THIRTEENTH BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES

OF THE

Iowa State Agricultural College and Farm

MADE TO

THE GOVERNOR OF IOWA,

FOR THE YEARS 1888 AND 1889.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

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1889.

STATE AGRICULTURAL COLLEGE,
AMES, IOWA, December 1, 1889.

To his Excellency, WM. LARRABEE:

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

E. W. STANTON, *Secretary.*

REPORT OF THE PRESIDENT.

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

GENTLEMEN—I am glad to be able to report substantial prosperity in the College during the period of three and a half years since I took charge as president, and especially during the two years properly covered by this report. In May, 1888, a brief disturbance occurred among the students, growing out of jealousies between college societies. It attracted far more attention at the time than its real importance deserved, soon passed out of mind here, and no vestige of ill will seems now to remain among the students. Never has there been in the College greater good will and good behavior, or more earnest work, than during the past year. And yet it seems to be a peculiarity of the human mind that a more unimportant, though unfortunate, episode will attract more public attention, and remain longer in the memory of those on the outside, than the beneficent daily work of a great institution for many years.

A MARKED EXAMPLE.

For example, Mr. Justice Miller, of the Supreme Court of the United States, a distinguished citizen and former resident of this State, in an illustrated article on Iowa in Harper's Monthly for July, 1889, has only this to say of the College and its twenty-one years of great usefulness: "The agricultural college, organized by the State five or six years ago (1), and supported by the sale (2) of land donated by the government, has not developed great capacity for instruction in agricultural labor (3) and science, either because no sufficient system of instruction has been devised (4), or because the intestine controversies among the trustees, presidents and professors (5) have retarded its growth and obstructed its usefulness." (6) The numbers inserted in parenthesis are for future reference.

STRANGE INACCURACIES.

The inaccuracies and the diametrically false impression of the above might, perhaps, pass unchallenged among the many equally gross ones on other subjects, did they not stand as types of the false impressions of many who are not well informed. As specimens of the inaccuracies of the article on other subjects, I give only four. On page 171, Justice Miller puts wheat first and corn second in agricultural and commercial importance. But, in fact, ten bushels of corn are raised to one of wheat, and corn is increasing while wheat is decreasing in area and productiveness. Again, he says, page 174: "The colleges (denominational) are unable to give salaries sufficient to command the services of competent professors; all of them are struggling inefficiently, with one or two exceptions," etc. Salaries are indeed low, as in all States west of the Alleghenies, but several Iowa colleges rank very high in the number of their students, the talent of their professors, and the excellence of their work—fully as high as the average of other States west of the Alleghenies. On the same page he says: "The Congregationalists have in 'Cornell University,' at Grinnell, a fairly successful college." The only "Cornell University" in the land is the great institution at Ithaca, N. Y., of which all Americans are justly proud. Cornell College is at Mt. Vernon, Iowa, is a Methodist institution, a thoroughly excellent and prosperous college. The Congregationalists have a college at Grinnell, but its name is not "Cornell University," but "Iowa College." It is the oldest college and one of the very best in the State, the peer of almost any college in the land for the learning of its faculty, the excellence of its equipments, the thoroughness of its courses and the worth of its graduates.

On the same page Mr. Justice Miller says that the State University "has not been very fortunate in the manner in which it has been conducted by the trustees appointed by the State."

What will our neighbors think of us when our distinguished former citizen says, in substance, of the State University, "mismanaged"; of the State Agricultural College, "growth retarded and usefulness obstructed by intestine controversies"? and of our distinctively Christian colleges, "struggling inefficiently," and with "incompetent professors"?

UNINTENTIONAL BUT DAMAGING INJUSTICE.

No one believes Justice Miller intended to hurt the colleges of Iowa. He has hurt them seriously. His twenty-seven years absence, from the time since Mr. Lincoln called him to the Supreme Court, may possibly explain, but cannot possibly excuse such ignorance of fact. The facts were easily accessible to one who really determined to write a truthful sketch of the great State of Iowa. Justice Miller is familiar with the stiff Latin, but sound law, of the maxim: *Ignoransia legis neminem excusat;* "Ignorance of the law excuses no one." The same is true of ignorance of facts. It excuses no historian. Amid so many harmful inaccuracies, what he says of the Agricultural College might pass unchallenged, but that his several mistakes in regard to it stand as types of popular misapprehensions, which it seems proper, and indeed important, to correct in this official State publication.

DATE OF ORGANIZATION.

(1) "Organized by the State five or six years ago." The facts are that the State act established the Agricultural College thirty-one years ago; the congressional grant, twenty-seven years ago, laid the basis for the mechanical and military departments, and strengthened the agricultural; and the College in its present form was opened for instruction twenty-one years ago.

MODE OF SUPPORT.

(2) "Supported by the sale of lands donated by the government." The great wisdom of our trustees' management of the congressional land grant lay in the fact that they did *not* sell the land, like most other States, at fifty to seventy cents per acre, but leased it at eight per cent annually, in advance, on an appraisal of about three dollars per acre—far higher than it could possibly have been sold for then.

KIND OF INSTRUCTION REQUIRED.

(3) "Has not developed great capacity for instruction in agricultural labor and science." An untold damage to this and every other agricultural college has grown out of the above assumption, that our chief or only mission is to give "instruction in agricultural labor," to teach mere farm processes, ordinary hand-work, requiring merely knack and practice. This assumption has hurt us with the farmers. They have said: "Unless you do that chiefly you pervert trust funds." It has hurt us with those who desire other technological and scientific instruction. They have said: "As you teach only agriculture, we will go elsewhere." The mischief has lurked

partly in the name "Agricultural College"; a partial, inadequate, misleading name, adopted, not by Congress, but afterward, simply for brevity. Three things, not one alone, are required in our organic law: agriculture, mechanic arts, military tactics. The two first are required and made equal; the third is required as an essential. Not "agriculture and the mechanic arts" themselves, however, but such branches of learning as are related to them.

