follows:

Financial Agency.....\$ 413,981.38
Land and Loan Agency..... 260,303.32
Bond Department..... 5,500.00
Total.....\$ 679,784.70

Yielding income—

Land under lease 8 per cent.....\$ 183,694.31
Farm mortgages 8 per cent..... 125,250.00
\$ 308,944.31
Farm mortgages 7 per cent..... 243,515.00
Bonds 6 per cent..... 5,500.00
Total.....\$ 657,959.31

Not yielding income—		
Land.....	\$	1,289.01
Cash investment awaiting—		
In hands of State treasurer.....	\$	9,531.38
In hands of financial agent.....		10,000.00
	\$	19,531.38
In hands of College treasurer.....		1,005.00
Total.....	\$	21,825.39

INCOME OF THE COLLEGE.

The net income of the College during the past two years has been as follows:

FOR 1890.

Interest collected on loans of endowment fund...	\$	22,391.95
Interest on bonds held by the State treasurer....		330.00
Total collected by State treasurer.....	\$	22,721.95
Rental on land belonging to the original grant...	\$	17,530.31
Rental on land obtained by foreclosure.....		246.00
Rental on land purchased with interest fund....		1,494.52
Interest on mortgage loans of interest fund.....		2,152.36
Total collected by agent Knapp.....	\$	21,423.19
Net income from the college farm.....		629.05
Total.....	\$	44,774.19
Experiment station fund.....		15,000.00
Received from State appropriations.....		10,918.73
Total for buildings, experimentation and support and maintenance of the college..	\$	70,692.92

FOR 1891.

From endowment fund—		
Interest on endowment fund mortgage loans...	\$	30,158.63
Interest on bonds held by the State treasurer...		320.00
Total collected by the State treasurer..	\$	30,488.63
Rental on land belonging to original grant.....	\$	14,364.98
Rental on land obtained by foreclosure.....		126.00
Rental on land purchased with interest fund.....		1,180.75
Interest on interest fund invested in farm loans..		3,199.54
Total collected by Agent Knapp.....		18,871.27
Interest on interest fund invested in sale notes, (collected by college treasurer)		11.32
Total income from endowment fund...	\$	49,371.22

From Morrill Support Fund—

Installment for 1889.....	\$	15,000.00
Installment for 1890.....		16,000.00
Installment for 1891.....		17,000.00
	\$	48,000.00
Total income from support fund.....	\$	97,371.22
Experiment Station Fund.....		15,000.00
Received from State appropriations.....		38,672.04

Total income from State and National sources for buildings, experimentation and maintenance of the College	\$	151,043.26
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Interest on loans negotiated by the financial agent is collected by the State Treasurer. He also collects interest on bonds held by him. Rental of land leased and loans made through the land and loan agency are collected by the agent. Accounts are kept in my office of each tract of land and each loan made. These accounts would disclose any failure to collect and properly account for rental and interest as they become due. Comparisons of my books with those of the State Treasurer and the land and loan agent have been made. All rental and interest collected by these officers have been accounted for. The total cash charged against the college treasurer during the biennial period is as follows:

1890.

Cash on hand at the beginning of the year.....	\$	15,148.87
Receipts from National sources—		
Support fund.....	\$	44,145.14
Experiment station fund.....		18,750.00
		62,895.14
Receipts from State appropriations.....		10,918.73
Receipts from students—		
Room rent.....	\$	1,680.73
Hospital fund.....		364.50
Diploma fund.....		30.00
		2,075.23
Receipts from sales—		
Sales by Experiment Station.....	\$	456.80
Sales of other departments		8,582.33
		9,039.13
Donations, rent on land		6.40
Endowment, accrued interest, paid in to be reinvested—		
Principal of loans	\$	1,900.00
Principal of land leases.....		5,240.00
		7,140.00
Total.....	\$	107,223.50

1891.

Cash on hand at the beginning of the year.....	\$ 20,322.55	
Sale note on hand at beginning of year, paid.....	100.00	
		\$ 20,423.55
Receipts from National sources—		
Support funds.....	\$ 97,371.22	
Experiment Station fund.....	15,000.00	
		112,371.22
Receipts from State appropriations.....		38,672.04
Receipts from students—		
Room rent.....	\$ 1,879.06	
Hospital fund.....	507.50	
Diploma fund.....	202.00	
		2,588.56
Receipts from sales—		
Sales by Experiment Station.....	\$ 222.49	
Sale of organ.....	300.00	
Sales of other departments.....	7,919.38	
		8,441.87
Donations, rent on land.....		3.20
Endowment—accumulated interest—paid in to be re-invested—		
Principal of loans.....	\$ 6,300.00	
Principal of land leases.....	7,840.00	
		14,140.00
Total.....		\$ 196,640.44

These amounts have been tested and found correct. Duplicates covering the items which make up the same are on file in my office.

COLLEGE EXPENDITURES.

All expenditures must be upon bills approved by the Board of Audit and should in no case exceed the appropriations made by the Board of Trustees. The expenditures of the past biennial period have been, in the opinion of your Board of Audit, in strict accordance with the law and rules and regulations of your honorable body. Vouchers are on file in the treasurer's office for all sums paid out. These vouchers are properly audited, receipted and correctly entered in the cash account. The books of the treasurer have been compared with those in my office and the two found to agree. The following summary shows how the cash charged against the treasurer has been accounted for:

For 1890—

Expended on account of college departments—		
Salaries.....	\$ 27,296.28	
Expenses covered by sales.....	7,378.18	
Apparatus, assistants and expenses paid from support fund.....	12,930.97	
		\$ 47,605.43
Expended on account of Experiment Station (including sales).....		15,018.94
Expended State appropriations.....		13,750.00

1891.]

REPORT OF THE SECRETARY.

83

Expended on student accounts—

Room rent.....	\$ 1,533.70	
College hospital.....	202.33	
Diploma fund.....	189.55	
		\$ 1,925.58
Invested in farm mortgages.....		8,600.00
Total disbursements during the year.....		\$ 86,899.95
Cash balance on hand.....		20,323.55
Total cash accounted for.....		\$ 107,223.50

1891

Expended on account of College departments—

Salaries.....	\$ 30,449.29	
Expenses covered by sales.....	7,919.38	
Apparatus, assistants and expenses paid from the support funds.....	35,280.37	
		73,649.04

Expended on account of Experiment Station (including sales).....

	\$ 17,737.31
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Expended on account of State appropriations....

	\$ 38,010.43
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Expended on student accounts—

Room rent.....	\$ 1,536.70	
College Hospital.....	536.77	
Diploma fund.....	88.95	
		2,162.42
Invested in farm mortgages.....		34,750.00
Refunded to lessees from Railroad damage fund held in trust.....		329.50

Total disbursements.....	\$ 166,638.60
Cash balance on hand.....	30,001.84

Total cash accounted for.....\$ 196,640.44

Exhibits "A" and "B" attached to this report show in detail the expenditures on account of the college departments. The cash balance belongs to the following funds:

College Support Funds—

Interest fund.....	\$ 6,680.41	
Morrill fund.....	16,845.33	
		\$ 23,525.74
Experiment station fund.....		1,821.12
State appropriations.....		1,005.97
Contingent principal fund awaiting investment...		1,005.00

Student Funds—

Room rent fund.....	\$ 1,585.69	
College hospital fund.....	244.94	
Diploma fund.....	281.30	
		2,061.93

Right of way damages held in trust.....264.00

Donation fund.....18.08

Organ fund (from sale of old organ).....300.00

Total.....\$ 30,001.84

You directed your board of audit at the May meeting to determine the items of expenditure to be charged to the Morrill fund.

In a circular letter of instruction issued by the Interior department it is stated that the language of the law "authorizes the purchase from this money of apparatus, machinery, text-books, reference books, stock and material used in instruction or for purposes of illustration in connection with any of the branches enumerated, and the payment of salaries of instructors of said branches only. The erection of buildings is specifically prohibited by the act, and the Assistant Attorney-General has decided that the purchase of land is not allowable. It should not be expended for repairs, furniture, casing, shelving or the like, or for musical instruments. In short, the plant, the land, buildings and ordinary appliances of a school must be provided from other sources, and this particular fund must be applied exclusively to the subjects named in the act and the facilities especially required for those subjects."

Following these instructions your board of audit have directed the treasurer to charge to the Morrill fund expenses amounting to \$31,154.67, leaving an unexpended balance as given above, of \$16,845.33. A detailed statement of the items paid from the "Morrill fund," prepared by the treasurer, is herewith submitted and your approval of the same asked. It will not be difficult hereafter to decide upon a line of necessary expenses coming clearly within the instructions of the Interior department and sufficient to exhaust the Morrill fund. It should be noted, however, that the fund is due each year in July. In order that it may meet a certain class of expenses running until the next July, only a portion of it—say about one-third—should be used in the fiscal year ending in the November following its receipt. My estimate of funds available for the next fiscal year is made upon this basis.

INCOME FOR 1890-91.

The income of the college for the past year was extraordinarily large. This was due to several causes:

First. Leases amounting to \$21,748.91 were renewed, thus continuing an investment yielding 8 per cent interest, payable in advance.

Second. The uninvested balance of the endowment fund was reduced from something over \$43,000 to less than \$20,000, while the principal of loans and leases paid in was promptly re-invested, the financial agency loaning during the last year the large sum of \$139,010.00. A considerable income was realized on these loans through the payment of the first fractional interest coupons falling due last October. The income of the endowment fund was thus brought to considerably exceed the estimate for the year. This fact, added to the payment during the year of three installments of the Morrill fund, gave the College a temporary income far in excess of that of ordinary years. This income has enabled you, during the year, to meet the expenses of the departments aggregating nearly \$66,000, transfer \$20,000 to the endowment fund and yet come out of the year with a cash balance of \$23,525.74.

INCOME FOR 1891-2.

In estimating the funds available for appropriation during the next fiscal year there should be deducted from the interest fund balance the unexpended appropriation for creamery apparatus of \$4,964.95, and the unexpended appropriation of \$400 for constructing a bridge across Squaw Creek.

This would leave:

Balance to credit of Morrill fund.....	\$ 16,844.43
Balance to credit of interest fund.....	1,315.05
Total available balance.....	\$ 18,159.48

While this sum is seemingly large the amount to the credit of interest fund is scarcely a safe working balance, while that to the credit of the Morrill fund, it should be remembered, includes the proportional share due to that part of the Morrill fund year running from November to July. During the next fiscal year loans are payable to the amount of \$122,250, while the leases, falling due, amount to about \$24,000.

The sum that will actually be paid in is so dependent upon changing conditions that it is difficult to estimate it. It can, however, be safely assumed that the financial agency will be called upon during the year to loan at least \$100,000, the certainty as to the exact condition of the principal necessarily introduces more or less uncertainty into any estimate of income. I consider however, that the following is a conservative view of the support funds that will be available during the coming year:

Cash balance available in round numbers.....	\$18,000
Income from endowment fund.....	44,000
One-third of next installment of Morrill fund.....	6,000
Total.....	\$68,000

This amount is subject to the deductions:

- (a) Of any amount you may see fit to transfer to the endowment fund.
- (b) Of a safe working balance.

It should be noted that the estimate is in excess of our ordinary yearly income, and besides that, agricultural colleges, to use the words of Senator Morrill in his address before the legislature of Vermont last winter, must not make their plans upon the supposition that the experiment station and Morrill funds are both to be permanent additions to their income.

Exhibits showing in a condensed form the present condition of the endowment fund and the receipts and expenditures on account of the College support funds are attached to this report, all of which is respectfully submitted.

E. W. STANTON,
Secretary.

EXHIBIT A.

The following statement shows the ordinary income of the College for the fiscal year ending November 12, 1890, together with the expenditures on account of the various departments:

INCOME.	
Cash balance on hand November 14, 1889.....	\$ 9,662.14
Rental on endowment fund land.....	17,530.31
Rental on land purchased with interest fund..	1,494.52
Interest on bonds held by State treasurer....	330.00
Interest on endowment fund invested in farm mortgages.....	22,391.95
Rental on land obtained by foreclosure of endowment fund mortgages.....	246.00
Interest on interest fund invested in farm mortgages.....	2,152.36
	\$ 44,145.14
Net income of the College farm.....	629.05
	\$ 54,436.33
EXPENDITURES.	
Salaries.....	\$ 27,296.28
Farm Department:	
Current expenses, \$1,204.15.	
Permanent improvements.....	\$ 300.00
Foreman.....	275.10
Income in excess of expenditures.....	629.05
	\$ 1,204.15
Mechanical Department:	
Current expenses and apparatus.....	\$ 1,200.00
Foreman.....	991.60
Assistant.....	420.00
	\$ 2,611.60
Veterinary department—	
Expenses and apparatus.....	373.75
House surgeon.....	200.00
	\$ 573.75
Chemical department—	
Expenses and apparatus.....	398.97
Assistant.....	300.00
Horticultural department.....	409.86
Civil engineering.....	198.69
Domestic economy.....	350.00
Military department.....	197.80
Physics.....	318.04
Botany.....	248.83
Entomology and Zoology.....	400.00

Library—	
Assistant.....	\$ 75.00
Books, periodicals and expenses.....	1,053.78
Salary of cataloguer.....	500.00
Special appropriation for history.....	33.50
Special appropriation for political economy..	50.00
	\$ 1712.12
Public grounds.....	397.86
Public rooms—	
Public rooms in main building.....	900.00
Office building.....	98.79
North hall.....	144.57
Chemical and physical laboratories.....	127.84
Rostrum and chairs.....	53.00
	1,324.20
Contingent expenses.....	2,776.49
Sabbath services and lectures.....	137.50
	39,652.15
Total ordinary expenses for the year...	3,000.00
Transferred to endowment fund.....	11,784.18
Cash balance on hand.....	\$ 54,436.33

EXHIBIT "B."

The following statement shows the income of the College from its support funds for the fiscal year ending November 11, 1891, together with the expenditures on account of the various departments:

INCOME.	
Cash balance on hand November 12, 1890.....	\$ 11,784.18
Received on sale notes on hand at the beginning of the year.....	100.00
	\$ 11,884.18
Rental on land purchased with interest fund..	1,180.75
Rental on endowment fund land.....	14,364.98
Interest on bonds held by State treasurer....	330.00
Interest on endowment fund invested in farm mortgages.....	30,158.63
Rental on land obtained by the foreclosure of endowment fund mortgages.....	126.00
Interest on interest fund invested in farm mortgages.....	3,199.54
Interest on interest fund invested in sale notes	11.32
	49,371.22
Morrill support fund—	
Installment for 1889.....	\$ 15,000.00
Installment for 1890.....	16,000.00
Installment for 1891.....	17,000.00
	48,000.00
	\$109,255.40

EXPENDITURES.

Salaries	\$ 30,440.29
Farm Department—	
Foreman	\$ 602.83
Permanent improvement	221.13
Creamery apparatus	35.05
Imported horses	1,783.80
Current expenses	758.24
	\$ 3,401.05
Mechanical Department—	
Assistants	\$ 2,196.85
Expenses and apparatus	4,951.32
	\$ 7,148.17
Horticultural Department	493.95
Veterinary Department—	
House surgeon	\$ 300.00
Expenses and apparatus	399.73
	\$ 699.73
Chemical Department—	
Assistants	\$ 600.00
Expenses and apparatus	688.34
	1,288.34
Civil engineering department	\$ 849.96
Domestic economy department	500.00
Military department {	
Physical apparatus. }	525.00
Physics	3,496.88
Botany Department—	
Assistant	246.50
Expenses and apparatus	578.22
	\$ 824.72
Entomology and Zoology—	
Assistants	\$ 500.00
Expenses and apparatus	2,442.16
	\$ 2,942.16
Library—	
Assistant	\$ 75.00
Cataloguer	650.00
Books, periodicals and expenses	1,449.81
	\$ 2,174.81
Public grounds	1,806.75
Public rooms	2,791.98
Contingent expense	4,535.87
Sabbath services	175.00
Piano for musical department	545.00
Safe for treasurer's office	650.00
Dynamos	440.00
Total ordinary expenses for the year ..	\$ 65,729.66
Transferred to endowment fund	20,000.00
Cash balance on hand	23,525.74
Total	\$ 109,255.40

EXHIBIT C.

The following statement shows for the fiscal year ending November 11, 1891.

1. Total expenditures of each department.
2. Total income of each department.
3. Net amount of interest fund expended by each department.
4. Appropriation by the board to each department.