AN INADEQUATE AND MISLEADING NAME.

The name "Agricultural" College is as partial, inadequate, and misleading as would be the terms "mechanical" or "military" college. The exact words of the organic law of Congress are that the interest of the land-grant fund "shall inviolably be appropriated by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may provide, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Referring directly to this congressional law for its authority, the legislature of Iowa, in 1884, passed the following law, still in force, and imperatively regulating our course of study now:

SECTION 621. That there shall be adopted and taught at the State Agricultural College a broad, liberal and practical course of study, in which the leading branches of learning shall relate to agriculture and the mechanic arts, and which shall also embrace such other branches of learning as will most practically and liberally educate the agricultural and industrial classes in the several pursuits of life, including military tactics.

In absolute fidelity to the letter and spirit of these, our organic laws, as passed by Congress and State legislature, are all the affairs of this College, financial, literary, scientific, and practical, now managed. Not simple processes in agriculture, horticulture, and the mechanic arts, learned better and more cheaply in shop or on farm; not these do we teach largely, but related science, underlying principles, and processes too intricate or difficult for the unskilled, uneducated laborer. Thus alone can we fulfill our true mission.

SYSTEM OF INSTRUCTION DEVISED.

(4) "Either because no sufficient system of instruction has been devised." Our system is the result of the best efforts of the wisest educators in the new world and the old for nearly a century. Industrial education is a century old. Agricultural education in colleges is not half a century old.

Literary and professional education is very many centuries old. Agricultural education is most difficult, youngest, least perfected. It is an untried and difficult field. We are gaining in wisdom and shall gain by more experience.

INTESTINE CONTROVERSIES.

(5) "Or because the intestine controversies among the trustees, presidents, and professors," etc. From all I can learn there has been less controversy, fewer changes in faculty, and greater steadiness in purpose here than in most State institutions.

OBSTRUCTED USEFULNESS.

(6) "Have retarded its growth and obstructed its usefulness." Its growth has been retarded only by the capacity of its dormitories and accommodations. Of this, more hereafter. Its usefulness has not been obstructed. Eighteen classes have graduated 473; twenty-six per year on the average. This year's class graduated forty-five members and three second degree graduates in the course; the largest class in the history of the College. More than half of the graduates down to 1886 entered agriculture and the manual and mechanical industries, including agricultural professorships and editorships, and less than half entered the learned professions, including law, medicine, theology, teaching, journalism, banking, and all other professions and clerical callings. Of our regular classical colleges nearly all the graduates enter the latter callings, and scarcely 2 per cent enter the mechanical industries. Of only two recent graduating classes, 1887 and 1889, have I at hand the statistics of intended or chosen work in life. These two classes, with their six post-graduates, number ninety-one. The industrial character of the course of study, and of the atmosphere of the College, can be seen by the occupations in life already chosen by the members of these two classes, as follows:

STATISTICS OF THE CLASSES OF 1887 AND 1889.

Industrial Callings Chosen:

Agriculture and horticulture	16
Architecture	1
Civil engineering	11
Designing and draughting	1
Electrical engineering	1
Mechanical engineering	4
Practical and manufacturing chemistry	6
Veterinary medicine	20
Total of agricultural, mechanical, and industrial callings	60

Professional Callings Chosen:

Dentistry	1
Law	8
Medicine	5
Teaching	10
Merchandising	2
Total of professional callings	26
Not decided	5

As to the industrial character of the callings named in the first of the above lists, there can, I think, be no question, unless it be in regard to veterinary medicine. A veterinary physician and surgeon is in some just sense a "professional" man. But his work is clearly for the promotion of the best interests of agriculture. It will be readily conceded that in no way could this college more effectively promote the agricultural wealth and welfare of Iowa than by sending forth each year a band of thoroughly equipped scientific veterinarians to supplant quacks and save life, prevent contagion, and promote health among our domestic animals. Iowa's wealth lies in her farm live stock. Proper care of its health increases our agricultural prosperity and our material wealth.

GARFIELD ON OUR PROPER WORK.

That broad-minded statesman, James A. Garfield, had this to say of proper work, in an address June 14, 1867, five years after the congressional land grants were made, two years before our College began the work of instruction:

In the next place I inquire, what kinds of knowledge are necessary for carrying on and improving the useful arts and industries of life? I am well aware of the current notion that these muscular arts should stay in the fields

and shops and not invade the sanctuaries of learning. A finished education is supposed to consist mainly of literary culture. The story of the forges of the Cyclopes, where the thunderbolts of Jove were fashioned, is supposed to adorn elegant scholarship more gracefully than those sturdy truths which are preached to this generation in the wonders of the mine, in the fire of the furnace, in the clang of the iron mill, and the other innumerable industries which, more than all other human agencies, have made our civilization what it is, and are destined to achieve wonders yet undreamed of. This generation is beginning to understand that education should not be forever divorced from industry—that the highest results can be reached only when science guides the hand of labor. With what eagerness and alacity is industry seizing every truth of science and putting it in harness.

Then, after two brilliant illustrations—one from the close, scientific study of the nice affinities between carbon and iron, applied in the Bessemer process of marvelously cheapening steel; the other where a knowledge of the cell structure of wood, and the power and penetration of superheated steam, were used to give us cheap wood-pulp for making paper—after these illustrations he continues:

Machinery is the chief implement with which civilization does its work; but the science of mechanics is impossible without mathematics. But for her mineral resources England would be but the hunting-park of Europe. Our mineral wealth is a thousand times greater than hers; and yet, without the knowledge of geology, mineralogy, metallurgy, and chemistry, our mines can be of but little value. Without a knowledge of astronomy commerce on the sea is impossible; and now, at last, it is being discovered that the greatest of all our industries, agriculture, in which three fourths of all our population are engaged, must call science to its aid if it would keep up with the demands of civilization. I need not enumerate the extent and variety of knowledge, scientific and practical, which a farmer needs in order to reach the full height and scope of his noble calling. And what has our American system of education done for this controlling majority of the people? I can best answer the question with a single fact. Notwithstanding there are in the United States 120,000 common schools, and 7,000 academies and seminaries—notwithstanding there are 275 colleges where young men may be graduated as bachelors and masters of the liberal arts—yet, in all these the people of the United States found so little being done, or likely to be done, to educate men for the work of agriculture, that they have secured from their political servants in Congress an appropriation sufficient to build and maintain in each State of the Union a college for the education of farmers. The scholar and the worker must join hands if both would be successful.

Thus, first he gives the mechanical part of our work, but in the closing paragraph even the broad mind of Mr. Garfield forgot for a moment—misled doubtless by the name—that "agricultural

colleges" rest firmly, like the surveyor's tripod, on the triple foundation of agriculture, mechanic arts, and military tactics, and must have that broad and liberal course of scientific, literary and historic study that underlies all three, and that was contemplated by Congress.

OTHER "AGRICULTURAL" COLLEGES.

Some of our sister colleges in other States, swayed, doubtless, by the name in part, and by the local predominance of agriculture, at first seemed to make their mission single rather than triple. It has been the custom of certain agricultural papers to name the agricultural colleges of Michigan, Mississippi, Massachusetts, and Kansas as the only ones that have been true to their organic law and to our industrial interests. They are all noble colleges, and have done a grand and faithful work for agriculture. But it has been a partial work. For nearly twenty years Michigan did little for the mechanic arts or for the military. Recently it has acknowledged its shortcoming, claimed and received large State appropriations for the purpose, built machine shops, and armory and veterinary buildings, created a veterinary department, and made its course of study more nearly what it has been in Iowa from the first. "Not that I love Cæsar less, but Rome more." Not that Michigan "agricultural college" loves agriculture less now, but the other industries more, and is more faithful to her land grant and her organic law.

The Massachusetts "agricultural college," at Amherst, is more purely agricultural than that of Iowa at Ames, but, its land grant was divided at the first, and it has its department of mechanic arts in the "Massachusetts Institute of Technology," in Boston, in which, by law its mechanical students have free tuition paid for by the land grant funds. Mississippi and Kansas are almost exclusively agricultural States. Hence, their "agricultural colleges" are as yet more largely agricultural, and less mechanical than both will become as manufacturing increases with its increased demand for scientific, technological instruction. After a very careful ten years' study of the workings of the land grant colleges in many States of the Union, I am convinced that in no State have trustees and faculty of the agricultural college held more wisely and persistently, from the first, to both the letter and the spirit of the organic law, than in Iowa. On this point I may speak freely, for I speak not of my own work, but of the work of trustees, presidents, and professors of years ago, who shaped this College. Whether they

builded better than they knew, I cannot say. They certainly builded better and more faithfully than the State at large seems to know.

ATTENDANCE.

Taking the last decade in two halves, we find from our official record that for the first five years the total enrollment was 1,338, or an average of 268 each year. During the second five years, just past, the total attendance has been 1,479, or an average of 296 each year. Since the beginning of the decade the dormitories have been increased somewhat, the recitation, lecture, and laboratory rooms and facilities have been increased considerably. The College has been practically full each year of the ten except 1881, when the appearance of scarlet fever early in the year reduced the total enrollment to 226. Our numbers for the past three years, and practically for the ten, have been made up of those who recite in the regular college classes. Six years of the ten, indeed, there was a small sub-freshman or preparatory class for one half of each year. But it was never advertised prominently nor encouraged, the attendance averaged thirty-one only, and three years ago the class was discontinued and the fact prominently advertised in the catalogue. The chief reason for the discontinuance was lack of dormitories and recitation rooms.

COMPARISONS OF NUMBERS.

It should be mentioned that in the usual comparison of our numbers with those of other colleges, our total in college classes is compared with their totals, including large preparatory schools or large professional departments, as those of the law, medicine, and dentistry at the University. In the regular college work our numbers are larger, I believe, than in any other college in the State.

LIMIT OF GROWTH.

We have practically reached our limit of growth until we have more buildings. Located two miles from Ames, with no sidewalk to the College, and only a single omnibus three times daily, our limit is really the number we can board and lodge. That number is less than 300. It was reached five years ago, indeed seven years ago; since which time we have dropped preparatory work, and almost discontinued advertising except by our regular catalogues

and circulars. The entire amount expended on newspaper advertising in the past four years has been hardly $50 per year. That is, we have spent less, in advertising in all newspapers in four years, than I am told the enterprising Shenandoah Normal School expends in a single newspaper in a single year. We are

PRACTICALLY FULL WITHOUT ADVERTISING,

and with our preparatory class dropped. These facts have been clearly stated to the committees of the legislature for four years, and we have earnestly asked for

ENLARGED ACCOMMODATIONS.

But the State has been in debt, drouth has been severe, crops poor, times hard, farmers and others have felt poor, and our urgent needs have had to go unmet. Now, however, the State debt is paid, crops are better and there seems to be no good reason why our needs should not now be met. I therefore state clearly

OUR PRESENT AND MOST PRESSING NEEDS,

as viewed by trustees, professors, and president, and will afterward explain each, and our general ground for claiming the whole as due from the State to the College and the Nation.