DEPARTMENTS.	Total Expended.	Total Income sales.	Amount of ap- propriation expended.	Amount of ap- propriation.
Salaries ..	\$ 30,440.29	\$	\$ 30,440.29	\$ 30,440.29
Farm department—				
Foreman	602.83		602.83	800.00
Permanent improvements	221.13		221.13	300.00
Creamery apparatus	35.05		35.05	5,000.00
Imported horses	1,783.80		1,783.80	1,800.00
Current expenses	3,735.46	2,977.22	758.24	800.00
Bridge				400.00
Mechanical department—				
Assistants	2,196.85		2,196.85	2,300.00
Expenses and apparatus	5,706.58	755.26	4,951.32	4,900.00
Horticultural department	2,949.17	2,455.22	493.95	1,540.00
Veterinary department—				
House surgeon	300.00		300.00	300.00
Expenses and apparatus	966.32	566.79	399.73	400.00
Chemical department—				
Assistants	600.00		600.00	600.00
Expenses and apparatus	1,478.27	784.93	688.34	700.00
Civil engineering	849.96		849.96	850.00
Domestic economy	530.00	30.00	500.00	500.00
Military department—				
Physical apparatus	525.00		525.00	525.00
Physics	3,496.88		3,496.88	3,500.00
Botany—				
Assistant	246.50		246.50	250.00
Expenses and apparatus	702.67	124.45	578.22	600.00
Entomology and Zoology—				
Assistants	500.00		500.00	500.00
Expenses and apparatus	2,579.37	137.21	2,442.16	2,450.00
Library—				
Assistant	75.00		75.00	75.00
Cataloguer	650.00		650.00	650.00
Books and expenses	1,449.81		1,449.81	1,419.81
Public grounds	1,851.87	45.12	1,806.75	1,806.75
Public rooms	2,835.16	43.18	2,791.98	3,222.95
Contingent expenses	4,535.87		4,535.87	4,608.04
Sabbath services	175.00		175.00	175.00
Pianos	545.00		545.00	545.00
Safe	650.00		650.00	650.00
Dynamos	440.00		440.00	500.00
Total	\$ 73,649.04	\$ 7,019.38	\$ 65,729.66	\$ 73,097.84

TREASURER'S

The following is a complete statement of the transactions in all the

	BALANCE NOVEMBER 12, 1890.		FISCAL YEAR.	
	Debit.	Credit.	Expenditures.	Receipts.
Interest on lands belonging to Congressional grant		\$ 12,638.38		\$ 14,364.08
Morrill support fund				48,000.00
Interest on accumulated interest				4,380.29
Endowment interest fund				30,488.63
Endowment interest foreclosures				126.00
Contingent principal fund		47,480.00		7,840.00
Mortgages receivable	45,865.00		34,750.00	6,300.00
*Donation fund		14.88		3.20
Diploma fund		118.25	88.05	202.00
Room rent		1,243.36	1,536.70	1,879.06
College hospital		274.21	596.77	507.50
Railroad damages		593.50	329.50	
Personal accounts	476.95			
Bills receivable	677.25			100.00
Interest on notes				11.32
Farm department			6,070.03	2,977.22
Horticultural department			308.24	
Chemical department			2,949.17	2,455.22
Civil engineering department			1,322.77	784.93
Zoology and entomology			750.50	
Domestic economy			840.96	
Military department			3,079.37	137.21
Physical department			530.00	30.00
Mechanical department			525.00	
Veterinary department			3,496.88	
Veterinary department			7,063.43	755.26
Botanical department			1,035.94	566.79
Salaries			230.56	
Salaries			949.17	124.45
Planos			6,331.14	
Treasurer's safe			24,200.15	
Organ			545.00	
Public rooms			650.00	300.00
Public grounds			2,835.16	43.18
Dynamics			1,851.87	45.12
Contingent expenses			440.00	
Contingent expense			3,913.41	
Chapel services			622.46	
Library			175.00	
Library			1,810.43	
*State appropriations			364.38	
*Experiment station			38,010.43	38,672.04
Experiment station			11,966.19	7,630.35
			5,771.02	7,592.14
	\$ 47,019.20	\$ 67,342.75	\$ 166,638.60	\$ 176,316.80
Balance interest fund on hand				
Balance Morrill fund on hand				
Cash to balance—				
State appropriations			661.61	
Experiment station				2,514.72
Morrill fund			16,845.33	
Other sources			15,642.35	5,313.93
	\$ 67,342.75	\$ 67,342.75	\$ 184,145.54	\$ 184,145.54

* Found above refers to the following:
 1. \$20,000.00 transferred from interest fund to the contingent fund principal, as per order of the Board of Trustees.
 2. Interest on State warrants, amount \$2.08, was transferred to donation fund, thus closing the account so that it does not appear in the balance sheet.
 3. For more complete statements of these accounts see pages —, — and — of this report.

REPORT.

accounts for the fiscal year ending November 11, 1891.

TOTALS.		MORRILL FUND.		INTEREST FUND.		BALANCE, NOV. 11, 1891.	
Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
\$ 27,303.36	\$ 48,000.00		\$ 48,000.00		\$ 7,303.36		
48,000.00	4,380.29				4,380.29		
30,488.63	126.00				30,488.63		
126.00					126.00		
*53,370.00							*75,320.00
80,615.00	6,300.00					74,315.00	
	18.08						18.08
888.95	320.25						231.30
1,536.70	3,122.30						1,585.09
536.77	781.71						244.94
329.50	566.50						264.00
476.95						476.95	
677.25						577.25	
	100.00						
	11.32					11.32	
6,070.03	2,977.22	2,101.35		931.46			
308.24		308.24					
2,949.17	2,455.22			495.95			
1,322.77	784.93			452.34			
750.50		83.50					
840.96		730.50		150.78			
3,079.37	137.21	690.18		87.87			
530.00	30.00	2,854.29		500.00			
525.00				525.00			
3,496.88		3,496.88		92.55			
7,063.43	755.26	4,703.57		2,444.60			
1,035.94	566.79	240.86		228.31			
230.56		150.00		80.50			
949.17	124.45	824.00		.63			
6,331.14				6,231.14			
24,200.15	14,630.77			9,578.38			
545.00				545.00			
650.00				650.00			
	300.00					300.00	
2,835.16	43.18			2,791.98			
1,851.87	45.12			1,806.75			
440.00				440.00			
3,913.41				3,913.41			
622.46				622.46			
175.00				175.00			
1,810.43		341.09		1,468.44			
364.38				364.38			
38,010.43	39,016.40						1,005.97
11,966.19	11,966.19						
5,771.02	7,592.14						1,821.12
\$ 213,657.80	\$ 243,659.64	\$ 31,154.67	\$ 48,000.00	\$ 34,574.99	\$ 42,300.00		
				7,734.61			7,734.61
		16,845.33					16,845.33
							1,005.97
							1,821.12
							16,845.33
							10,379.42
\$ 243,659.64	\$ 243,659.64	\$ 48,000.00	\$ 48,000.00	\$ 42,309.60	\$ 42,300.00	\$ 105,371.04	\$ 105,371.04

STATE APPROPRIATIONS.

The following is a statement of the different appropriations for the fiscal year ending November 11, 1891.

	Balances November 12, 1890.	Drawn from State Treas- ury.	Expended.	Balances November 11, 1891.
State repair and improvement fund of 1890.....	\$ 178.54	\$ 1,530.00	\$ 1,319.82	\$ 408.72
State contingent fund of 1890-91.....	27.59	1,097.27	1,083.56	41.30
State experimental fund of 1888.....		366.04	366.04	
State experimental fund of 1889-90.....	138.23	1,149.16	731.44	555.95
Morrill hall.....		24,681.27	24,681.27	
Boiler and engine house.....		3,159.63	3,159.63	
Repairs on college building.....		2,483.57	2,483.57	
Repair and improvement of farm buildings.....		1,292.95	1,292.95	
Fire escapes.....		892.15	892.15	
Enlargement and renewal of physical laboratory.....		2,000.00	2,000.00	
Totals.....	\$ 344.36	\$ 38,672.04	\$ 38,019.43	\$ 1,005.97

MORRILL FUND.

The following is a summary of the report made to the Secretary of the Interior for the year ending June 30, 1891:

January 16, 1891, received from State treasurer.....	\$ 15,000.00
May 29, 1891, received from State treasurer.....	16,000.00
Total received.....	\$ 31,000.00

EXPENDITURES.

Paid for Agriculture:	
Instruction.....	\$ 2,730.21
Apparatus.....	6.64
Text and reference books.....	9.77
Stock and materials.....	158.24
	\$ 2,904.86
Paid for Mechanic Arts:	
Instruction.....	\$ 2,637.14
Apparatus.....	354.35
Machinery.....	509.15
Text and reference books.....	47.02
Stock and Materials.....	171.04
	\$ 3,808.70
Paid for the English Language:	
Instruction.....	\$ 166.65
Text and reference books.....	.80
	\$ 167.45
Paid for Mathematical Science:	
Instruction.....	\$ 544.43
Text and reference books.....	9.95
	\$ 554.38
Paid for Physical Science:	
Instruction.....	\$ 756.00
Apparatus.....	302.02
Text and reference books.....	14.91
Stock and materials.....	7.45
	\$ 1,075.28
Paid for Natural Science:	
Instruction.....	\$ 2,587.45
Apparatus.....	1,213.28
Text and reference books.....	70.40
Stock and materials.....	4.45
	\$ 3,875.58
Paid for Economic Science:	
Instruction.....	\$ 223.21
Text and reference books.....	97.51
	\$ 319.72
Total expended.....	\$ 12,705.97
Balance cash on hand June 30, 1891.....	18,294.03
	\$ 31,000.00 \$ 31,000.00

The following is a summary of the Morrill Fund from July 1 to November 11, 1891:

July 1, 1891. Balance on hand.....	\$ 18,294.03
October 2, 1891. Received from State Treasurer.....	17,000.00
Total received.....	\$ 35,294.0

EXPENDITURES.

Paid for Agriculture:

Instruction	\$ 3,075.67
Apparatus	311.77
Text and reference books	40.46
Stock and materials.....	1,783.80
	\$ 5,211.70

Paid for Mechanic Arts:

Instruction	\$ 2,384.02
Apparatus.....	1,078.13
Machinery	423.70
Text and reference books.....	27.50
Stock and materials	108.44
	\$ 4,021.

Paid for English Language:

Instruction	\$ 145.54
	\$ 145.5

Paid for Mathematical Science:

Instruction	\$ 533.68
	\$ 533.68

Paid for Physical Science:

Instruction	\$ 655.00
Apparatus	3,086.96
Text and reference books	2.00
Stock and materials	5.00
	\$ 3,748.96

Paid for Natural Science:

Instruction	\$ 2,786.33
Apparatus	1,715.91
Text and reference books	73.06
	\$ 4,575.30

Paid for Economic Science:

Instruction	\$ 194.07
Text and reference books.....	17.66
	\$ 211.73

Total expended.....	\$ 18,448.70
Balance—Cash on hand November 11, 1891.....	16,845.33
	\$ 35,294.03 \$ 35,294.03

Respectfully submitted.

HERMAN KNAPP,
Treasurer.

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, 1889, to October 31, 1891, inclusive, is hereby submitted.

The following are the transactions for the fiscal year ending October 31, 1890:

COLLECTIONS.

Interest or rent upon leases belonging to the congressional grant.....	\$ 17,530.31
Interest or rent upon leases belonging to lands purchased with accumulated interest.....	1,494.52
Interest on loans made from accumulated interest	2,152.36
Interest or rent on land obtained by foreclosure of loan made with endowment fund.....	246.00
Total income collected during fiscal year.....	\$ 21,423.19
Sale of lands belonging to congressional grant....	\$ 55,250.77
Sale of lands purchased with accumulated interest	5,240.00
Principal on loans made from accumulated interest	1,900.00
Total principal collected during fiscal year.....	\$ 62,390.77
Total collections for fiscal year.....	\$ 83,813.96

DISBURSEMENTS.

Paid College Treasurer as follows:

Interest or rent upon leases belonging to the congressional grant.....	\$ 17,530.31
Interest or rent upon leases belonging to lands purchased with accumulated interest.....	1,494.52
Interest on loans made from accumulated interest	2,152.36
Interest or rent upon land obtained by foreclosure of loan made with endowment fund.....	246.00
Principal on loans made from accumulated interest	1,900.00
Total paid College Treasurer for the fiscal year.....	\$ 23,323.19 \$ 23,323.19

Remitted State Treasurer as follows:

Sale of lands belonging to congressional grant...	\$ 55,250.77	
Sale of lands purchased with accumulated interest	5,240.00	
Total remitted State Treasurer for the fiscal year.....	\$ 60,490.77	\$ 60,490.77
Total disbursements for fiscal year.....		\$ 83,813.96

The following are the transactions for the fiscal year, ending October 31, 1891:

COLLECTIONS.

Interest or rent on lands belonging to the congressional grant.....	\$ 14,364.98	
Interest or rent on land purchased, with accumulated interest.....	1,180.75	
Interest or rent on land obtained by foreclosure of loans made from endowment fund.....	126.00	
Interest on loans made from accumulated interest.....	3,199.54	
Total income collected during fiscal year.....	\$ 18,871.27	\$ 18,871.27
Sale of lands belonging to congressional grant.....	\$ 43,637.25	
Sale of land purchased with accumulated interest.....	7,480.00	
Principal on loans made from accumulated interest.....	6,300.00	
Total principal collected during fiscal year.....	\$ 57,767.25	\$ 57,767.25
Total collections for fiscal year.....		\$ 76,638.52

DISBURSEMENTS.

Paid College Treasurer as follows:

Interest or rent on lands belonging to congressional grant.....	\$ 14,364.98	
Interest or rent on lands purchased with accumulated interest.....	1,180.75	
Interest or rent on land obtained by foreclosure of loan made from endowment fund.....	126.00	
Interest on loans made from accumulated interest.....	3,199.54	
Principal on loans made from accumulated interest.....	6,300.00	
Total paid College Treasurer for fiscal year.....	\$ 25,171.27	\$ 25,171.27
Remitted State Treasurer as follows:		
Sale of lands belonging to congressional grant.....	\$ 43,637.25	
Sale of lands purchased with accumulated interest.....	7,840.00	
Total remitted State Treasurer for fiscal year.....	\$ 51,467.25	\$ 51,467.25
Total disbursements for fiscal year.....		\$ 76,638.52

LOANS.

There have been loaned of the Contingent fund principal since date of last report, \$43,350.00 at seven per cent. secured on improved farming land, as follows:

Loan No. 67, Andrew J. Drugsvold.....	\$ 800.00
Loan No. 68, Ole Peters.....	700.00
Loan No. 69, Andrew Ingebertson.....	1,000.00
Loan No. 70, Andrew Anderson.....	1,200.00
Loan No. 71, Andrew J. Drugsvold.....	1,400.00
Loan No. 72, Andrew E. Moen.....	700.00
Loan No. 73, Martin Simonson.....	1,500.00
Loan No. 74, G. A. Kringlaak.....	600.00
Loan No. 75, Thomas Lundt and John Johnson.....	700.00
Loan No. 76, Ole T. Eames.....	1,000.00
Loan No. 77, George W. Fisher.....	1,200.00
Loan No. 78, Detlef H. Lemberg.....	2,000.00
Loan No. 79, R. H. Spencer.....	700.00
Loan No. 80, Richard Jones.....	2,000.00
Loan No. 81, J. C. S. Green.....	2,500.00
Loan No. 82, C. S. Salverson.....	1,200.00
Loan No. 83, Martin E. Gullard.....	1,000.00
Loan No. 84, Wm. S. Hitchings.....	2,000.00
Loan No. 85, T. K. Hangan.....	1,150.00
Loan No. 86, Phebe J. Cole.....	1,200.00
Loan No. 87, Elert Erickson and Peder Johnson.....	800.00
Loan No. 88, Marilla McKimin.....	1,200.00
Loan No. 89, Wm. W. Clark.....	800.00
Loan No. 90, Elias W. Clark.....	1,000.00
Loan No. 91, C. S. Salverson.....	1,200.00
Loan No. 92, Celia Larson.....	1,200.00
Loan No. 93, John A. Elverback.....	1,200.00
Loan No. 94, Hans H. Smedsrud.....	1,100.00
Loan No. 95, Tilda O. Johnson.....	3,000.00
Loan No. 96, Fred J. Schmer and Richard E. Smith.....	1,200.00
Loan No. 97, O. A. Qualey.....	1,000.00
Loan No. 98, John Larson.....	2,000.00
Loan No. 99, F. E. Whitrock.....	900.00
Loan No. 100, E. H. Stonecypher.....	700.00
Loan No. 101, A. P. Blackman.....	800.00
Loan No. 102, Hatte Johnson.....	700.00

Total loaned from November 1, 1889, to October 31, 1891, inclusive.....	\$ 43,350.00	\$ 43,350.00
Amount of loans outstanding November 1, 1889.....		39,165.00
Total.....		\$ 82,515.00
Amount of principal paid from November 1, 1889, to October 31, 1891, inclusive.....		8,200.00
Total of loans outstanding.....		\$ 74,315.00

ENDOWMENT FUND LANDS LEASED FROM NOVEMBER 1, 1889, TO OCTOBER 31, 1891.