1.	Fire proof building for museum, library, chapel and recitation rooms and remodeling main building	$ 35,000
2.	For repairs and improvements on main building and dormitory cottages	5,000
3.	Boiler house and boiler for mechanical department	5,000
4.	Enlargement and repairs of chemical and physical building	2,000
5.	Two houses for professors	5,000
6.	House for the president	6,000
7.	Repairs and improvements of farm buildings	2,200
8.	Addition to office and room for postoffice	800
	Total	$ 61,000

1. On the first item I remark: the museum and library are now in the main building. Their value is over $30,000. They are of a most combustible nature, especially the alcoholic preservations in the museum. A fire, if ever started in such combustible material in the main building, would doubtless end in total loss, and much risk to 200 human lives. These sources of danger should be in

a separate fire proof building. They now, with the chapel, occupy room that could be utilized for rooms for forty-six ladies, and for two large rooms for literary societies. This College is the only one in the State, so far as I know, and about the only one in the United States that gives no room to its literary societies to fit up and use as their own for society work. The present chapel is not adapted to the needs of the College. The pianos could be put in music rooms in the new building and the constant piano practice would thus make far less disturbance of study and recitation work. The plan of this new building is simply a modification of the plan of a separate ladies' hall and museum and biological building, heretofore urged. It is suggested now by the growth of the library, the museum, the department of biology and the increasing danger to property and life, should fire begin in the museum or library as now located. See Prof. Osborn's report.

(2) REPAIRS ON MAIN BUILDING AND DORMITORIES.

These buildings, originally costing over $150,000, now need painting and considerable repairs and improvements, especially of the foundation of the main building, to prevent further settling, cracking and deterioration. This outlay is demanded in the interests of true economy.

(3) THERE IS MANIFEST NEED OF A BOILER HOUSE AND BOILER

for the machine shops of the mechanical engineering department. One old boiler has thus far served to run the large engine of the electric light plant with dynamos of some 3,600 candle power, and for the three engines of the machine shops. See report of Professor Scribner.

(4) ENLARGEMENT AND REPAIRS OF CHEMICAL AND PHYSICAL BUILDING.

The physical laboratory requires more room to accommodate the growing classes. At present a class must be divided into three sections for laboratory work, thus making three-fold labor for the professor. One story needs to be added to the west wing of the building. This will give the physical laboratory the same amount of room now had by the chemical laboratory, and already greatly needed by the physical. This work, with the needed fixtures and the improvements in the chemical laboratory, cannot be done properly for less than $2,000. Indeed the estimate is too small. See Professor Hainer's report.

(5) TWO HOUSES FOR PROFESSORS, AND (6) A HOUSE FOR THE PRESIDENT.

The College is located two miles from Ames. No houses can be rented nearer, and few suitable ones even in the village. Professors who live at such a distance, with no means of transportation at the right time, and only mud or gravel roads to walk upon, cannot live in comfort or do good work and best help build up the College. Those who board and room in the main building, as some professors now do, exclude just so many students, and cannot even then have the comforts of home and family life.

It is sojourning, *not living*, for they have not even an abiding place during our long winter vacation, and shorter one in summer; and are thus practically compelled to leave town, and leave all college interests behind them during the vacation. This breaks up the continuity of work and the possibility of home, and greatly injures the College. In short, our location so far from town, for which the State is responsible, and not the present professors, while it has many advantages for students in the way of seclusion from interruption to study, and from temptation, yet seems to me to make additional houses on the College grounds, for the use of members of the faculty, an absolute and urgent necessity.

The State has in the past recognized that necessity by furnishing dwelling houses for nine professors. It seems to me it should at once provide for three other members of the faculty who just now need houses. The entire cost would be $11,000, including a house for the president.

At present there is no president's house. That occupied by President Welch was ten years ago assigned to the professor and department of domestic economy, and Dr. Welch boarded in the College two years, then built himself a house. This he occupied as president and professor until three years ago. President Hunt boarded and roomed in the College. My family would not admit of that, and Dr. Welch kindly rented me his house, and himself and wife boarded. His death last March left the house in the hands of the executors of his will. They now offer it to the State, with five acres of land, including fine fruit, grapery, etc., at less than two thirds its cost when built eight years ago. It is an excellent house and a beautiful place; well located, and well adapted to the needs of the president of the College.

(7) REPAIRS AND IMPROVEMENTS ON FARM BUILDINGS.

The professor of agriculture and the farm committee of the board have made estimates of the needs here, including painting of the large barns, repairs of foundation, replacing decayed stable floors, re-arranging stables, and replacing swine-house burned some four years ago, and some other items.

(8) ADDITION TO THE GENERAL OFFICE, INCLUDING NEW ROOM FOR POST-OFFICE.

The government has established a regular post-office at the College. There is no suitable room for it, however. Two additional sleeping-rooms are also needed for the trustees, at their meetings, and to be used at other times for guests of the College.

For further information as to these items I refer to the reports of the different professors in the following pages.

THE CLAIMS OF THE COLLEGE UPON THE STATE.

As to the undoubted obligation of the State to supply the above needs of the College I simply refer to the following concise statement of facts:

First—The State is *the only source* from which funds can be legally obtained for buildings, permanent fixtures, and repairs thereon. The law of Congress of 1862, giving the lands that form the funds of our endowment, explicitly declares (section 5) that "no portion of said fund, nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings."

In 1862 the General Assembly of Iowa accepted the land grant upon the conditions and under the restrictions contained in this act of Congress, and thus entered into contract with the general government to erect and keep in repair all buildings necessary for the use of the College. The General Assembly, also, at each session elects trustees. One of the duties of the board of trustees is to ascertain and inform the Assembly at each session what buildings and repairs the college really needs. That board, after full examination at the College, and consultation with the president and professors, has by unanimous vote declared the above amount to be urgently needed, and decided so to report to the General Assembly. As president of the College, acting for the board of trustees, I make this statement of the facts in order that they may appear in

printed form in our biennial report, and be in the hands of each member of the General Assembly. The amount of land received by Iowa in this grant of 1862, being proportional to population, was less than that received by each of nineteen other States, as follows: New York, Pennsylvania, Ohio, Illinois, Virginia, Indiana, Massachusetts, Missouri, Kentucky, Tennessee, Georgia, North Carolina, Alabama, Mississippi, Wisconsin, Michigan, Louisiana, South Carolina, and Maryland. But from the first the trustees have so wisely managed the grant and the funds, that to-day our income from the grant is, I believe, larger than that of any other State except New York. That is, our income, which naturally would have been less than that of *nineteen other States*, has been so wisely managed that it is to-day *greater than that of all but one of the nineteen*. Under the wise management of the trustees and faculty the College is to-day the peer of any similar one in the land in fidelity to its organic law, in the quality of work done, in the proportion of its graduates working in strictly industrial occupations. But it falls woefully behind the agricultural colleges of *many* other States in the amount of State appropriations for buildings and improvements, especially in recent years.