Part of Section.	Section.	Township.	Range.	Acres.	Price per acre.	Valuation.	Name of Lessee.	Date of Lease.	Time—years.	Rate—per cent.	Amount of first year's interest.
2082 ne qr.	28	95	31	160	\$ 3.00	\$ 480.00	J. F. Gallup	November 15, 1889	10 1/2	per cent.	\$ 38.40
2083 sw qr.	28	95	31	160	12.50	2,000.00	John Q. Williams	April 21, 1890	10 1/2	per cent.	160.00
2084 sw qr.	28	95	31	160	5.00	800.00	George W. Hanna	May 1, 1890	10 1/2	per cent.	64.00
2085 sw qr.	28	95	31	160	5.00	800.00	George W. Hanna	May 1, 1890	10 1/2	per cent.	64.00
2086 sw qr.	28	95	31	160	5.00	800.00	George W. Hanna	May 1, 1890	10 1/2	per cent.	64.00
2087 ne qr.	28	95	31	160	5.00	800.00	George W. Hanna	May 1, 1890	10 1/2	per cent.	64.00
2088 ne qr.	28	95	31	160	5.00	800.00	George W. Hanna	May 1, 1890	10 1/2	per cent.	64.00
2089 n hf of sw qr.	28	95	31	80	5.00	400.00	Lyons Lumber Company	May 15, 1890	10 1/2	per cent.	32.00
2090 ne qr.	28	95	31	160	9.00	1,440.00	George C. Call	December 6, 1890	10 1/2	per cent.	115.20
2091 nw qr.	28	95	31	160	9.00	1,440.00	George C. Call	December 6, 1890	10 1/2	per cent.	115.20
2092 ne qr.	28	95	31	160	7.50	1,200.00	George C. Call	December 11, 1890	10 1/2	per cent.	96.00
2093 ne qr.	28	95	31	160	8.00	1,280.00	P. V. Nolan	February 12, 1891	10 1/2	per cent.	102.40
2094 ne qr.	28	95	31	160	8.00	1,280.00	George M. Roe	August 6, 1891	10 1/2	per cent.	102.40
2095 ne qr.	28	95	31	160	9.00	1,440.00	George M. Roe	August 6, 1891	10 1/2	per cent.	115.20
				2,170.27		\$ 15,654.75					\$ 1,204.39

LANDS BELONGING TO THE SIOUX CITY PURCHASE, LEASED FROM NOVEMBER 1, 1889, TO OCTOBER 31, 1891.

172 se qr.	26	93	30	160	\$ 9.00	\$ 1,440.00	A. B. Willis	August 13, 1890	10 1/2	per cent.	\$ 115.20
173 sw qr.	26	93	30	160	10.00	1,600.00	W. S. Van Buskirk	November 13, 1890	10 1/2	per cent.	128.00
				320		\$ 3,040.00					\$ 243.20

Number of acres of congressional grant forfeited since last report.....	440.00	
Valuation of same when forfeited	\$	1,400.00
Number of acres of congressional grant patented since last report.....	30,506	
*Valuation of same.....	\$	99,207.52
Number of acres of land, purchased with accumulated interest fund, patented since last report	3,760.00	
Valuation of same.....	\$	13,080.00

* This amount exceeds the amount collected for the sale of lands belonging to the congressional grant by \$329.50, which had already been collected by the college as "right of way damages across some of the lands."

LANDS BELONGING TO CONGRESSIONAL GRANT.

Number of acres not under lease.....	280.00
Number of acres under lease	49,350.98
Total number of acres patented.....	154,361.66
N. W. 1/4, 30, 97, 28, in conflict with swamp land entry	149.67
S. 1/4 of N. E. 1/4, 29, 95, 30, decided to be swamp land	80.00
Total number of acres.....	204,292.31

LANDS BELONGING TO ACCUMULATED INTEREST.

Number of acres under lease	4,013.17
Total number of acres patented.....	11,000.00
Total number of acres	15,013.17

The following is a description of the land belonging to the congressional grant, which is not under lease.

Part of Section.	Section.	Twp.	Range.	No. of acres.
N. E. 1/4 of S. E. 1/4 and S. 1/4 of S. E. 1/4.....	21	99	48	120
S. E. 1/4.....	28	99	48	160

Respectfully submitted,

HERMAN KNAFF,
Land Agent.

PROCEEDINGS
OF
BOARD OF TRUSTEES.

ABSTRACT OF THE PROCEEDINGS OF THE BOARD OF TRUSTEES, 1890-91.

MEMBERS OF THE BOARD OF TRUSTEES.

	Term expires.
<i>First District</i> —Hon. J. W. Garner, Columbus City.....	1893
<i>Second District</i> —Hon. C. M. Dunbar, Maquoketa.....	1892
<i>Third District</i> —Hon. J. S. Jones, Manchester.....	1896
<i>Fourth District</i> —Hon. S. P. Yeomaas, Charles City.....	1892
<i>Fifth District</i> —Hon. Cato Sells, Vinton	1892
<i>Sixth District</i> —Hon. W. O. McElroy, Newton.....	1896
<i>Seventh District</i> —Hon. C. F. Saylor, Des Moines.....	1894
<i>Eighth District</i> —Hon. Geo. Van Houten, Lenox.....	1892
<i>Ninth District</i> —Hon. J. H. Wood, Atlantic.....	1896
<i>Tenth District</i> —Hon. Eugene Secor, Forest City..	1894
<i>Eleventh District</i> —Hon. C. D. Boardman, Odebolt.....	1894

OFFICERS OF THE BOARD.

Hon. C. M. Dunbar, Maquoketa.....	<i>Chairman.</i>
E. W. Stanton, Ames.....	<i>Secretary.</i>
Herman Knapp, Ames.....	<i>Treasurer.</i>
J. R. Lincoln, Ames	<i>Steward.</i>

STANDING COMMITTEES.

- Executive and Finance Committee*—Trustees Secor, Van Houten, McElroy Jones and Garner.
- Committee on Faculty and Courses of Study*—Trustees Sells, Boardman, Wood, Saylor and Dunbar.
- Committee on Farm and Farm Buildings*—Trustees Boardman, Van Houten and Saylor.
- Committee on Horticulture, Experiments and Hybridizing*—Trustees Van Houten, Secor and Yeomans.
- Committee on Workshop*—Trustees Jones, McElroy and Dunbar.
- Committee on College Lands*—Trustees Wood, Secor and Jones.

Building Committee—Trustees Garner, Yeomans, Boardman, Van Houten and Dunbar.

Committee on Investments—Trustees McElroy, Secor and Garner.

Committee on Library—Trustees Saylor, Sells, Boardman and Wood.

Committee on Rules—Trustees Van Houten, Boardman and Wood.

Committee on Bonds—Trustees McElroy and Saylor.

Committee on Domestic Economy—Trustees Boardman, Jones and Yeomans.

Committee on Experiment Station—Trustees Yeomans, Secor and Dunbar.

Committee on Scientific Departments—Trustees Sells, Wood and McElroy.

Committee on Re-appraisal of Forfeited Lands—Trustee Secor.

MEMBERSHIP OF THE BOARD.

The following changes have taken place in the membership of the Board during the last two years; the terms of office of the Hon. G. W. Dunham, of the third district, Hon. John Morrison, of the sixth district, and Hon. Platt Wicks, of the ninth district, expired May 1, 1890. Hon. J. S. Jones, of Manchester, Hon. W. O. McElroy, of Newton, and Hon. J. H. Wood, of Atlantic, were elected by the General Assembly to represent these districts.

Hon. Joseph Dysart, of the fifth district, because of continued ill health, resigned in July, 1891. The Board unanimously elected Hon. Cato Sells, of Vinton, to fill the vacancy. Under the statute he holds his office "until the next session of the General Assembly after such appointment." In accepting the resignation of Gov. Dysart the following resolution was entered of record:

WHEREAS, Hon. Joseph Dysart has tendered his resignation as a member of the Iowa Agricultural College Board of Trustees,

Resolved, That in accepting the resignation of the Hon. Joseph Dysart, as a trustee of the College, we do so only in deference to his wishes. We desire to express to him our love, confidence and respect, and to commend him for his faithful services as a citizen of Iowa, as Lieutenant-Governor of the State, and as a member of the College Board. With sincere regret that his ill health will not permit his continuing as a member of this Board, we accept his resignation.

Resolved, That this resolution be spread upon the minutes of the meeting and that the secretary be directed to furnish Gov. Dysart with a copy.

STATE APPROPRIATIONS.

At the beginning of the biennial period there remained to the credit of the appropriation of \$3,500 made by the Twenty-second General Assembly for the erection of lavatories in connection with the main college building, an unexpended balance of \$156.23. This balance the Board ordered transferred to the College room rent fund to in part reimburse that fund for payments made to Burnside & Kehoe for plumbing in fitting up said lavatories, the total sum thus charged to the room rent fund amounting to \$900. It was also made a condition of the transfer that necessary repairs or improvements upon the lavatories, hereafter made, should be charged to the room rent fund to the amount thus transferred.

Minor balances of thirty-nine cents to the credit of the water supply appropriation and ninety-eight cents to the credit of the appropriation for repairing boiler and machinery in the electric light and mechanical depart-

ments, have been expended and these accounts closed out. The balance of \$73.86, which the last biennial report showed to the credit of the annual appropriation of \$1,000 for the repair and improvement of College buildings, has been expended for the following purposes:

Engineering hall.....	\$ 26.38
Main College building.....	25.00
Farm buildings.....	11.80
Houses occupied by professors.....	6.40
Chemical laboratory building.....	3.03
Office building.....	1.25
Total.....	\$ 73.86

The balance of \$527.76 to the credit of the annual appropriation of \$1,000 for the repair of college buildings and the payment of expenses incurred in the management of the land department has been used as follows:

Repair of main building.....	\$ 9.65
Repair of engineering hall.....	16.27
Repair of chemical laboratory building.....	17.40
Repair of office building.....	4.45
Repair of farm buildings.....	70.13
Repair of horticultural building.....	63.40
Repair of veterinary building.....	72.83
Repair of north hall.....	2.08
Repair of south hall.....	3.73
Repair of houses occupied by professors.....	160.83
Repair of library.....	76.00
Expenses of land department.....	16.52
Expenses of financial agency.....	13.97
Total.....	\$ 527.26

The foregoing, accounts for all unexpended balances, of appropriations for buildings, prior to those of the Twenty-third General Assembly.

The Twenty-third General Assembly made the following appropriations to the Iowa Agricultural College:

For building for museum, library, chapel and recitation rooms, and remodeling main building.....	\$ 3,500.00
For repairs on main college building and two boarding halls...	5,000.00
For fire escapes, additional water tank in main building, hose and other appliances for protecting college building against fire.....	1,000.00
For boiler, boiler and engine house, and steam heating apparatus for engineering hall.....	5,000.00
For the enlargement and repair of the chemical and physical laboratory building.....	2,000.00
For the repair and improvement of farm buildings, including the erection of swine houses and corn cribs.....	2,000.00
Total.....	\$ 50,000.00

It was provided in the act making these appropriations that the money thus appropriated should be drawn and paid on the order of the trustees of the College, in such sums and at such times as they might deem necessary; provided, no more than one-third thereof should be drawn during 1890, and the balance in two equal installments, the first on or after May 15, 1891, and the second on or after October 15, 1891.

As, under this provision, only a portion of the appropriation was available during 1890, the Board at its meeting in May of that year decided to postpone work on all other buildings and improvements until 1891 and proceed only with the erection of the building to contain the museum, library, chapel and recitation rooms. The building was located north of and near the main building. From the first, it was deemed by everyone fitting that it should bear the name of Senator Justin S. Morrill, the originator of the "Land Grant" or "Agricultural Colleges." In response to this general feeling it was christened Morrill Hall by the Board of Trustees. The venerable senator gracefully acknowledged the honor thus conferred in the following letter:

STRAFFORD, Vt., May 30, 1890.

E. W. Stanton, Secretary, Ames, Ia.:

DEAR SIR: Your favor of the 25th inst. has been received informing me, by the direction of the Board of Trustees of the Iowa Agricultural College, that you have named your new building for the library, chapel and museum as the "Morrill Hall." Let me assure you that the honor thus conferred upon my name is fully appreciated. The structure, I judge by the representations sent me, must be very handsome and will bring great additional credit to your college.

You also invite me to be present at the exercises which shall mark the dedication of the "Morrill Hall" in June, 1891. It is possible that I may be able to accept your very cordial invitation, as nothing would afford me greater pleasure, but I cannot now give my positive assurance that I will be present at the time named, as I cannot foresee what other affairs may require my attention. Please present to the trustees my grateful acknowledgments for the honor bestowed and for your flattering attentions.

With much respect,

Yours truly,

JUSTIN S. MORRILL.

Josselyn & Taylor, of Cedar Rapids, submitted plans and specifications for the new building, together with a proposition to act as architects. Their proposition provided that they would furnish in triplicate complete plans, large scale diagrams and such full size details as might be necessary to explain all construction, and complete written specifications, and would superintend the construction for a compensation of five per cent of the cost of execution of the work. They agreed to visit the College on an average of twice per week during the progress of the work and oftener, at their own expense, if occasion should occur through any fault of their own; occasional visits to be at a cost to the college of \$5.00 per diem and traveling expenses.

The proposition of Josselyn & Taylor was accepted and the secretary was directed to advertise for bids upon the basis of the plans and specifications furnished by them. These bids were opened at a meeting of the Board in July following. The bids for the erection of the building, including basement story ten feet high—three sides of stone and one of brick—and cases for museum and library, were as follows:

O. J. King, Omaha, Neb.....	\$ 28,404.00
W. M. Hall, Cedar Rapids.....	31,930.00
L. Wallace & Son, Cedar Rapids.....	33,851.88
F. S. Whiting, Des Moines.....	29,215.76
Collins Bros., Rock Island, Ill.....	30,660.00
A. H. Conner & Co., Cedar Rapids.....	39,244.00
J. W. Smith, Cedar Rapids.....	42,597.74

The bid of O. J. King was accepted, and contract made with him upon the basis thereof, Mr. King agreeing to complete the building by June 1, 1891. Mr. King was required to give bond in the sum of \$15,000 for the faithful performance of his contract, and it was also agreed that 15 per cent of the contract price should be reserved by the Board until the final completion and acceptance of the building. The contract was completed to the satisfaction of the architect and the Board, and the building was formally accepted June 24, 1891. Mr. King was allowed the sum of \$56 in addition to his contract, for extra plumbing and anchors, making the total paid him \$28,460.

Bids for the seating of the chapel in the new building were submitted by A. H. Andrews & Co., J. H. Murphy and the American Desk and Seating Co. After careful consideration the bid of A. H. Andrews & Co., to furnish in place, ready for use by June 15, 1891, 400 chairs more or less of style No. 29 of their catalogue for \$1.85 per chair, was accepted. It was agreed in the contract that the chairs should be of the color of antique mahogany, plain seat, veneered back, numbered, and with hat rack and foot rest on every chair and book rack and shawl rack on every alternate chair. Three hundred and ninety-eight chairs, amounting to \$736, were furnished under this contract; funds for payment not being available until October 15, interest to the amount of \$12.29 was allowed on the bill, making a total paid the company of \$748.59. Of this amount it was found necessary to charge \$117.66 to the annual appropriation for the improvement of buildings, leaving a balance of \$631.44 paid from the appropriation for Morrill Hall.

Bids for the electric wiring of the building were submitted as follows:

United Edison Manufacturing Co., Chicago, Ill.....	\$ 452.00
Southwestern Electric Engineering Co., St. Louis, Mo.....	395.00
Brush Electric Light Co., Omaha, Neb.....	357.00

The contract was let to the Southwestern Engineering Co. At its completion they were paid, including \$2.75 for an extra light, the sum of \$397.75.

The architects, Josselyn & Taylor, having prepared plans and specifications for steam heating, bids were advertised for, and opened at the November meeting of the Board. The bids were as follows:

Baker, Smith & Co.....	\$ 3,975.00
E. Best Plumbing and Steam Heating Co.....	3,774.00
Wallace & McNamara.....	3,440.00

The matter having been referred to the building committee, that committee, on the basis of slightly modified plans, awarded the contract to Wallace & McNamara, of Des Moines, at \$3,390, with bond of \$1,700 for its satisfactory completion. The work was done in first-rate shape, and the full amount of the contract paid. The mason work necessary to placing the boiler was not included in the contract with Wallace & McNamara. This was furnished by Henry Matter at a cost to the college of \$255.