The argument I make is this: That the State cannot afford not to be liberal in its appropriations to an institution managed so wisely and so well from the first. It is the sound, old argument of scripture, of nature, and of common sense, "To him that hath shall be given." To him that wisely uses trust funds, more shall be intrusted. In this case it seems wise to follow this maxim. Our income from national sources averages $48,000 per year, besides $15,000 yearly for agricultural experimentation solely. This costs Iowa taxpayers *not a dollar*. By law, it must all be used for instruction, experimentation, and illustration. None can be used for buildings and fixed machinery or apparatus. It seems true wisdom and plain duty for the State to furnish buildings and permanent fixtures and appliances so liberally that this large annual income, which costs the State nothing, may furnish free tuition and industrial training to as large a number as possible of the young men and women of this State. With our income we can teach four hundred students each year as well as three hundred, if only the State will, as it has solemnly agreed, furnish the "necessary buildings."

PREPARATORY WORK.

Already have faculty and trustees unanimously voted that it is our duty to resume and advertise preparatory work. The chief

argument is that this is necessary in order to reach one main class for whom the College was founded — the farmers. Most of the country district schools do not furnish the instruction required for admission to our freshman class. One half year's instruction at the college would supply this lack. It is believed to be our duty to give this instruction. But we cannot lodge those who come unless the State provides more room. On behalf of the College, therefore, its trustees, faculty, and future students, I bespeak the careful attention of each member of the Twenty-third General Assembly, this winter, to the facts and arguments here presented, and to such additional ones as our trustees shall present to its committees.

The accompanying reports of the professors and officers of the College clearly present the condition, work, and wants of the several departments.

Respectfully submitted,

W. I. Chamberlain,
President.

REPORT OF THE DEPARTMENT OF AGRICULTURE.

L. P. SMITH, PROFESSOR.

INSTRUCTION.

In the catalogue for 1889, page 45, we find the following which may be worthy of consideration:

In offering a course in agriculture to those who are to become our farmers in the future, we recognize,

1. That it is native ability that makes the successful man in any line of work, regardless of education.

2. That *any* education is a *help* to a farmer.

3. That a man may be perfectly successful on the farm after a thorough training in any line, classical, scientific, or technical.

4. That from a lack of business ability, a man may fail as a farmer after the best college training in agriculture. Education only makes more effective, but cannot *change* the powers of mind which nature has given.

5. That the best years of life for college work are also the best years for acquiring a business knowledge and training; and, on that account, the college graduate is at a disadvantage when first entering active life, unless he has associated his college work with his late occupation.

With these facts in view, the purpose of the course in agriculture is to furnish to those who wish to become farmers, in the best sense, an opportunity to acquaint themselves with some of the many scientific questions which their daily work brings forcibly before them; to enlist their efforts in working out problems yet unsolved; and, by a study of the applications of scientific truth in daily practice, to deepen and make enduring that intelligent interest in their work which makes the difference between delight and drudgery in the performance of any labor.

The *main studies*, aside from English and mathematics, are chemistry, physics, botany, zoology, geology, veterinary science, and bacteriology.

All students take the studies mentioned above.

Except these studies and stock breeding and practical agriculture, the course has been so modified as to make the purely agricultural studies elective.

The following is a statement of the subjects and the number of students in each, for the past two years:

Stock breeding, 92.

Practical agriculture, 44.

In studies of the senior year, 2.

WINTER OF 1887-8.

My election to the professorship of agriculture in the Iowa Agricultural College occurred at the close of the college year in November, 1887. Coming directly from a farm in New York to an entirely new field of work, it took some time to become accustomed to the new surroundings and new duties.

The summer that had just closed was the second one of severe drouth. We had on hand a large number of horses, cattle, sheep, and swine, with very little to feed them, aside from the ensilage—less than a two weeks' supply.

The price of corn began at thirty cents and ran gradually to forty-five cents; hay could be purchased at from $5 for the coarsest slough grass to $10 to $12 for timothy. It was difficult to get it at those prices.

For our supply of corn we managed to subsist on the surrounding country; but the hay had to be shipped in—mainly from Calhoun county. There were some anxious days when consignments had not arrived on time, and we did not know how soon we should be left with nothing to feed our stock. The highest price paid was less than $8 per ton for baled hay f. o. b., Ames.

This shortage of feed necessitated a large outlay for hay and grain.

ENSILAGE, 1887-8.

Owing to an attack of chinch bugs on the corn, the extremely dry weather, and delay in getting the machinery ready, part of the ensilage of 1888 was put up too dry; the heat of fermentation was so great as to mold and char the fodder. One third of the ensilage was entirely spoiled, and only a part of the remaining two thirds was eaten by the cattle with a relish; the rest of it had a bad effect on their digestive organs.

THE FARM.

In the spring of 1888 the establishment of the experimental station here as a department of the College, introduced a radical change in some features of the farm department.

The plan which was adopted of keeping the experimental station as separate as possible from the College, made it necessary to add to the existing appliances an entirely new outfit of teams, tools, and buildings, and to have land entirely separate from that used by the farm department; as a consequence, 120 acres in all, including 65 acres of the best land belonging to the farm, were leased to the experimental station for experimental purposes, and thus passed out of the control of the farm department.

This was not only the most fertile land on the farm, but the most accessible—the only land connected with the barns by good roads. The tillable land remaining is at a distance from the barns with a railroad or bottom lands between.