The following is a summary of the expenditures on account of the appropriation for Morrill Hall:

Paid O. J. King for erection of building	\$ 28,460.00
Paid A. H. Andrews & Co., on account of chapel seating	631.44
Paid Southwestern Electric Eng. Co., for wiring	337.75
Paid Wallace & McNamara, for steam heating ..	3,390.00
Paid Henry Matter, for mason work in setting boiler	255.00
Paid Queal & Co., lumber, covering steam pipes	9.75
Paid Henry Matter, for extras on building	146.60
Paid Kniffin & Adams, for kalsomining	31.04
Paid Josselyn & Taylor, architects, including two extra trips ..	1,706.34
Paid for advertising for bids	18.90
Paid for express, telegrams, etc.	13.18
Total	\$ 35,000.00

In accordance with arrangements made by the Board of Trustees, Morrill Hall was on June 16, 1891, formally dedicated to the uses for which it was designed by the act of the Twenty-third General Assembly making provision for its erection.

The removal of the museum, library and chapel to Morrill Hall left considerable room in the main building available for other purposes. To utilize this and to put the main building and boarding cottages in thorough repair the last legislature appropriated the sum of \$5,000. The disposition to be made of the vacated rooms was referred by the Board to the faculty for report. Upon their recommendation it was decided to wall off the stairway in the west end of the south wing from the floor of the girls' apartment and to divide the upper museum, the lower museum and the library each into seven rooms for students. The chapel was set aside by the Board as the future dining-room. By this remodeling of the main building, and by the fitting up of six new rooms in the upper story of one of the cottages, accommodations for fifty-four students were secured.

Up to the close of the last fiscal year bills against this appropriation had been audited and paid amounting to \$2,483.57. Since then the following claims have been allowed:

Wallace & McNamara, for addition to and changes in water closet system	\$ 387.28
J. F. McLain, for repairing gutters	482.49
G. H. Welch, for painting exterior of main building	600.00
Sundry persons, for material and labor putting in new floors and making other repairs	490.16
Total	\$ 1,959.93

Making a total expended of \$4,443.50. Other repairs are now in progress. The unexpended balance of \$556.50 will be exhausted before the urgent demand for repairs in the main building and cottages are met.

In the expenditure of the appropriation of \$1,000 for fire escapes and appliances for protecting the college building against fire, the Board adopted the J. T. Cowles improved fire escape No. 4. A contract was made with Mr. Cowles to put in place one fire escape on the north side and one on the south side of the building, at the ends of the main hall, extending from the fifth floor to the basement story for the sum of \$377.15. Under an agreement with the Board, Mr. Cowles also furnished and put in place in the central tower a sixty barrel wood tank; connected therewith a three inch wrought iron pipe with two branch 3/4 inch pipes running to the north and south central stairways and thence down to the basement with a two inch brass hose valve at each floor and 500 feet two inch mill hose in 50 foot lengths with hose complete, for \$515.00.

These two contracts aggregate \$892.15. The Board agreed with Mr. Cowles to themselves furnish the supports for the tank in the central tower, the bills for which have not yet been paid.

The Board employed Josselyn & Taylor to furnish plans and specifications for boiler and engine house, and for the enlargement and repair of the chemical and physical laboratory building, agreeing to pay therefor three per cent of the cost of such improvements. Bids were advertised for and opened at the June meeting, 1891. The bids were as follows:

Boiler and engine house	\$ 4,500.00
Enlargement and repair of chemical and physical laboratory ..	4,800.00
Henry Matter, Marshalltown, Iowa—	
Boiler and engine house	4,700.00
Chemical and physical laboratory improvements	4,800.00
W. B. Christy, Des Moines, Iowa—	
Boiler and engine house	2,849.00
Chemical and physical laboratory improvements	3,400.00

The bid of Mr. Christy was accepted. Since the appropriation could not be drawn until October 15, it was provided in the contract with Mr. Christy that no payments should be made until after the completion of the work. In consideration thereof the contract price of the two buildings was fixed at \$6,320, Mr. Christy furnishing an approved bond in the sum of \$3,500. The work was completed to the satisfaction of the Board and has been accepted by them. The following are the payments on account of the boiler and engine house appropriation:

Paid W. B. Christy for erection of building	\$ 2,920.00
Paid Josselyn & Taylor, architects	87.60
Paid for original sketch of building and laying out foundation ..	7.75
Paid for advertising	8.22
Paid expense of changes in electric light system necessitated by location of building	136.06
Total	\$ 3,159.63

A cement floor for boiler and engine rooms, the necessary shafting, the boiler, and the steam heating for engineering hall, contemplated by the appropriation, will easily absorb the unexpended balance of \$1,841.37.

The appropriation of \$2,000 for the enlargement and repair of the chemical and physical laboratory, proved utterly inadequate for that purpose. The portion of Mr. Christy's contract chargeable to this improvement, amounted to \$3,400 and the architect's fee to \$102. There was paid from the appropriation:

Architect, 3 per cent of \$3,400.....	\$ 102.00
Wm. B. Christy on contract.....	1,898.00
Total.....	\$ 2,000.00

The balance of \$1,502 was ordered charged to the annual appropriation for the repair and improvement of College buildings.

Of the appropriation of \$2,000 for the repair and improvement of the farm buildings, including the erection of swine house and corn cribs, there has been expended on the swine house and in the repair and painting of other farm buildings, the sum of \$1,292.95.

The expenditure by the Board of the appropriation of the last General Assembly has thus been briefly outlined. Itemized receipted bills for all amounts paid out are on file in the treasurer's office. These bills have been carefully examined and approved by a committee of the Board of Trustees.

The Eighteenth General Assembly made to the College an annual appropriation of \$1,000 for needed repairs on College buildings and for necessary expenses incurred in the management of College lands. The Twenty-second General Assembly supplemented this with an annual appropriation of \$1,000 for the repair and improvement of College buildings. Both of these annual appropriations are payable on the first of May of each year. The two appropriations for 1890 and 1891, amounting to \$4,000 have, under the orders of the Board, been expended as follows:

South hall addition.....	\$ 320.46
Horticultural department library cases and houses.....	43.85
Mechanical department forge shop.....	34.97
Bell house.....	73.42
Office building.....	14.35
Electric light house.....	4.85
Farm house.....	33.85
Protection for Gatling gun.....	8.62
Boiler house for Morrill Hall.....	160.00
Seats for Morrill hall.....	117.06
Repairs on Morrill hall.....	128.40
Gas machine for north hall.....	161.46
Improvement of chemical laboratory.....	533.08
Repairs on music room.....	4.00
Repairs on houses occupied by professors.....	104.84
Veterinary barn.....	353.63
Main building and boarding cottages.....	111.28
Experimental barn.....	34.70

Farm buildings.....	502.02
Engineering hall.....	26.54
Land department.....	15.80
Financial agency.....	10.07
Total.....	\$ 2,797.25

The bills on hand, including a balance of \$892 due Mr. Christy on his contract for the repair and improvement of the chemical and physical laboratory, are more than sufficient to exhaust the balance to the credit of these funds, while other urgent repairs are unprovided for. The Board at its annual meeting in November, 1891, directed that bills for general repairs to the amount of \$500 should be charged, at the discretion of the building committee, to the room rent account, with the understanding that repairs on the student rooms to that amount shall be hereafter charged to the State repair fund.

Of the annual appropriation of \$1,500 for experimentation in agriculture and horticulture there was on hand at the beginning of the biennial period an unexpended balance of \$2,416.91. The Board had allowed this balance to accumulate with the intention of erecting an experimental fruit house for the horticultural department. This amount was afterwards reduced by the following:

Expended for agricultural experimentation.....	\$ 941.48
Expended for horticultural experimentation.....	251.71
Total.....	\$1,193.19

Leaving still a balance of \$1,223.72; which being increased by the \$3,000 due for the years 1890 and 1891, gave the Board an available fund of \$4,223.72. The dairy and other agricultural interests having strongly urged the establishment at the College of an experimental creamery in connection with the dairy school, the Board decided to abandon temporarily the idea of building an experimental fruit house and devote all of the funds at its disposal, which could be legally used for the purpose, to the erection of a creamery. It, therefore, in May, 1891, appropriated for the erection of a creamery building the following sums:

From the national experiment fund.....	\$ 500.00
From the State experiment fund.....	2,500.00

At its meeting in November, 1891, the Board added the balance of the State experiment fund \$733.72 to the amount already appropriated for experimental creamery and experimental hog house.

All appropriations for building and repairs have been expended under the direction of the building committee, and all bills have been approved by its chairman, trustee Garner, before payment.

The Board at its annual meeting in November, 1891, decided to ask the Twenty-fourth General Assembly for the following appropriations:

No. 1. General repairs and improvements.....	\$ 12,500.00
(a) Post-office, express office, book room, etc.	
(b) Assembly room for students over present boiler house.	

(c) Repair and improvement of laboratory, including steam heating.	
(d) Remodeling north hall.	
(e) Addition to office building.	
(f) Frescoing Morrill hall.	
(g) Repairing engineering hall.	
(h) Sewerage.	
(i) Other repairs and improvements.	
No. 2. Completion of creamery (including dormitory rooms on second floor) and repair of barns.....	\$ 5,000.00
No. 3. Ladies' hall, including rooms for domestic economy.....	75,000.00
No. 4. Building for agriculture, horticulture, veterinary science and agricultural chemistry.....	5,000.00
No. 5. Central steam heating plant.....	25,000.00
No. 6. Feed barn and horse stables.....	8,000.00
No. 7. Water works.....	15,000.00
No. 8. Addition to veterinary hospital.....	7,000.00
No. 9. Armory.....	15,000.00
No. 10. Two professors' houses.....	5,000.00
Total.....	\$ 217,500.00

Trustees Dunbar, Boardman, Van Houten, Sells, Garner, Yeomans and Wood were appointed a committee to see that the necessity of these appropriations was duly presented to the legislature and its committees, and to have charge of all legislative matters.

THE FINANCIAL AGENCY.

A summary of the financial transactions of the agency will be found in the report of the secretary on page —.

A question having arisen regarding the authority of the agent, under the law, to extend loans falling due, the Secretary of State secured the opinion of Attorney-General Stone. He says, under date of January 18, 1890:

"I am of the opinion that the law under which the funds of the College are authorized to be loaned does not make provision for an extension merely of such loans by the financial agent, and that such agent would not be responsible on his bond for any matter pertaining to such extension without a new loan.

"While this question may be open to some doubt, I am still of the opinion that the foregoing is a correct view of the law, and in any event, in view of such doubt, it is much safer to reloan the money according to the terms of the statute."

The Board in March, 1890, directed its secretary to procure from the Attorney-General an opinion as to the proper fund from which to pay the expense of foreclosing endowment fund mortgages. At the request of the Secretary, the Auditor of State presented the matter to the Attorney-General, who, after examination, endorsed the opinion of Attorney-General Baker, found on page 126 of the Thirteenth biennial report of the College.

Upon the question of the use of the endowment fund to pay delinquent taxes on land constituting the security of endowment fund loans, the Attorney-General rendered to the Treasurer of State the following opinion:

DES MOINES, March 6, 1890.

Hon. V. P. Twombly, Treasurer of State, Des Moines, Iowa:

DEAR SIR—I am in receipt of your communication of the 11th ult., in which you say, "When borrowers of Agricultural College endowment fund upon real estate mortgage are delinquent, it is provided in the contract that when the mortgagor failed to pay all taxes, or public dues, assessed upon said property, the grantee may pay the same at his option, and all sums so expended shall be secured hereby, and shall bear interest at ten per cent per annum from date of payment.

"With this contract, and under chapter 193, laws of the Twentieth General Assembly, especially section seven of said chapter, will I, as Treasurer of State, be authorized to pay out the Agricultural College endowment fund for the purpose above named?"

Answering the foregoing, but without going into detail, I am of the opinion that using the fund for the purpose named is fully authorized. Money so expended is as much invested as if it were a part of the original loan, and hence I think it is competent to so use it.

Truly yours,

JOHN Y. STONE,
Attorney-General.

Upon the recommendation of Trustee Van Houten, the Board in March, 1890, appraised the land in Ringgold county, viz: The south half of the southeast quarter and the southeast quarter of the southwest quarter of section 22, township 69, range 31, obtained under the foreclosure of mortgage loan No. 168, at \$1,575, and ordered it placed in the market for lease as the law in such case directs. Mr. Van Houten reported in May that it had been leased upon the valuation fixed by the Board. It is the only tract of land to which deed has been issued to the College because of the foreclosure of any loan of college funds.

Agent Sigler, having taken exception to the rulings of the chairman of the Board as to the character of the expense items which could legally be paid by the State, the chairman submitted to the Board, at its meeting in July, 1890, the expense bill of the agent which had been presented to him for approval. The Board, after considering the same, directed its secretary to express to the agent the opinion that the items for exchange and office supplies could not legally be paid from the fund allowed by the State for the expenses of the agent while absent from his office, but that such expense items should under his contract be paid by himself.

At the meeting of the Board in May, 1891, Agent Sigler resigned. His resignation was accepted and the chairman and secretary of the Board were directed to make with him a full settlement of his accounts. The committee submitted to the Board the following report:

TO THE BOARD OF TRUSTEES:

Your committee, to make settlement with D. S. Sigler as financial agent of the College, beg leave to submit the following report:

We find that during his term of office Mr. Sigler drew from the State treasury for investment, endowment fund to the amount of \$514,803.98, of this amount he invested in loans from 1 to 424 inclusive, the sum of \$513,903.98. The balance, \$900, he returned to the State treasury. Of the character of the security in these loans, your committee has made no investigation. Attached to this report is a detailed statement of the condition of each loan at the expiration of its agency. This statement shows:

Loans paid (to State treasurer).....	\$ 121,903.98	
Loan 168, sheriff's deed issued.....	1,200.00	
Loan 180, sheriff's certificate of sale issued.....	3,500.00	
Loans 223, 229, 235 and 247 in hands of agent for foreclosure.....	6,800.00	11,000
Other loans outstanding, papers being in the hands of State treasurer.....		381,000
	\$ 513,903.98	

Since the expiration of his term of office, loans 180, 223 and 247 have been paid to the State treasurer, principal and interest. The papers in loan 235 have been returned to your secretary and duly forwarded to the State treasurer.

In the case of loan 229, Mary E. and D. F. Harris, secured by mortgage on southwest quarter of southwest quarter of section 13, township 79, range 24, Polk county, the land was sold under foreclosure, the year for redemption expiring the 20th of next month. We understand that the land will not be redeemed. In case it is, the clerk of the district court of Polk county has been directed to pay the amount received to the State treasurer.

During his term of office there has been placed in the hands of the agent for foreclosure loans amounting to \$76,178.98. Settlement by payment of principal of loan or payment of delinquent interest and return of papers to State treasurer has been made in all cases except those mentioned above. We find in every case where payment of principal or interest has been made to the agent that he has remitted the same to the State treasurer. The interest due has been paid on all loans except those ordered foreclosed.

Your attention is called to the following provision in the contract with agent Sigler:

"He shall receive a salary of \$1,000 per annum and a commission not to exceed 1 per cent upon all loans made during the year. This commission shall be paid said agent only when he finds it necessary to pay commissions to the sub-agents making such loans, and shall be allowed only on vouchers duly verified and filed with the secretary of the Board, showing such commissions paid to such sub-agents; and provided, further, that the salary of \$1,000 and the commissions shall not exceed the sum of \$2,000 in any one year. The agent shall also receive all necessary expenses while away from his office in the discharge of his official duties, provided the amount of such expenses payable from the treasury of the State under the provisions of section six (6) of Chapter 193 of the acts of the Twentieth General Assembly shall not exceed the sum of four hundred (\$400) dollars per annum. All other expenses, including advertising and commissions not already provided for in his contract, shall be borne by said agent. The salary of the agent shall begin on the 14th day of June, A. D. 1889."

During the year from June 14, 1890, to June 14, 1891, agent Sigler made loans amounting to \$108,710.00, on which he agreed to pay one per cent commission to sub-agents amounting to \$1,087.10. This amount with his other salary of \$1,000 would be \$87.10 in excess of the salary which the law allows the Board to pay him in any one year. Even if the agent's contract did not explicitly provide that he should himself pay this excess the statute would not permit us to certify it to the State Auditor for payment. The agent strongly objects to our decision.

Your committee has also declined to approve certain items contained in the agent's bill of expenses. These items cover office expenses and are not in our opinion included in the "necessary expenses while away from his office in the discharge of his official duties." Such decision is in accord with the action of your honorable body, in the case of the agent's expense bill submitted for your consideration at your meeting in July, 1890. The items not allowed amount to \$37.46. The agent believes himself entitled to payment for these expenses.

Respectfully submitted,

C. M. DUNBAR,

E. W. STANTON,

Committee.

The report of the committee was adopted.