IMPROVEMENT.

During the last two years a large amount of fencing has been rebuilt; this will be necessary every spring in which high water occurs; having a

large acreage of bottom lands lying along Squaw creek, the fences on the bottoms or crossing the stream are carried away in times of flood by the ice or drift wood.

PERMANENT IMPROVEMENT.

A new wire fence has been built in No. 18, No. 1, and No. 5—175 rods. The stumps in No. 1 have been grubbed out and that field of twenty-one acres is now under the plow for the first time. The hay and pasture having failed on the bottom fields, Nos. 18 and 19, they have been broken.

A new and excellent wooden bridge, twenty-eight feet long, has been built across College creek, connecting No. 19 with No. 18, and through it with the barns.

Two new runways on which to wheel out the droppings from the cow stables, have been constructed this season; these are high enough at the outer end to allow the manure to be disposed of at a great saving of labor over the former plan. A large reservoir cistern has been placed at the southwest corner of the north barn, and connected with the barn roofs by eavestroughs, and with the spring by a pipe tapping the engine house supply-pipe. It is also connected by a pipe with the water-tank in the barn-yard, into which tank the cistern will wholly empty itself by gravity by opening a water-gate.

The pipe from the windmill to the well at the horse barn froze up in mid-winter, 1887–1888; the following spring it was lowered to from five to seven feet below the surface, five feet being the least distance from the surface.

CROPS.

In 1888 the oats were a failure; they grew so large that the most of them lodged, owing to the moist growing weather in the early summer. Corn yielded sixty bushels per acre. The hay crop was a light one.

In 1889 13.64 acres of oats on the north farm yielded sixty bushels per acre; and thirty acres on the house farm yielded forty bushels per acre.

Corn on the house farm in 1889 will give a return of sixty bushels on the basis of what has been gathered. The hay crop this season was very light.

STOCK.

The stock on the place now consist of Clydesdale and high grade Percheron horses; Short-horn, Holstein, Jersey, and grade cattle; Poland-China swine, and full-blooded and cross-bred Shropshire sheep.

The intention is to make a good dairy herd out of the grades by selecting the best for breeding.

Our thoroughbred cattle are not as good as they should be for the College to own, and it is hoped that we may in time keep only fine specimens, even if we keep but a few of them, instead of a larger number of the ordinary sort.

BUILDINGS.

Having no general plan or unity of design, the buildings on the farm are inadequate to the needs of the department, by reason of their lack of capacity and their inconvenience. The large amount of additional labor made necessary by the inconvenient arrangement is a serious drain on our resources, because it is continuous.

The creamery has been pronounced by some of the best dairymen in the State to be entirely unfit for our purposes. There is surely no inducement for a student to pursue the study of dairying here.

FINANCIAL STATEMENT.

The high prices we have to pay for labor, and the large amount of it made necessary by our inconvenient buildings, and the distance of our arable fields and pastures from the barn, account in part for the fact that the aggregate expenditures of the farm run beyond the receipts every year.

During the past two years we have paid for—

Student laborers	$1,221.37
Regular farm hands (including day labor)	5,035.24
Total	$6,256.61

EXPERIMENTS.

In the winter of 1887–88 some dry cows were fed, with the idea of comparing ensilage and corn fodder, but the results were too unsatisfactory to be worth publishing.

At the urgent solicitation of the director, the experiment station was allowed to take part in the experimental work of feeding during the winter of 1888–9. Twelve steers were fed with the different objects in view, as stated in Bulletin No. 6 of the experiment station. All the steers, buildings, machinery, tools, feed, grain, and labor were furnished by the farm department, except the labor of one man to feed and care for the steers. This last was furnished by the experiment station. The results of the experiments were printed as a part of Bulletin No. 6.

The plan of the experiments was jointly the work of the farm department and the experiment station.

DEPARTMENT OF HORTICULTURE AND FORESTRY.

J. L. BUDD, PROFESSOR.

I am glad to report important advances during the last biennial period in class work, needed facilities, and the important work of trying to adapt fruits, trees, and shrubs to Iowa and the prairie States.

INSTRUCTION.

Instruction in horticulture and forestry commences with the second term of the freshman year, and is imparted to all students except the ladies and the specialists of the mechanical, civil engineering, and veterinary courses.

As we have as yet no suitable class book, instruction is imparted by lectures, object lessons, and field observation and practice.

In successive order the history, best varieties for varied soils and varied parts of the State, propagation, and general management to insure success, are given in detail of the strawberry, raspberry, blackberry, grape, currant, gooseberry, native fruits, apple, pear, cherry, plum, apricot, peach, nut trees, shade trees, ornamental trees, shrubs, and evergreens. The notes taken of lectures, laboratory work, and field observation, are required to be elaborated in note books, which are inspected, and become an important part of the final examination.

Instruction in the sophomore year is given to all students except those named above in special courses. The lectures and lessons of the first half of the term are mainly confined to the propagation, management, and identification of the species and varieties of forest trees for groves, shelter belts, and economic uses in the prairie States, and the recognized influence of trees in the modification of climate by lessening of evaporation, etc. During the last half of the term attention is given to the identification, relative value, propagation, and adjustment for landscape effect, of the ornamental trees, new forest trees, evergreens, shrubs, and flowers of the College grounds.

In the junior year horticulture is an optional study, but a large part of those who have taken horticulture in the freshman and sophomore years select it as juniors.

In the first term the subject of theoretic horticulture is considered in connection with recitations in Lindley's "Theory and Practice of Horticulture." This work is selected as it was written for students in a wholly different climate, hence it gives an opportunity for contrasts in management and selection of modes, methods, and varieties in different climates.

With the aid of associate studies the Iowa Agricultural College junior is fitted for the intelligent consideration of all the varied questions which arise in dealing with trees and plants on varied soils and in varied climates.

During the second term the lectures and field notes are given to the more advanced consideration of facts, principles, and modes previously considered.

In connection I wish to state that my estimate of the value of systematic instruction in horticulture is much higher than it was twelve years ago, when I began the work. From hundreds of sources I am now receiving reports of the creditable work of our students as professors of horticulture, department managers, leaders of horticulture or forestry associations, writers for the press, or leaders in their localities in the introduction and methodic management of the fruits, trees, shrubs, flowers, and garden products generally.

If the German plan of teaching the elements of horticulture in the common schools, normal schools, and academies, was adopted in Iowa, it would not retard advances in ordinary school studies, but increase school interest, and rapidly advance the horticultural interests of the State and the northwest.

EXPERIMENTAL ORCHARD (NO. 1).

This orchard in 1887, contained over 1,200 trees of about 120 of the hardiest varieties then known. In 1887 every variety in the orchard had been ruined by the severe winters except a few scattering trees of Duchess, Wealthy, Tetofsky, and crabs, with some injured trees of Wealthy, Gros Pomier, and Roman Stem. As the ground could not be encumbered with these scattering trees it has been wholly cleared and is now a part of the agricultural experimental grounds. This orchard fully demonstrated the fact that on the college grounds no variety less hardy than the Duchess could be relied on, for a profitable crop of fruit, for a reasonable period of time.

EXPERIMENTAL ORCHARD (NO. 2).

This was started by the writer in 1879, on soil less favorable than that of the wrecked orchard, with a view to testing the varieties then obtainable from Russia, and the seedlings which had attained local notoriety in trying portions of Maine, New Hampshire, Canada, Wisconsin, Minnesota and Iowa.

It is not a test of the relative value of the fruits of east Europe, as the varieties then obtainable were from the west provinces of Russia, or from points as far north as Moscow. The varieties personally selected by the writer in 1882, from the south central provinces, are not in this orchard, but mainly in the orchards of amateurs in all parts of the State. Yet, if confined to the best varieties of this trial orchard, we would have a satisfactory list for every county of the State, of varieties as hardy as Duchess, and of nearly all sizes, colors and variation of quality and season of fruit.

Visitors unitedly express the opinion that this orchard—after the recent trying winters and summers, followed by the most severe and protracted

drouth known to our history—is the thriftiest and most fruitful one in the prairie States north of the fortieth parallel.

Of the varieties of American Seedlings on trial since 1889, I can report the Iowa Keeper, Windsor Chief, Scott's Winter, Peffer's No. 1, Canada Baldwin, McIntosh Red, Red Russet of Wisconsin, Wrightman Blush, Magog Red, Harry Kaump, Weitcher No. 5, New Porter, Peffer's Yellow, Peffer's Winter, Northern Spitzenburg, Clark's Orange, Wythe, Wolf River, Burlington, Excelsior, Iowa Greening, Iowa Russet, Hill's No. 5, Winter St. Lawrence, Winsted Pippin, and Calville of Abbottsford, have all proven as hardy as Roman Stem when top-worked on Gros Pomier, but none of them are hardy when root grafted at this point and northward, and not one of them, perhaps, will prove as hardy root-grafted in the south district as Roman Stem, except the Scott's Winter, Windsor Chief, Winsted Pippin, Wolf River and Burlington.

The Russian varieties of this orchard were exhibited at the recent State Fair, and are described mainly in the bulletins of the Department.

MORE RECENTLY IMPORTED VARIETIES.

The varieties of the apple personally selected by the writer in 1882, in east Poland, north Silesia, and the corn and melon growing provinces of south Russia, were not at first planted in orchard on the college farm, as no suitable ground was then available, and we found it difficult to keep first specimens of fruit in such a public position. Hence, the plan was adopted of propagating them for distribution to careful amateurs in all parts of the State and the Northwest. In the testing of the hardiness of these new varieties we have been much favored by the unexampled severity of the recent winters, and the trying drought of the four past years. Many of them are proving as hardy in tree as the Duchess, and heavy bearers of handsome and good winter apples for the north half of the State, while others of the grade of hardiness of Wealthy, will prove good keepers down to the fortieth parallel. Since the last biennial report was written we have gathered much information in regard to the trees and fruits of these newer varieties, which will be sent out in bulletin form during the present winter.

EXPERIMENTS WITH THE PEAR.

The first importation of varieties of the pear were from England, France, Belgium and west Germany. The hardiest of those brought into the eastern States, and their seedlings, and tried in the prairie States, was the Flemish Beauty, which was a stray from Poland. On the College grounds the last tree of this race of the pear disappeared after the winter of 1884–5. Of the new varieties introduced by the College from east Europe, a dozen or more have proven fully as hardy in tree as the Russian apples, but the pear in all countries does best on high, dry soils. Hence, its profitable culture will not be as general on the level, black-soiled prairies as that of the apple, cherry, and plum. The most favorable reports come from high, dry locations, where the trees are wholly unprotected from the west and northwest winds. Yet, such varieties as the Gakovsky, and some others described in Bulletin No. 3, of the experiment station, are doing well wherever the apple does well. Some of the Snow pears we have on trial from northwest China, also, are models of health in wood and foliage as yet, on our grounds, and in many parts of the State.

THE CHERRY ORCHARD.

Not a trace of the old list of cherries common to the nurseries has been found on the College grounds since 1886. In 1887 I reported the new varieties from Poland, Silesia, and south central Russia, perfect in wood and foliage, notwithstanding the merciless cutting of the wood for grafting and budding, and that they had made remarkable growth during the two rainless summers of 1886 and 1887. I am now glad to report that the trees are yet perfect, and most of them have now fruited in our climate.