The Board at its meeting in May, 1891, elected Mr. W. A. Helsell of Odebolt, Iowa, to fill the vacancy caused by the resignation of Mr. Sigler. His bond was fixed at \$50,000. Under the law the appointment of financial agent and the bond given by him are subject to approval by the State Executive Council. The council approved the bond of Mr. Helsell, subject to the condition that the Board limit the amount of funds to be surrendered into or allowed to be in his hands at any one time to \$25,000, or increase the amount of his bond so it shall be twice the amount of funds allowed to be in his hands, providing he should have more than \$25,000.

The chairman and the secretary of the Board were directed to complete and, on behalf of the Board, sign the contract with agent Helsell.

The following is the contract, as thus completed and signed:

CONTRACT WITH AGENT HELSELL.

"This contract, by and between the Iowa Agricultural College and Farm and W. A. Helsell, witnesseth: That the said Helsell, 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 Helsell) 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 seven 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 and the borrower to have the privilege, after five years from date of maturity of the first interest coupon to make payments of principal in sums of \$100.00, 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 shall observe such instructions, as may be prepared by the Attorney General under the direction of the executive council for the purpose of and pursuant to the fourth paragraph of section 2 of the aforesaid act.

3. He, the said agent, shall not loan less than \$500.00 nor more than \$10,000.00 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 such loans; provided that he at no one time shall have in his possession nor under his control, more than \$10,000.00. He shall exercise care and diligence in making such 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, through his willful or negligent acts or the willful or negligent acts of his sub-agents, the said Helsell shall be fully liable to the 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 hand 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 seven per cent per annum.

6. He shall report to the secretary of said college and farm annually, or so much oftener as he may be required by said Board, his doings since last report. He shall keep complete abstract of each of said loans, and full and complete record and register of all his doings, and keep all letters received and press or type written copies of all letters sent, all of which 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 or their duly appointed agent. The agent shall forward to the secretary of the Board all papers relating to such loans.

7. Once each year, just prior to the time of the tax sales for non-payment of taxes on real estate, he shall examine and ascertain whether all taxes are paid on the real estate covered by the mortgage to secure any of such loans. If the taxes are not paid, he shall pay the same and the penalties thereon out of the funds in his hands and shall forward the receipts therefor through the secretary of the Board of Trustees, to the treasurer of the State.

8. He shall receive a salary of \$1,000 per annum and a commission not to exceed 1 per cent upon all loans made during the year. This commission shall be paid said agent only when he finds it necessary to pay commissions to sub-agents making such loans, and shall be allowed only on vouchers duly verified and filed with the Secretary of the Board, showing such commissions paid to sub-agents; and, provided further, the salary of \$1,000 and the commissions shall not exceed \$2,000 in any one year. The agent shall also receive all necessary expenses payable from the treasury of the state under the provisions of section six (6) of chapter 193, of the acts of the Twentieth General Assembly, while away from his office in the discharge of his official duties, provided the amount of such expenses shall not exceed the sum of four hundred (\$400) dollars per annum, and in addition thereto all taxable

costs in foreclosure proceedings. The said Helsell shall be entitled to the attorney's fees taxadas costs in any foreclosure case where he personally attends to foreclosing the same. All other expenses, including commissions, not already provided for in this contract, shall be borne by said agent. The salary of the agent shall begin on the fifteenth day of June, A. D. 1891.

9. Each loan shall be secured by a mortgage paramount to all liens upon improved farms in the state of Iowa, and shall not exceed 40 per cent. of the cash value of the mortgaged premises, exclusive of buildings.

10. This contract fully recognizes the regulation of the Board that the time of foreclosure of mortgages of delinquent loans shall be decided by a committee consisting of the chairman and secretary of the Board of Trustees and the financial agent, and the said financial agent hereby agrees that said provision for ordering foreclosures shall not in any way lessen his responsibility, but no delay in ordering foreclosure shall exceed six months.

11. The said Helsell shall take charge of the foreclosure of mortgages and collection of bonds from delinquent debtors to the endowment fund, as provided by Chapter 58 of the laws of the Twenty-second General Assembly, and shall promptly remit all amounts thus collected to the treasurer of the State as directed by the provisions of chapter 193 above mentioned; but the agent shall, before commencing foreclosure proceedings, give twenty days' notice by letter deposited in the postoffice, directed to the mortgagor, at his known place of residence.

12. The said Helsell shall at all times be subject to the rules, orders and directions of the said board of trustees.

13. The said Helsell shall hold his office as financial agent during the pleasure of the board of trustees.

In witness whereof, this contract is executed in duplicate by the Iowa State Agricultural College and Farm, by the chairman and secretary of the board of trustees, duly authorized so to act, and by the said W. A. Helsell, in his own proper person, this 15th day of June, A. D. 1891.

C. M. DUNBAR,
Chairman Board of Trustees.
E. W. STANTON,
Secretary Board of Trustees.
W. A. HELSELL,
Agent Board of Trustees.

The financial agent was requested by the Board to suggest to the Attorney-General certain changes in the forms of papers used by the College in making loans. He recommended the following which were in substance embodied in the new papers prepared during September, 1891.

"1. The interest coupons should state in terms that they are payable at the office of the State treasurer, in Des Moines, Iowa.

2. Erase from the mortgage the clause, 'at the option of the grantee without further notice.'

3. Add a clause to the mortgage making the mortgagors liable in terms for the costs of continuing any abstract in case of foreclosure, which costs shall be secured by the mortgage and taxed as other costs.

4. Make the application show who is in the actual possession of the premises to be mortgaged, and in case it is occupied by a tenant or other person not the owner, have such person, on the back of application, state over his signature what his rights are.

5. Provide in the mortgage that the rents and profits of the premises mortgaged are pledged for the payment of the interest of the debt to accrue."

Agent Helsell in his report to the Board in November, 1891, made the following suggestions in regard to needed additions and changes in the laws governing the financial agency.

"1. I think an effort should be made to amend the law so as to compel county treasurers to certify the condition of the taxes on land upon which the College holds loans, free of any fee. I have procured a suitable blank so that we will have a complete record of the condition of the taxes for years in a bunch, but I find difficulty in getting the county treasurers to sign the same without pay, and some not even then. It is absolutely essential to the safety of the fund that we keep a record of this matter.

2. In keeping our money invested I think some arrangement should be made so that the agent could renew outstanding loans simply by taking new coupons and making a renewal agreement without the bother, vexation and expense of taking an application and making new papers.

Many men would retain the money if they had simply to sign new coupons and an extension agreement, who will go elsewhere if they are compelled to get everything from the start. Besides, it makes a great deal of unnecessary trouble and delay, aside from the expense of a new abstract and recording. All loan companies of which I have any knowledge arrange in the way I mention, and the retention of the money is thus simple and no loss incurred. I am told the Attorney-General doubts whether the present law permits such extension.

3. The law as now construed by your chairman in regard to the expense of the agent should be modified. As now construed it simply pays the expenses of the agent while away from home. Suppose some matter requires attention a hundred miles away from the agent's home, and to go there and attend to it personally would necessitate an expense of twenty-five dollars. If he goes, this expense will be paid, but if he sends to some one whom he can trust and incurs five dollars expense this will not be paid, although it is an actual saving to the State. It is not right to ask the agent to pay every expense which is not by a remote effort classified under the head of traveling expenses, when he could attend to the affairs of the College in a much better manner if he were allowed some latitude to employ his judgment.

The report was referred to the legislative committee and agent Helsell was requested to draft a bill embodying these suggestions for presentation to the Board at its next meeting.

The following resolutions were adopted:

"Resolved. 1. That any person having borrowed money of the College at seven per cent, and wishing to borrow a larger sum from the College upon the same security be allowed to make payment of the first loan for that purpose, provided that the agent of the College having charge of such loan shall decide that the increased amount can be loaned upon said security under the law and with safety to the College.

2. That the chairman and the secretary of the Board are authorized to sign all orders upon the State treasurer for the papers connected with any loan to be foreclosed."

LAND AND LOAN DEPARTMENT.

This department is under the charge of Herman Knapp, working under a contract entered into in February, 1887, and found on page one hundred and fifty-nine of the twelfth biennial report of the Board of Trustees. The law governing the department will be found in chapter 72, acts of the Twentieth General Assembly. The financial transactions of the agency during the last biennial period, are reported by agent Knapp on page —. Yearly settlements have been made with the agent by the secretary of the Board to whom he has rendered a satisfactory account of all lands and funds under his charge.

The following leases have been forfeited during the biennial period for non-payment of rental.

No. 776, northeast quarter section 24, township 85, range 31.

No. 1900, northeast quarter of section 26, township 95, range 27.

No. 2079, northeast quarter and the south half of the southeast quarter section 21, township 99, range 48.

No. 2080, southeast quarter of section 28, township 99, range 48.

New leases have been issued during the biennial period as follows:

Lands belonging to the congressional grant—

Leases covering 2,170.27 acres, appraised at. \$ 15,054.78

Land purchased with interest fund—

Leases covering 320 acres, appraised at. 3,040.00

The following have been renewed:

Land belonging to the congressional grant—

Leases covering 12,759.98 acres, appraised at. 44,697.82

Land purchased with interest fund—

Leases covering 1,573.17 acres, appraised at. 4,439.51

The new leases run ten years; renewed leases, five or ten. Both bear interest at eight per cent., payable in advance.

The following table includes all lands not under lease at the beginning of the biennial period together with the tracts forfeited during that time and shows in detail the changes in the valuation of the same, with the consequent increase, from this source, of the endowment fund of the College.

	Section.	Township.	Range.	No. of A. res.	No. of old Lease.	No. of new Lease.	Valuation Nov. 1st, 1889.	Valuation Nov. 1st, 1891.	Increase in Valuation
Northeast quarter	12	99	28	180.00	495	2092	\$ 360.00	\$ 1,440.00	\$ 1,080.00
Northeast quarter	34	98	29	180.00	465	2190	360.00	1,000.00	640.00
Northwest quarter	34	98	29	180.00	402	2091	360.00	1,440.00	1,080.00
Southwest quarter	3	99	30	160.00	1360	2083	432.00	2,000.00	1,568.00
Northeast quarter	13	95	27	160.00	1805	2094	800.00	1,280.00	480.00
Northeast quarter	33	95	27	160.00	1807	2088	640.00	800.00	160.00
Southwest quarter	31	95	27	166.84	1913	2084	509.52	834.20	323.68
Southwest quarter	31	95	27	163.43	1914	2085	653.72	980.58	326.86
Southwest quarter	30	95	27	160.00	1915	2086	800.00	960.00	160.00
Southeast quarter	25	95	28	160.00	1916	2087	800.00	800.00	0.00
Northwest quarter	26	95	28	160.00	1917	2087	800.00	800.00	0.00
North half southwest quarter	15	93	27	80.00	1985	2089	320.00	400.00	80.00
Northeast quarter	30	96	33	160.00	2020	2093	880.00	1,200.00	320.00
Southeast quarter	26	93	30	160.00	115	172	1,440.00	1,440.00	0.00
Southwest quarter	26	93	30	160.00	166	173	1,600.00	1,600.00	0.00
Southwest quarter	26	93	30	149.67	449.01	449.01	0.00
Northwest quarter	20	97	31	160.00	776	2082	200.00	480.00	280.00
Northeast quarter	24	85	31	160.00	1900	2095	560.00	1,440.00	880.00
Northeast quarter	26	95	27	160.00	2179	...	360.00	360.00	0.00
Ne qr and s hf se qr	21	99	48	120.00	2080	...	480.00	480.00	0.00
Southeast quarter	28	99	48	160.00	2080	...	480.00	480.00	0.00
Total							\$11,995.25	\$19,383.79	\$7,388.54

The following are the only tracts of land not under lease:

Northwest quarter section 30, township 97, range 28.....	149.67 acres.
Northeast quarter and south half of southeast quarter section 21, township 99, range 48.....	120 acres.
Southeast quarter section 28, township 99, range 48.....	160 acres.
Total	429.67 acres.

The title to the first of these tracts is in conflict with a swamp land claim, and no lease has therefore ever been issued upon the land. The other two tracts will soon be reappraised and placed upon the market for lease. Trustee Secor was appointed a standing committee on the reappraisal of forfeited lands. It was ordered by the Board that the appraised value fixed by him should be considered the minimum, and in case of two or more applicants for the same tract the land agent was authorized to lease at a higher rate; other things being equal, to the applicant offering to pay the highest annual rent.

Numerous applications coming in for duplicate leases in cases where the originals had been lost or destroyed, the Board directed the land agent to issue copies of such lease with an endorsement across the face that said copy was subject to existing equities; *provided*, that the lessee file with the agent an approved bond in double the amount of the appraised value of the land described in said lease and furnish him with satisfactory proof that he was the party entitled to such copy.

Mr. R. W. Atwood, whose claim against the college in connection with lease 776 is fully explained in the Thirteenth Biennial Report, pages 132-4, appeared before the Board in November, 1890, and urged that relief be granted him. The committee appointed to inquire into his claim submitted the following report, which was adopted by the Board:

"We have examined the claim of Mr. Atwood and find:

1. That the claim is not without merit to some extent, as we believe, but the relief asked is wholly without and beyond the jurisdiction of the Board of Trustees of the Iowa Agricultural College.

2. That in our judgment there is no fund from which said claim can be lawfully paid. We therefore recommend that said claim be not allowed by the Board; we also recommend that the secretary of the board, the treasurer of the college and the land agent be instructed to furnish Mr. Atwood certified copies of all records pertaining to said claim, if he shall so desire, for the purpose of enabling him to present the claim before the legislature."

The Board directed its chairman and secretary to make quit claim deed from the College to the State of Iowa of all lands included in the list purchased in 1869, by James C. Cusey, with accumulated interest fund. The following form of deed, which explains itself, was adopted:

Form of deed:

WHEREAS, in 1869, James C. Cusey, member of a committee to invest accumulated interest fund belonging to the Iowa Agricultural College purchased certain land script which he located in his own name, and

WHEREAS, said James C. Cusey executed to said Agricultural College deeds for certain lands located in different counties of the State, instead of to the State of Iowa as trustee, and

WHEREAS, complaints are being made to the Board of Trustees by the present owners of said lands, who have derived their title from the State of Iowa, that the conveyance of said agent Cusey to said Agricultural College is a cloud on the title of said real estate, and

WHEREAS, the acts of congress and the acts of the State legislature make the State of Iowa the trustee for the use and benefit of the College of all lands donated to said College,

Now, therefore, for the purpose of removing the alleged cloud from the title of said lands, the Iowa Agricultural College hereby quit claims to the State of Iowa, in trust, the following described real estate located in, etc.

Quit claim deeds have been issued in accordance with the directions of the Board.

THE INCOME OF THE COLLEGE AND ITS EXPENDITURE.

The income of the College from national sources, (exclusive of the experiment station fund), available for the support and maintenance of the institution during the biennial period, has been as follows:

Cash on hand at the beginning of the biennial term.....	\$ 9,662.14	
Sale notes belonging to interest fund paid.....	100.00	\$ 9,762.14
Income from endowment during fiscal year 1890.....		44,774.19
Income from endowment during fiscal year 1891.....	49,371.22	
Income from Morrill support fund during 1891....	48,000.00	97,371.22
Total available funds.....		\$ 151,907.55
This amount is accounted for as follows:		
Expenditures during fiscal year 1890 as per exhibit "A".....		\$ 39,652.15
Expenditures during fiscal year 1891 as per exhibit "B".....		65,729.65
Transferred to endowment fund.....		23,000.00
Cash balance on hand		23,525.75
Total		\$ 151,907.55

The board of audit was authorized to divide the expenditures for the year 1891 between the Morrill support fund and the interest fund in such manner as would in their judgment comply with the law and best subserve the interests of the College. The expenditures were divided by the auditing board between the two funds as follows:

Charged to Morrill fund.....	\$ 31,154.67
Charged to interest fund	34,574.98
	\$ 65,729.65

The list of items charged to the Morrill fund was examined by the finance committee, who reported that they found the same to be in accordance with the national law establishing the fund, and upon their recommendation the list was approved by the Board of Trustees.

All expenditures have been upon bills, signed correct by the head of the department making the purchase or employing the labor, and afterwards audited by the Board of Audit. All disbursements have been made by the treasurer, Herman Knapp. Annual settlements have been made with this officer by the Board of Trustees and his accounts found correct.

The secretary estimates the available funds for the next fiscal year, including the balance on hand, at \$68,000. The Board appropriated the following sums to meet the expenses of the different branches of the college work during the fiscal year, 1892.

FROM INTEREST AND MORRILL SUPPORT FUNDS.

For salaries	\$ 33,050.00	
For department of agriculture—		
Farm help.....	\$ 600.00	
Bridge connecting north and south farms....	400.00	
Other permanent improvements.....	300.00	
Purchase of hogs and sheep.....	1,700.00	
Creamery apparatus, balance of former appropriation reappropriated	4,964.95	
Purchase from Ames Creamery Company of milk routes and good will of business.....	500.00	
Credit for the dairy	1,000.00	
Expert instruction in butter and cheese making.....	1,000.00	
Class illustration.....	125.00	
		10,589.95
For department of mechanical engineering—		
Assistant, balance due Mr. Meeker.....	\$ 175.58	
Machinists' pay	750.00	
Carpenter and helper.....	600.00	
Blacksmith.....	375.00	
Janitor.....	250.00	
Instruction in mechanical drawing.....	150.00	
Man helping fire.....	100.00	
Extra labor.....	95.00	
Freight and express.....	100.00	
Hardware and sundries.....	50.00	
Fuel	400.00	
Water bill.....	25.00	
Office stationery, etc.....	50.00	
Drawing room equipment.....	100.00	
Wood shop.....	100.00	
Forge shop	100.00	
Machine shop	100.00	
Foundry	100.00	
New boiler room and fittings	200.00	
Laboratory fittings.....	300.00	
		4,120.58

Any sums not expended as per itemized estimates may be expended for the other necessary uses of the department, provided permission be first granted by the board of audit.

For horticultural department—

Experimentation and current expenses of the department.....	\$ 1,500.00	
Assistant, part of salary payable from interest fund.....	400.00	\$ 1,900.00

For veterinary department—

House surgeon, the conduct of the work in the laboratory in pathology to be added to his duties.....	\$ 400.00	
Current expenses and apparatus.....	600.00	1,000.00

For department of civil engineering—

Assistant.....	\$ 300.00	
Instruments, testing and current expenses...	800.00	1,100.00

For department of chemistry—

Two assistants	\$ 600.00	
Current expenses and apparatus.....	700.00	1,300.00
		350.00

For department of domestic economy.....

For department of military tactics and physical culture.....	300.00	
For department of mathematics assistant..	700.00	

For department of physics and electrical engineering—

Assistant.....	\$ 300.00	
Additional apparatus.....	1,000.00	
Janitor.....	125.00	1,425.00

For department of botany—

Two gas stoves.....	\$ 14.00	
Janitor, eight months for north hall.....	200.00	
Assistant.....	250.00	
Mounting specimens.....	135.00	
Three new cases.....	115.00	
New apparatus and collection.....	350.00	
Botanical garden.....	100.00	1,164.00

Department of entomology, zoology and geology—

Assistant.....	\$ 800.00	
Current expenses.....	300.00	
Casing.....	200.00	
Specimens.....	300.00	
Apparatus	200.00	
Preliminary world's fair exhibit.....	200.00	2,000.00

For department of agricultural chemistry chairs and apparatus.....

100.00

For Library—

Assistant.....	\$ 75.00
Current expenses and general purchases as per division made by the faculty.....	1,925.00
For books purchased of Prof. Hainer.....	140.00
Typewriting shelf list.....	60.00
Completing periodicals.....	300.00
Exchanges.....	25.00
Desk chair, embossing stamp, steps, and tables for catalogues.....	23.00
Paper for class exercises.....	8.00

For Sabbath services..... \$ 2,556.00
 For Department of Music—

Miss Chambers, for instruction of freshman class in sight singing and for taking charge of music at public exercises.....	\$ 400.00
Organist and pianist for public services.....	100.00
Programmes for public entertainments.....	25.00

For public grounds..... \$ 525.00
 For public rooms—

Heating, lighting and cleaning public rooms in main building.....	\$ 200.00
Heating, lighting and cleaning Morrill Hall..	600.00
Heating, lighting and cleaning office building	250.00
Heating, lighting and cleaning north hall....	175.00
Heating chemical and physical laboratory....	200.00
Additional blinds for Morrill hall and shelving and other needed furniture in college library.....	100.00

Contingent expense—

Stenographer.....	\$ 500.00
Catalogues, printing, stationery and advertising.....	1,766.00
Telephone service.....	60.00
Ring bell for recitations.....	75.00
Typewriter for offices of secretary and treasurer.....	135.00
Mail service.....	200.00
Proctors.....	325.00
Assistant to preceptress.....	75.00
Address before the college and trustees this year.....	40.00
Address next year.....	50.00
Clerk hire, secretary's office.....	100.00
Emergency fund.....	150.00
Fund for attending teachers' institutes, farmers' institutes and associations (intended for the President and professors authorized by the President to attend such meetings).....	150.00

1,525.00

<i>The Aurora</i> for advertising.....	50.00
<i>The Student</i> for advertising.....	50.00
Card catalogue for recorder for keeping register of standings and information concerning the alumni, including printing and postage	125.00
Clerk for treasurers' office.....	50.00
Typewriter and equipment for President.....	75.00
Department of English and Latin for doing mimeograph work.....	25.00
C. L. Dahlberg, services of stenographer.....	31.44
Total.....	\$ 4,032.44
Total.....	\$ 69,437.97

The Board directed that the foregoing appropriations should be divided between the Morrill support fund and the interest fund as follows:

From Morrill support fund—

Salaries as per salary list.....	\$ 21,050.00
Assistants in mathematics.....	700.00
Expert instruction in butter and cheese making	1,000.00
Assistant in entomology and zoology.....	800.00
Total.....	23,550.00

From interest fund—

Salaries as per salary list.....	12,000.00
Expenses of departments.....	33,327.97
Total.....	45,327.97

Total..... \$ 69,437.97

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. The aggregate expenditures always fall short of the amount appropriated.

OFFICERS OF INSTRUCTION.

The following is in brief, the action of the Board during the biennial period as it relates to the officers of instruction:

The employment by the committee on vacancies of Miss Margaret Doolittle as instructor in English and Latin, was approved at the meeting in March, 1890. In August of that year Miss Cora Marsland, librarian and professor of elocution, asked to be released. Her request being granted by the president, the committee on vacancies appointed Miss Fanny Thomas, a graduate of the Monroe School of Oratory of Boston, to fill the vacancy. The Board, at its November meeting, elected Miss Thomas librarian and instructor in library work and elocution, fixing her salary at \$1,000 per annum. Prof. Pammel was, at this meeting, elected full professor of botany at an annual salary of \$1,600 and the use of a house. The salary of Mr. Weihe, assistant in the mechanical department was increased from \$600 to \$1,000 per annum. Mr. Weichardt's salary was increased to \$1,200, and he was given the title of assistant professor of mechanical engineering.

The recommendation of Dr. Stalker, that a well trained veterinarian be added to the corps of instructors in the department of veterinary science, was approved with the express understanding that the new instructor should devote a portion of his time to the work of the experiment station, and that his salary should be divided equally between the College and the station. At a subsequent meeting Dr. W. B. Niles, a graduate of the College, and at that time professor of veterinary science in the University of South Carolina, was elected as such instructor under the title of assistant professor of veterinary science at a salary of \$1,300 per annum, his services and salary to begin March 1, 1891. His salary was afterward increased to \$1,500 with \$200 additional in lieu of a house, said increase to begin with the second half of the school year. It was provided that \$500 of his salary should be charged to the experiment station fund and that his services should be required during the entire year.

At the annual meeting in November, 1890, President Chamberlain, Prof. L. P. Smith, head of the department of agriculture, Prof. C. F. Mount, head of the department of civil engineering, and Miss Eva F. Pike, instructor in vocal and instrumental music presented their resignations. The resignations were accepted and these officers excused from further service. Prof. Stanton was chosen to act as president until a permanent president could be secured. The agricultural department was placed in the charge of Prof. Knapp and committees were appointed to make necessary investigation and recommend suitable persons for the vacant chairs. At a special meeting of the Board, held in Des Moines in January, 1891, Prof. W. M. Beardshear, a graduate of Otterbein University, of Ohio, for many years president of the Western College, at Toledo, in this State, and at the time superintendent of the public schools of West Des Moines was elected president of the College. It was arranged that he should enter upon his duties February 17, and that his salary, which was fixed at \$3,500 per annum should begin at that date. Hon. James Wilson of Tama county was chosen professor of agriculture and director of the experiment station at a salary of \$2,200 per annum. He entered upon his duties and his salary began January 30th. In May following his salary was increased to \$2,500 and the use of a house, he putting the same in thorough repair at his own expense. The increased salary which went into effect July 1, was divided equally between the Morrill support and the experiment station funds. The election of Prof. Beardshear as president and Mr. Wilson as professor of agriculture was strongly urged upon the Board by the Farmers' Alliance, the Stock Breeders' Association and other leading organizations representing the agricultural interests of the State.

Mr. D. A. Kent was elected assistant professor of agriculture and Mr. C. F. Curtiss station assistant, each at an annual salary of \$1500 with \$200 additional in lieu of house rent. Mr. Kent is a graduate of the College in the class of 1873, Mr. Curtiss in the class of 1887; both have had in addition to their theoretical training a large and successful experience in practical farming. Mr. Kent entered upon his duties January 30th and Mr. Curtiss January 20th, their salaries beginning with these dates. Professor Wilson reported at the May meeting that it had been found wise to reinforce the teaching force in the agricultural department by adding Professor Curtis to it, which compensated the farm department for the attention given by Professor Kent to the station work and strengthened both departments. This arrangement of work was approved by the Board.

The chair of agricultural chemistry was created at the meeting in January 1891 and was filled by the election of G. E. Patricks, with the understanding that he should perform its duties in addition to those of station chemist. His salary was fixed at \$2,000, payable until July 1, 1891, from the experiment station fund, and to be thereafter divided equally between that and the Morrill support fund.

The committee appointed to conduct correspondence and make recommendation regarding the professor of civil engineering reported in favor of Mr. D. W. Church, of Chicago. His testimonials showed that he graduated at the Rensselaer Polytechnic Institute of Troy, N. Y., in the class of 1877, that he was for six years assistant engineer to the commission having charge of the improvement of the Missouri and Mississippi rivers, and that he had had several years experience in railroad and bridge engineering. Mr Church was placed at the head of the department for the school year at a salary of \$1,600 and the use of a house. At the end of the year he was formally elected professor of civil engineering at the same salary. The proposition was made him that in case he accepted the dwelling house connected with the experiment station, his salary, in addition to the use of said house, should be \$1,700 per annum.

The resignation of Miss Lillie M. Gunn, preceptress and professor of French and German was tendered to the Board in January, 1891. The resignation was accepted, and President-elect Beardshear and Acting President Stanton were appointed a committee to fill the vacancy. They appointed Miss Stephanie Marx, a graduate of Cornell University, class 1888, and teacher in the celebrated school for girls at Ogontz, Pennsylvania, to the position, at a salary of \$1,200, beginning March 1st.

The same committee was instructed to arrange for instruction in vocal and instrumental music. Miss Marie Chambers, of Coe College, Cedar Rapids, was selected as director of music and vocalist, and upon her recommendation Mr. George L. Backus was chosen instructor of piano and organ. Miss Jennie Gratz was afterwards added to the musical staff, as instructor of violin and theory. Miss Chambers was allowed \$400 per year for conducting music at public exercises, and giving instruction in sight singing to the freshman class. She, and her associates in the department, were allowed the tuition collected from students for instruction in music.

Mr. A. J. Weichardt, assistant professor of mechanical engineering, and Mr. F. A. Weihe, assistant in the same department resigned at the close of the spring term of 1891. Their resignations were accepted and salaries ordered paid for the half year. The president of the College, the secretary of the board and the professor of mechanical engineering were appointed a committee to arrange for carrying on their work during the remainder of the school year. G. W. Bissell, Cornell University, 1888, was selected as assistant professor and W. H. Meeker, Cornell, 1891, as department assistant. The salary of the former was fixed at \$1,400 and the latter at \$800 per annum.

At its meeting in May, 1891, the Board directed that commencing with July 1st, \$300 of the salaries of each of the following professors, viz., Budd, Osborn and Pammel be charged to the experiment station fund. The Board at this meeting ordered that English be raised to a full department in

charge of a professor. In July, the recommendation of President Beardshear that Miss Doolittle and Miss Thomas be given full place in the meetings of the faculty was adopted.

At the annual meeting in November, 1891, Prof. J. C. Hainer presented his resignation. President Beardshear thus refers to it in his annual report:

"I herewith submit the resignation of Prof. Hainer. He has concluded to change his vocation. His resignation takes from the teaching force a decidedly able man. The spirit and catholicity of his letter are most commendable. These voluntary changes of life are the outcome usually of deep conviction and should command high regard. I recommend that his resignation be accepted, and that the most hearty good will and cheer of the authorities go with the Professor in his future work in life."

The following resolution, introduced by Trustee McElroy, was adopted:

WHEREAS, Prof. J. C. Hainer has determined upon a change of vocation, and to that end has placed his resignation in the hands of the Board, therefore be it

Resolved, That realizing his ability as an instructor, his efficient services to the College and his intrinsic worth as a man, we very reluctantly accept his resignation.

President Beardshear was directed to secure the strongest man available, to fill the vacancy. Upon his recommendation Prof. W. S. Franklin was elected to the position, at a salary of \$1,800, and \$200 additional, in lieu of the rent of a house, his salary to begin March 1, 1892, and his services to be at the disposal of the Board during the entire year. Prof. Franklin is a graduate of the State University, of Kansas. He took post graduate work in physics and electricity in the Cornell University, Ithaca, N. Y., and spent considerable time in the best physical laboratories in Germany. He taught physics a couple of years in the Kansas State University, and is now in a fellowship of physics in the Jefferson school of physics of Harvard University.

N. E. Hansen, of the class of 1887, was elected assistant in horticulture at a salary of \$800 per annum. It was ordered that his salary should commence when he entered upon his duties, that it should be divided equally between the experiment station and interest fund, and that his services should be required during the entire year.

The sum of \$1,000 was appropriated from the Morrill support fund to meet the expenses of instruction in butter and cheese making, \$720 to be used in payment of the annual salary of Mr. William Leighton, and the balance in securing expert instruction in cheese making. The Board directed that Mr. Leighton's salary commence with his services and cover time actually employed.

It being deemed in every way desirable that the president should reside near the College, and that the house owned by Mrs. Welch, being the one most desirable for such use, the Board made to her the proposition that if she would agree to reserve said residence property for occupancy by College officers, that the trustees would agree in the employment of president or some other officer of the College to make such arrangements as would insure the lease during the next five years of the said property at a yearly rental of \$400, she to keep the property in repair, or \$350, the occupant to make all needed repairs.

Professor Budd desiring to remove to Ames, the Board directed that the sum of \$200 be added to his salary, in lieu of the use of the house occupied by him on the College grounds, said additional salary to begin March 1, 1892. The house thus vacated was assigned to Prof. Kent at an annual rental of \$200, subject to the provision that the office connected therewith should be reserved for the use of Prof. Budd and that the president should have the prior right of occupancy in case he was unable to make arrangements with Mrs. Welch to remain in the house now occupied by him.

It was ordered by the Board that only such officers of instruction as are full professors shall be considered active members in the deliberations of the faculty, except in case other instructors be given a place in said deliberations by a vote of the faculty itself, determined on the importance and relation of the place held by them.

A list of the officers of instruction for 1892, together with their salaries and the funds from which they are paid, will be found further on in this report under the head of "College and Station Salaries."

OFFICERS OF THE BOARD.

Hon. C. M. Dunbar was elected chairman of the Board at the meeting in May, 1889, and has served in that position since that time.

E. W. Stanton resigned as secretary of the Board in November, 1890, in order to perform the duties of acting-president.

Prof. J. C. Hainer was elected secretary to serve at the will of the Board. Upon the election of President Beardshear, Prof. Hainer resigned, to take effect February 17, 1891, and Prof. Stanton was re-elected secretary at a salary of \$600 per annum.

Herman Knapp has served as College treasurer and recorder during the biennial period at a salary of \$700, and as station treasurer at a salary of \$250 per annum. He was re-elected to these positions for 1892.

James Rush Lincoln receives as steward a salary of \$1,000 and board during the College year. His salary is paid from the receipts of the boarding department.

COLLEGE AND STATION SALARIES FOR 1892.

The following are the salaries for 1892 of the officers of instruction, the officers of the Board and the station staff, charged by order of the Board, to the general salary accounts of the College and station and divided between the national support and experiment station fund as given below:

NAME AND DEPARTMENT.	FROM WHICH FUND PAID.			Total Salary.
	Interest fund.	Morrill fund.	Station fund.	
W. M. BEARDSHEAR, A. M., LL. D. President.	\$ 3,500			\$ 3,500
Psychology and Ethics.				
M. STALKER, M. Sc., V. S. Veterinary Science.		\$ 1,600		1,600
Station Veterinarian.				
J. L. BUDD, M. H. Horticulture.		1,700	300	2,000
Station Horticulturist.				
E. W. STANTON, M. Sc. Mathematics and Economic Science. \$1,600.	600	1,600		2,200
Secretary Board of Trustees. \$600.				
D. S. FAIRCHILD, M. D. Pathology, Histology, Therapeutics and Comparative Anatomy.	1,000			1,000
COL. JAMES RUSH LINCOLN Military Science and Tactics.	600			600
ALFRED A. BENNETT, M. Sc. Chemistry.		1,600		1,600
HERBERT OSBORN, M. Sc. Zoology and Entomology.		1,300	300	1,600
Station Entomologist.				
W. S. FRANKLIN Physics and Electrical Engineering.		2,000		2,000
A. C. BARROWS, A. M., D. D. English Literature and History.	1,800			1,800
C. W. SCRIBNER, A. B., M. E. Mechanical Engineering.		1,800		1,800
L. H. PAMMEL, B. Agr. Botany.		1,300	300	1,600
Station Botanist.				
MRS. ELIZA OWENS Domestic Economy.	800			800
JAMES WILSON Agriculture.		1,250	1,250	2,500
Director of Experiment Station.				
G. E. PATRICK, M. Sc. Agricultural Chemistry.		1,000	1,000	2,000
Station Chemist.				
D. W. CHURCH, C. E. Civil Engineering.		1,800		1,800
MISS STEPHANIE MARX, B. L. Preceptress.	1,200			1,200
French and German.				
D. A. KENT, B. Sc. Agriculture.		1,500		1,500
C. F. CURTISS, B. S. A. Station Assistant.			1,700	1,700
W. B. NILES, D. V. M. Veterinary Science.		1,200	500	1,700
G. W. BISSELL, M. E. Mechanical Engineering.		1,400		1,400
MISS MARGARET DOOLITTLE, A. B. English, Latin and Rhetoric.	800			800
MISS FANNIE THOMAS, A. M. Librarian.	1,000			1,000
Elocution.				
HERMAN KNAPP, B. S. A. College Treasurer and Recorder. \$700.	700		250	950
Station Treasurer. \$250.				
Totals.....	\$ 12,000	\$ 21,050	\$ 5,600	\$ 38,650

The following are included in the appropriations to the departments, and are paid from the funds specified:

NAME AND DEPARTMENT.	FROM WHICH FUND PAID.			Total salary.
	Interest fund.	Morrill fund.	Station fund.	
WILLIAM LEIGHTON Instruction in Dairy.		\$ 720		\$ 720
INSTRUCTION IN CHEESE MAKING.....		280		280
ASSISTANTS IN MECHANICAL ENGINEERING—				
Machinist.....	750			750
Carpenter and helper.....	600			600
Blacksmith.....	375			375
JOSEPH CHAMBERLAIN, B. Sc. Chemistry.	300			300
LEO THURLIMANN, B. Sc. Chemistry.	300			300
MISS MINNIE ROBERTS..... Mathematics.		600		600
S. W. BEYER, B. Sc. Geology and Zoology.		800		800
MARY A. NICHOLS..... Botany.	250			250
WM. A. CLANAHAN..... House Surgeon.	400			400
N. E. HANSEN, B. Sc. Horticulture.	400		400	800
ASSISTANT IN CIVIL ENGINEERING.....	300			300
ASSISTANT IN PHYSICS.....	300			300
MISS MARIE CHAMBERS..... For instruction in sight singing and music at public exercises.	400			400
(Miss Chambers also receives tuition collected from music pupils.)				
GEORGE L. BACKUS..... Organist and pianist at public exercises.	100			100
Totals.....	\$ 4,375	\$ 2,400	\$ 400	\$ 7,175

Houses on the College grounds are occupied by Professors Stanton, Lincoln, Bennett, Osborn, Pammel, Wilson, and Kent. These professors are required, as a condition of such occupancy, to keep the inside of said houses in first class repair. Mrs. Owens is granted the use of that portion of south hall not occupied by the department of domestic economy. The rooms in the main College building, vacated by Prof. Hainer, have been assigned to Prof. Patrick at an annual rental of \$48. Rooms in this building have been permanently assigned to the preceptress, the librarian, the head of the department of English, Latin and rhetoric and the instructors in music. These rooms are fitted up and furnished by the steward and an annual rental charged of \$12. No furniture is purchased with College funds for any room occupied by a professor or teacher.

EXPERIMENT STATION.

The national law establishing and governing experiment stations, can be found in full on page one hundred and seventy-eight of the twelfth biennial report of the College. This law provides that an amount not exceeding five per centum of the annual appropriation of \$15,000 can be expended in the erection, enlargement, or repair of buildings necessary for carrying on the work of the station. The board of trustees decided in 1890 to erect,

with this fund, a foreman's cottage. A balance belonging to the building fund of the year ending June 30, 1890, was invested in material; practically all of the building fund of the year following was devoted to the purpose, while the east porch was built out of the appropriation for the present year. A sufficient sum to erect the cottage was thus secured. Plans and specifications were furnished by Josselyn & Taylor and the building constructed by M. H. Willits, under the supervision of the building committee. It cost \$1,075.

At a meeting of the Board in July, 1890, a committee was appointed to recommend a plan fully determining the relation of the farm and the experiment station. At the November meeting the following resolution was adopted:

Resolved by the Board of Trustees, That the experiment station be reorganized upon the following general plan:

1. That the station be divided into sections as follows: agriculture, in charge of the professor of agriculture; horticulture, in charge of the professor of horticulture; veterinary science in charge of the professor of veterinary science; botany, in charge of the professor of botany; entomology and chemistry to be in charge of such professors as may be hereafter determined by the board of trustees.

2. That the president of the College, director of the station, and the professors in charge of the various sections shall constitute a board of directors for the management of the station subject to such rules and regulations as shall be adopted by the board of trustees as to salary and other matters, and that the head of each section shall have general supervision and control of the experiment work in their various lines, *provided* that nothing in this resolution shall be construed as discharging any of the professors, instructors, or assistants now in the service of the College or station, and *provided* further, that the committee to report a definite plan of organization be continued, and instructed to report a definite and detailed plan of organization at the adjourned meeting of the Board, in practical accordance with the suggestions outlined above.

At the special meeting of the Board in January, 1891, the office of the director of the experiment station was declared vacant. The directorship of the station was united to the professorship of agriculture, and Hon. James Wilson was elected professor of agriculture and director of the station. His salary for the time being was fixed at \$2,200.

The following plan for the reorganization of the station was adopted:

1. The chairman of the board of trustees at the May meeting in each even numbered year shall appoint three members of the Board, who shall constitute a standing committee on experiment station. The duties of this committee shall be advisory, and the committee shall stand in the same relation to the experiment station that other standing committees of the Board sustain to the various departments of the College.

2. The president of the College, the director of the station, the heads of the departments of agriculture, horticulture, agricultural chemistry, entomology, botany, and veterinary science shall constitute a board of direction who shall hold semi-annual meetings one week previous to the regular May and November meeting of the board of trustees of the College.

3. It shall be the duty of the board of direction at their November meeting to decide on the lines of experimentation, the amount of funds to carry on the same, and to recommend a proper division of the funds among the various departments of the station according to the work they are expected to do. At the May meeting of the Board any necessary additions, alterations or changes in the general line of work laid out for the year can be

made and a readjustment of the funds, in case it seems necessary. It shall also be the duty of the board of direction to determine upon and recommend to the board of trustees the necessary amount of scientific help needed to perform the experimental work in the different sections of the station.

4. The plans of experimentation devised by the heads of departments and their working staff shall be prepared by them and submitted to the board of direction at its November meeting and changed, adopted or rejected.

5. The conclusions of the board of direction shall be submitted to the board of trustees, and if approved, shall constitute the general plan of experimentation to be followed by the station.

6. It shall be the duty of the board of trustees to make sufficient appropriation to the different sections to meet the expense of the same.

7. The board of direction shall hold monthly meetings for the purpose of reporting progress and results in experiment work in the various sections.

8. The working staff of the station shall consist of the director of the station and the professors of the heads of the departments of agriculture, agricultural chemistry, horticulture, entomology, botany and veterinary science and their assistants.

9. Competent assistants shall be employed in such sections of the station as require them and when employed shall be under the control and direction of the head of the section to which they are respectively assigned. It shall be their duty to carry on the work assigned to them in said section and they shall receive due credit in the bulletin for the same.

10. It shall be the duty of the board of direction to recommend to the board of trustees such assistants as shall be necessary in the various sections. If such recommendations are approved by the board of trustees, the president of the College, the director of the station and head of the department for which the application is made shall constitute a committee to renominate candidates to the board of trustees.

11. When it becomes necessary for any section of the station to have additional scientific assistants and the work of the station may be delayed by waiting for the regular meeting of the board of trustees, the same may be furnished by the committee composed of the president of the College, the director of the station and the head of the section for which additional help is asked. Their selection to be submitted to the board of trustees at its next meeting.

12. The board of direction shall employ and pay from the proper fund all temporary assistants, laborers and workmen needed by the different sections, and report the same to the board of trustees at its regular meeting.

13. The several sections of the station shall make quarterly reports of experiments with results of discoveries and of practical applications of scientific principles and facts. The quarterly reports may be published by the board of direction as bulletins, each report to be over the signature of the respective heads of sections. But all material before being used in a bulletin shall be read before the board of direction for its approval.

14. The duties of the director shall be advisory. He shall be secretary of the board of direction and be entitled to vote on all questions and have the same privileges as the other members of the board. It shall be his duty to examine the work of each section so as to be advised personally of the character of the work done and in progress; and where two or more sections are

at work jointly upon experiments or investigations, it shall be his duty to see that they work in harmony, and in case of any disputes he shall be the final arbiter. He shall have charge of and conduct the general correspondence of the station, see to the publication and distribution of the bulletins, and perform such other duties as shall be assigned by the board of trustees.

15. The experiment station shall use such land as shall be assigned to it by the board of trustees for experimental work.

16. The board of trustees or the professor of agriculture shall assign such farm tools, machinery, stock, materials, labor and teams for the use of the station as he may be able to do without interfering with the College work in his department.

Prof. C. P. Gillette having been elected professor of entomology in the Colorado Agricultural College, presented his resignation as entomologist of the College station. The resignation was accepted to take effect January 20th. The office of the station assistant was created, and C. F. Curtiss was elected to the position at a salary of \$1,700 per annum.

The following resolution regarding a preliminary organization of the board of direction of the station was adopted:

Resolved, That the board of direction of the experiment station be directed to meet at the College on Friday, January 16th, and effect such organization as they deem necessary and in harmony with the rules adopted by the Board for their government.

That they shall have the power to arrange to continue the work of the station and make full report at the regular meeting in May at which the board of direction shall submit to the Board, for approval or modification, a plan of work covering the time between the May and the November meetings. They shall also make recommendations at the May meeting as to the proper division of the salaries of the board of direction and their assistants, between the Hatch fund and the interest fund; and until that time that the salary of Director Wilson, Professor Patrick and Station Assistant Curtiss, be paid from the Hatch fund, and all other professors on the board of direction, as also Assistant Professor Kent be paid from the interest fund.

At the May meeting of the board of trustees the board of direction of the station reported that on January 16th it was voted to authorize Professors Osborn, Pammel and Patrick in consultation with the president of the College and the director of the station to employ competent assistants in their respective departments and that in accordance therewith the following had been employed: Harry A. Gossard, assistant in entomology at a salary of \$400 per annum, P. H. Rolfs assistant in botany at a salary of \$250 per annum, and E. N. Eaton assistant in chemistry at a salary of \$400 for eleven months. These appointments were confirmed by the Board.

The plan of work outlined by the board of direction was adopted. Instead of dividing the station fund among the different departments of the station as contemplated in the plan of organization, the Board decided, upon the recommendation of the station committee, to appropriate the sum of \$15,000 to the station to be used during the year beginning July 1, 1891, for salaries, experimental work, bulletins and all incidental expenses. The Board ordered that the same should be expended under the direction of the station authorities, in accordance with the rules and regulations of the board of trustees and that a full and detailed account should be kept in permanent form of all items of expense. To this end the director of the station was directed to open an account with each member of the board of direction as to the

disposition of the funds assigned to the various sections by the board of direction. The expenditure of any balance of the appropriation for the year ending June 30th remaining on hand after providing for current expenses was left to the judgment of the director of the station. The salaries of the station staff, charged by the board to the station, are given on page — of this report. The salary of the former director was ordered paid to February, 1891.

A full statement of the work of the station and its plans for the future will be found on page 17.

The matter of the publication of station bulletins by the State was referred to the Legislative committee.

DEPARTMENT OF AGRICULTURE.

At the annual meeting in November, 1890, a committee of the Iowa Butter, Cheese and Egg Association appeared before the board to urge upon them the necessity of establishing a dairy school in Iowa and to assure them that it was the wish of the Association that the school should be established in connection with the Agricultural College. A communication from the same committee was received by the Board at its January meeting, asking the establishment of a dairy department, the erection of a creamery and cheese factory upon the latest improved plans and the equipment of the same with the latest improved apparatus for making of butter and cheese on a commercial basis and for experimental work in all dairy lines.

The Board replied to the committee that the establishment of a dairy school at the College had already been determined upon, before the presentation of their request, and that the advice of the committee in regard to building and equipment would receive the considerate attention of the Board.

In the meantime Acting President Stanton had transmitted to the Board in his report, the recommendation of the faculty that there should be established at the College:

1. A short winter course in agriculture.
2. A dairy course.
3. A distinctive four year course in agriculture.
4. Such short sub-courses in agriculture, made up by selecting studies from the longer course, as would meet the wants of students who have not the time or means to take the full four year course.

The report was carefully considered at a joint session of the Board and faculty, a two year's course in agriculture was outlined, and this and the other courses recommended were adopted by the Board. The action thus taken was in the line of the report of the Farmer's Alliance, Stock Breeder's Association, and other kindred organizations, to the Board, in which the establishment of such courses was urged.

At its meeting in January, 1891, the Board, as elsewhere stated, placed the Hon. James Wilson at the head of the department, elected Mr. D. A. Kent assistant professor of agriculture, and afterwards, in the readjustment of work, added Station-Assistant C. F. Curtiss to the teaching force of the department.

The Board, at its May meeting, approved the recommendation of Professor Wilson and the faculty that agriculture and horticulture be confined exclusively to the courses in agriculture. The conditions of admission to these

courses were afterwards so changed that students possessing a thorough knowledge of the common branches such as can be obtained in the better class of country schools, could be admitted. As recommended by the committee of the Dairy Association, the dairy school was placed under control of the agricultural department; arrangements were made for furnishing board in one of the boarding cottages, and December 1, 1891, was fixed upon as the date of opening of the short winter term.

At different times the Board appropriated from the National and State experiment funds to the erection of a creamery various sums, aggregating in all \$4,723.72. An appropriation of \$5,000 was made from interest fund for purchase of apparatus, and Professors Wilson and Kent were authorized to visit and investigate such model creameries as they might see fit, to the end that the college creamery might be built upon the latest and most approved plans. The results of their investigations are embodied in a well arranged and splendidly equipped creamery. The Board asks the Legislature for the means to construct a cheese annex, and to finish off the second story into dormitory rooms. In connection with the establishment of the College creamery, there arose the question of the purchase of the franchise, routes and good will of the Ames creamery, which was forced to suspend operations by the opening of the one at the College. A committee of the Board, to whom the matter was referred, reported that they deemed it the duty of the institution to give the creamery company such relief as could legally be granted. The Board after careful consideration of the question decided to purchase the milk routes and good will of the company. An appropriation of \$500 was made from the interest fund for this purpose.

The Board added the sum of \$500, taken from the annual repair fund, to the \$2,000 appropriated by the State for the erection of a swine house and the repair of farm buildings. Authority was given Prof. Wilson to use a portion of this amount in remodeling and fitting up the old creamery as a dwelling house for farm workmen. He was also authorized to tear down the old hog house and slaughter house and use the lumber in the repair of fences and farm buildings. He was directed to repair and build fences, make lanes, etc., looking to a general improved condition of the department. The board of trustees in May, 1889, adopted a plan for the management of the College farm, which can be found in full on pages 144 and 145 of the thirteenth biennial report. In May, 1891, this plan was amended by providing:

(a) That the present foundation stock for standard bred horses be kept and bred in that line.

(b) That a herd of milking short-horn cattle be formed.

(c) That the farm department buy and keep several breeds of sheep, of mutton, fine wool and other characteristics thought to be desirable for Iowa.

A detailed statement of the operations and condition of the department is given by Prof. Wilson on page 15.

OTHER COLLEGE DEPARTMENTS.

The biennial reports to the Board of the heads of the other College departments give full information of the work done during the biennial period and the present condition of the departments.

The following rules, applicable to all departments, were adopted by the Board at its last annual meeting:

1. "The head of each department shall, on or before the second Wednesday of November in each year, file with the secretary of the Board a statement of receipts and disbursements of his department during the year, which statement shall be so divided and arranged as to show under what specific or general appropriation each expenditure is made."

2. (Substitute for section 8, page 22, of the rules and regulations of the Board.) "The head of each department shall, at the time of filing his annual financial statement, file an inventory of all apparatus, books, stock, feed, machinery or other articles belonging to the College, in his department. The items of the inventory shall be valued at their actual cash value. All articles not in use or not liable to be used shall not appear in the inventory, but be listed by themselves each year and valued at such sums as can probably be realized for them. This list shall be attached to the inventory. The secretary shall report to the Board the aggregate sum of each inventory."

COURSES OF STUDY.

The committee of the Board on courses of study reported at the annual meeting in 1890, that the establishment of an electrical engineering course was in every way desirable, and that looking to this end the contemplated enlargement of the physical laboratory rooms should be completed at the earliest possible date. In accordance with the policy thus expressed, the faculty prepared and submitted to the Board at its May meeting, a course of study in electrical engineering which was adopted. The title of the professor of physics was changed to professor of physics and electrical engineering.

At the special meeting of the Board in January, 1891, the recommendation of the faculty that German be stricken out of the junior and senior years of the course in sciences related to the industries, and that it be made optional with history in the first term and rhetoric in the second term of the freshman year was adopted. Certain limitations were also placed upon the options of the junior and senior years of this course. At the meeting in May, 1891, German was extended through the first term of the sophomore year, being made optional in that term with English. The student was given the choice of Latin in the place of German during the first three terms of the course. Agriculture and horticulture were, upon the advice of the professors in charge of these studies, stricken out of this course. The work in English was raised to a full department. The faculty was directed to arrange in the courses of study for instruction in library work one hour per week during the second term of the freshman year. The changes in the engineering and the ladies' courses recommended by the faculty were adopted. The establishment of short agricultural courses and the changes made in the long courses in agriculture are set forth in full under the heading of Department of Agriculture.

In November, 1891, the faculty recommended to the Board the establishment of a course in mining engineering. In submitting this recommendation President Beardshear says in his report:

"The work belongs legitimately to the purpose and scope of our institution. The work can be apportioned to chairs already established and for the

present be done quite efficiently. The aggregate additional expense for the four years would not exceed, for the entire course, two thousand dollars, but for the first year there would be but a limited fraction of that amount necessary to be added to the present expense. The number of students entering the course would also have much to do with the amount of expense. Much of the apparatus that would be needed in addition would be of permanent value to the other departments of the institution.

"It is hereby recommended that a course in mining engineering be established, provided that it does not make necessary a new instructor and that the work be apportioned for the present to the chairs already established."

The recommendation of the president and faculty was adopted.

CONTROL OF COLLEGE BUILDINGS.

The Board at its meeting in July, 1891, adopted the following :

"1. In order to promote a more uniform and complete control of the various public buildings and other property of the College, the President is hereby made the custodian of the same.

2. The President shall have entire control of the chapel and may place the various buildings in charge of the heads of department subject to his direction, or where he may deem expedient he may place parts of buildings in charge of other suitable persons.

3. The President shall appoint all janitors, proctors and other employees about the various buildings upon the recommendation of the heads of department or other persons to whom he may have intrusted the care of said buildings or other property of the College.

4. The President shall, at least once a month, appoint a committee whose duty it shall be to visit and inspect all the public buildings and report to him the condition of the same.

5. All matters pertaining to the recitation rooms, parlors, living rooms and out buildings shall be subject to the control of the President, and he shall be held responsible for the best results touching the same, and free to make such modifications as in his judgment may seem best.

6. Any rule or regulation in conflict with the above is hereby modified to conform thereto.

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 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 Col. 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 Boardman and Wood, who were appointed a committee to make settlement with the steward for the fiscal year 1890, reported that they had examined his accounts and found them correct. The same committee made the annual settlement with him for 1891. The following is their report, which was adopted by the Board :

To the Board of Trustees :

The committee on examination of the accounts of the steward beg leave to report that they have made an examination of the books of the steward, as far as the present system of keeping accounts will permit, and find the same correct and neatly kept and show balances on hand in the various funds amounting to \$2,291.24.

Amount received during the year.....	\$ 37,830.97
Amount paid out during the year.....	35,539.73
Balance on hand November 24, 1891.....	2,291.24

Respectfully submitted,

JOHN M. WOOD,
C. D. BOARDMAN,
Committee.

The following resolution was adopted in July, 1891 :

Resolved. 1. That the steward be directed to make necessary details for a thorough inspection of rooms in the main building, and boarding cottages each day, and to require that each one be kept in a neat and orderly condition by students occupying the same and that he make a personal inspection each week.

2. That all halls be swept each day and kept clear of all dirt or rubbish of any kind.

3. That students be prohibited from throwing papers or rubbish from the windows.

The steward, acting under the orders of the Board, exchanged in 1891 one of the old dynamos of the electric light department for an Edison dynamo, having a capacity of two hundred and seventy sixteen-candle power lamps. The cost to the College was \$440, for which an appropriation was made by the Board from interest fund.

The rent of the preceptress' reception room was ordered charged to the College interest fund.

The Board directed that a system of keeping accounts with the steward and other departments should be instituted by which all receipts and disbursements of the steward's department, and all receipts of other departments, should be made through the College treasurer. Trustee Wood is a committee to arrange the details of such a system.

AMES AND COLLEGE RAILWAY.

A communication from the Ames Street Railway Company was presented to the Board in November, 1890, in which said company proposed, upon the granting of certain privileges, to construct a street railway between Ames and the College.

The communication was referred to a committee consisting of Trustees Van Houten, McElroy, and Wood. This committee reported in substance as follows:

"1. We do not believe a horse car railway will meet the demands for rapid transit.

"2. We believe some means of rapid transit by electric or other railway would greatly benefit the College, and our failure to recommend the plan proposed is not because of opposition to the general project, but with the hope that something better may be secured.

"3. Even if a horse car line is the best that can be secured, care should be taken to insure the best possible service, with proper safeguards and limitations to protect the interests of the College, the students and the public."

The report was adopted and the committee continued, to report to the Board any recommendations or conclusions that in their judgment might be of interest in regard to a rapid transit line between the College and Ames.

In January, 1891, the railway company submitted to the Board another proposition embodying the idea of a standard gauge railway, operated by steam or other improved motive power. The report of the committee upon this proposition was in the shape of the following resolution:

"Be it Resolved, By the board of trustees of the Iowa Agricultural College and farm that there be hereby granted to the Ames Street Railway Company, their successors and assignees, right of way, not exceeding fifty feet wide, across the college grounds, from the east line of the College farm, by said Agricultural College, to the machine shops on said farm, for railway purposes."

Said strip to be twenty-five feet wide on each side of the center of the railway track to be built by said company, said road to be built substantially, in conformity with the survey and plat made by Bramhall and Davidson in the year 1890, and that the several requests and privileges asked by the Ames Street Railway Company, contained in the eight (8) propositions hereto annexed and made a part of this concession, be granted subject to the following modifications:

1. That said right of way hereby granted shall not at any point on the ornamental grounds or through the stock yards of the farm be wider than actually necessary for roadbed, berme ditches, necessary siding, platform, Y and turntable.

2. That after said road is fenced by the College the said railway company shall renew and maintain in repair such fences as may be required from time to time; that said railway company shall construct and maintain all needed crossings over said road and protect the same by proper cattle-guards, and shall also provide, where needed, suitable under-crossings.

3. That said College shall not be liable to any damage to the property of said company or any other person who may patronize said road.

4. That nothing in this contract shall be construed to prevent any department of the College from doing its own necessary hauling to or from the College and Ames or elsewhere. It being only intended to grant said railway company the franchise as common carrier between Ames and the College, reserving to the College the right to do such part of its own hauling as convenience or necessity may require.

5. That no unnecessary cuts or fills or accumulations of dirt shall be permitted upon the ornamental grounds, and all such cuts or fills or removal of dirt shall be made under the supervision of the committee on public grounds, or some person designated by the Board.

The following are the eight propositions of the company, included in and made a part of the committee's report:

1. The Ames Street Railway Company requests the board of trustees of the Iowa Agricultural College to grant said company the right of way over a strip of land for railway purposes, from some point on or near the machine shops on the College grounds substantially with the survey made by Bramhall and Davidson, to the east side of said farm, including also grounds for a turntable, switches, side tracks and burrowing pit.

2. We ask said board of trustees to fence said ground so granted wherever the same passes over or through any cultivated field or pasture land, and to keep fence and gates, if any, in proper repair.

3. To erect suitable platforms for the accommodation of passengers and such stations on the College grounds as will accommodate the traffic, and such facilities as the Board may require for loading stock or freight.

4. We also ask an agreement from the said Board not to allow or permit the College authorities to run or operate any teams or trains or other conveyances for the carrying of freight, the same to be used as common carriers of passengers or freight between Ames and the College grounds.

5. We ask the Board to relinquish the carrying of mail and express, and to contract with said company for carrying the same.

6. To at all times give the said company the preference in the carrying of all freight, merchandise and other articles between said College grounds and Ames, but not at a higher rate than could be contracted with any common carrier or teamster, provided said rates shall include terminal charges for loading and unloading.

7. In consideration of the granting of the rights, privileges and requests above mentioned the said Ames Street Railway Company hereby agrees to construct and have in operation a standard gauge railway to be operated by a steam motor, or other improved motor power as may be hereafter determined—animal power is hereby expressly prohibited—said railway to be completed and in operation on or before November 1, 1892, A. D.

8. That during the time said College is in regular session and during the day-time thereof said company shall make hourly round trips between the college and Ames, and during the vacation such trips as will accommodate the needs of the college. That the passenger fare shall not exceed five cents for each person one way over said road. That said company will provide comfortable and suitable passenger cars for the transportation of passengers between said College and Ames.

The report was adopted and it was ordered that after the signing of the same by the chairman and the secretary of the Board and the proper officers of the railway company, it be entered at length upon the records.

In May the Board adopted the recommendation of the public grounds committee, that the railway as it enters the campus proceed by what had previously been the north driveway of the College grounds. President Beardshear and Professors Church and Wilson were appointed a committee to determine all questions of grading and locate all switches, platforms, etc., upon the ornamental grounds and farm. The sum of \$100 was appropriated from interest fund to the public grounds department to build a platform near the main College building.

The president of the College and Trustees Dunbar and Garner were at the July meeting given full power to make contract with the railroad company. The following is the contract as signed by the chairman of the board and the president of the company:

"It is agreed by and between the Iowa State Agricultural College and the Ames Street Railway Company: That said company should receive from the postoffice at Ames the U. S. mail for the College and all the departments and the general mail usually received at the College and deliver the same at the experiment station, the main building and the treasurer's office, and that said company shall also receive the express and packages for the offices of president, secretary and treasurer of the College, the experiment station and book department and deliver the same to said places, and in consideration of the performance of such services the Iowa State Agricultural College shall pay the sum of two hundred dollars (\$200) per year, the Experiment Station the sum of fifty dollars (\$50) per year and the book department shall pay the sum of sixty dollars (\$60) per year. Payment for such services shall be made monthly, upon the filing of proper bills therefor, after the same shall have been properly audited.

"It is further agreed that the year for the delivery for the book department shall be during the school year beginning the Monday before each term and closing on the last day of the second term and shall not include the vacations, and the monthly payments shall be so divided that the sum of sixty dollars shall be paid in equal parts during the months school is in

session. The packages to be carried under this contract shall not be deemed to include packages of goods purchased of retail merchants in Ames for private use, nor heavy freight or merchandise for the departments. This contract shall begin and be in force from the ninth day of July, 1891, until January 1st, 1893.

"THE IOWA STATE AGRICULTURAL COLLEGE,
"BY C. M. DUNBAR, *Chairman Board of Trustees.*
"THE AMES STREET RAILWAY COMPANY,
"BY J. L. STEVENS, *President.*"

By mutual consent of the company and the College it was agreed that the above contract should be construed to mean that during the winter vacation there shall be two deliveries of mail, one by the first motor in the morning and the other by the noon train; and that during the summer session of the school the mail shall be delivered at noon and in the evening.

The charge for hauling freight in car load lots was fixed at twenty-five cents per ton and the heads of departments were directed to have such freight hauled by the company until the further orders of the Board. It was further agreed that the company should be notified of any proposed change in this regulation in order that it might be heard.

COLUMBIAN EXPOSITION.

The Board in May, 1891, requested the faculty to outline a plan for an exhibit of the different departments of the College at the Columbian Exposition. The faculty submitted a detailed outline of such exhibit, and estimated the expense thereof at about \$15,000.

The faculty state in connection therewith:

- "1. That in their opinion such an exhibit is desirable if it can be made upon such a basis as to reflect credit upon the College and the State.
2. That it should be made intact, all departments of the College being represented as far as possible in one collective exhibit.
3. That we believe this exhibit should, by preference, be a part of the State exhibit, and that it is our opinion that it would be of great advantage to the College and to the State exhibit to have it form such a part.
4. That we deem it essential in providing for such an exhibit that the requisite expense should be borne by the State, as the funds of the College would not be adequate to meet the extra outlay necessary, and we believe that in no other way would the State be able to promote its exhibit better than by utilizing the college departments in the collection and display of material to illustrate the resources of the State.
5. That this material so collected be returned to the College after use at the exposition and be permanently preserved for the State as a part of the College equipment.
6. That the Legislature be asked to set aside, in the appropriation for the State exhibit, a sum sufficient to prepare the proposed College exhibit.

MATTERS RELATING TO STUDENTS.

In order to meet the almost constant demand for statistics regarding graduates and students of the College the Board in January, 1891, adopted the following resolution:

WHEREAS, It is important that the College should have on hand at all times full statistics in regard to its students and graduates, therefore be it

Resolved, That the recorder of the College be directed to procure as full information as possible upon the following points in regard to graduates: (1) residence of graduates at time of entering college; (2) occupation of parent or guardian; (3) purposes in attending college; (4) change of purpose while attending college, if any, and reasons for same; (5) occupation since graduation and present residence and occupation.

In regard to present and future students the following points shall be covered: (1) residence and occupation of student and parent or guardian; (2) desire or purpose of parent or guardian in sending student to college; (3) purposes of student in attending college; (4) influences which caused him to attend; (5) reasons for change of purpose, leaving college or not returning to same; (6) also intentions of students in regard to occupation at time of graduation.

All of these points and any others that may be necessary in order to make the record of each student and graduate full and complete shall be kept in a book or books provided for this purpose and these records shall be corrected from time to time so as always to furnish the desired information. And be it further

Resolved, That similar information be procured and records kept of advanced and special students that have or may attend college.

The matter of College fraternities having been referred by the Board to the faculty, with full power to act, the faculty delegated said power to President Beardshear, to the end that he might make settlement of all questions relating thereto in such manner as his judgment might determine.

He adopted and put in force the following regulation:

"All members of college secret fraternities belonging at this date shall have the same relations as hitherto authorized by the board of trustees, but from this date onward no other student of this College shall be permitted to join a secret college fraternity."

The action of the President was approved by the Board, they pledging themselves to heartily sustain him in his plans and rules adopted for the government of the students.

It was ordered by the Board that wages paid students be fixed by the heads of departments employing such labor after consultation with the board of audit.

Students were graduated in the different college courses during the biennial period as follows:

	1890.	1891.
In the joint course in science and agriculture.....	20	1
In the course in agriculture.....		13
In the course in sciences related to the industries.....	2	6
In the course in mechanical engineering.....	1	8
In the course in civil engineering.....	9	4
In the ladies' course.....	5	7
In the course in veterinary science.....		
Total.....	37	39

Appropriate degrees were conferred on these graduates. The degree of Master of Science (M. Sc.) was conferred on R. Ellsworth Call and P. H. Rolfs and the degree of Master of Horticulture (M. H.) on Charles A. Keffer.

E. W. STANTON,
Secretary.

CALENDAR FOR 1892.

Term opens	-	-	-	Tuesday, February 23.
Entrance Examinations	-	-	-	{ Tuesday, February 23. Wednesday, February 24.
Recitations begin	-	-	-	Thursday, February 25.
Decoration Day	-	-	-	Monday, May 30.
Term Examinations	-	-	-	June 13 to 22.
Junior Exhibition	-	-	-	Wednesday, June 22.
Field Sports and Competitive Military Drill	-	-	-	Wednesday, June 22.
Second Term begins	-	-	-	Tuesday, July 19.
Entrance Examinations	-	-	-	{ Tuesday, July 19. Wednesday, July 20.
Recitations begin	-	-	-	Thursday, July 21.
Term Examinations	-	-	-	November 1 to 9.
Baccalaureate Sermon	-	-	-	Sunday, November 6.
Address before Trustees	-	-	-	Tuesday evening November 8.
Commencement Exercises	-	-	-	Wednesday, November 9.
Winter Vacation from November 9, 1892, to	-	-	-	February 21, 1893.

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