In 1888 the cherry crop of the old varieties was reported a total failure at our horticultural meetings, yet several of the Russian varieties were well loaded with fruit which in size and quality was much superior to anything in the old list cultivated at the west. The drought in our region seems to have culminated in 1889. Our creeks are dry, and it does not seem that the roots of trees have been wet in four years. On the campus our native trees have made no appreciable growth, yet our scions of the Russian cherries were never longer or larger, and the trees have given good crops of excellent and full sized fruit. The timely introduction of these varieties will, I believe, soon extend the profitable culture of this healthful and delicious fruit to every neighborhood of the State.

THE PLUM ORCHARD.

We have made a specialty of collecting and fruiting the fine native varieties of the plum which have sprung up in different parts of the west. Of these the De Soto, Wolf, Wyant, Rollingstone, Maquoketa, Forest Rose, and Pottawattamie have proven best in tree, and most regular in bearing of those yet fruited for successive seasons. But we have several others of native origin which are very promising, such as Hawkeye, Cheney, Bixby, and others.

Some of the Russian plums reported in 1887 are proving very valuable for dessert and culinary use. Of these the Early Red, Black Prune, Moldavka, Ungarish, Long Red, Long Blue, and Orel Black have fruited on the College grounds and at other points, and are very promising. While many would prefer for eating our best native plums, those of east Europe have the texture and flavor of the German plums and prunes, and will show no astringency of skin or pit in eating or cooking. Some of them are also much larger in size than any of our native sorts except Cheney.

THE APRICOT.

Some of the extreme south Russian apricots are hardy in the south half of the State, and the fruit compares favorably with our native plums for dessert use, and are better for cooking. Our best apricot, however, in size, beauty, and quality, was grown on the College grounds, from a pit imported from the province of Shense, in northwest China. At first we sent it out for trial under the name of "Chinese apricot," but after it had fruited we named

it Shense. In the meantime parties in Nebraska had discovered its value and named it "Acme." This will bring some confusion, but it will be known soon in the nurseries under its proper name. In size and quality it compares favorably with the Pacific coast apricots.

THE PEACH.

Our introduction of varieties of the peach from north China, and from north central Asia, was noted in the biennial report of 1887. They have proven even more valuable than we then suspected. In hardiness they about equal the Wild Goose plum, and they are early bearers of fruit that is equal to the second grade peaches of New Jersey. In sheltered spots they will make the growing of this fruit possible up to the 42d parallel without winter protection. South of the 41st parallel some of them will be nearly or quite ironclad in favorable positions.

The much talked of *Prunus Simoni*, also, comes near to the peach family in tree, and as near to it in its brick-red tomato-like fruits as to anything else. In hardiness it is about like the peaches above named, and its thoroughly ripened fruit in our climate is really excellent for any use.

THE VINEYARD.

The continued drought has lowered the vitality of the vines, yet we have had good crops of excellent fruit the two past years. This vineyard has not failed to bring a good crop but once in the past ten years. The plan of laying down and covering only the tips and the crown, is still continued, leaving the bow of the laid-down canes exposed to the air and cold. While it may be best to cover the whole cane farther north, up to the 42d parallel I do not think it is needed. The heavy manuring of the vineyard in 1886 has proven a great advantage. The varieties giving the best fruit and most of it are Concord, Worden, Moore's Early, Cottage, and Telegraph. When standing among Concords some of the Roger Hybrids have done well.

OTHER SMALL FRUITS.

We are continuing the testing of all promising new varieties of the strawberry, raspberry, gooseberry, Juneberry, etc., and have imported several new varieties of the currant and Juneberry from east Europe. The reports from these are given from time to time in the journals, and horticultural reports of the East and West.

ORNAMENTAL TREES AND SHRUBS.

Very many of the ornamental trees and shrubs imported by the College from east Europe and central Asia, in the springs of 1883 and 1884, are proving very valuable additions to our restricted list of ten years ago. Visitors to the grounds continually express surprise that we have been able to gather so many handsome trees and shrubs, which are perfect in foliage and wood, in our trying climate. In most cases these oriental shrubs and trees have made fine growth during the drought when native trees are at a stand still. Of our collection in this line, Hon. T. T. Lyon, of Michigan, recently wrote: "The quality of these introductions of both plants and fruits, constitutes a wealth of possibly useful and valuable material, greatly in excess of public apprehension."

Many of the shrubs and trees of our introduction are now in the eastern nurseries.

NEW FOREST TREES.

On the uplands of Northwest Iowa, and over large portions of Kansas, Nebraska, and Dakota, all the native quick growing trees fail on account of too much evaporation from the leaves. In such localities, and indeed over nearly the whole West, the poplars and willows introduced by the College from east Europe, are proving of great value. They will make rapid growth where our cottonwood and the white willows utterly fail, and the timber of some of the oriental poplars and willows does not warp, shrink, or crack, as does that of our native species.

OUR PROPAGATING STOOLS.

With a view to the extended trial of newly introduced fruits, trees, and shrubs, we have done considerable in the way of propagation during the past eight years, and as the scions and cuttings must be taken from our own plants we have been forced to use our first plantations in nursery and orchard as stools from which to cut annually the new wood. This gives rise to expressions of wonder on the part of visitors that we should have so many cherry, plum, pear, apple, and other trees and shrubs, that have the appearance of dwarfed stubs and bushes in an old pasture. So far this has been unavoidable, but our younger orchards, and shrub and tree plantations, will not be ruined in this way, and will present a more tidy and methodic appearance.

ARBORETUM.

We have made no attempt to start a systematic arboretum, yet on the large campus, and in plots and groups on the horticultural grounds, we have specimen trees and shrubs of about all the native and foreign trees that will live in our climate. While not as convenient for study as the well arranged arboretum, it is best for landscape effect.

EXPERIMENTS IN CROSSING.

Two or three years ago we crossed hundreds of blossoms of the hardiest known fruits with the pollen of the best in quality and of the season most needed. We have now many seedlings as the result of such crossing, which we shall fruit as soon as possible on the College grounds, and send out the scions for trial at our many trial-stations.

DEPARTMENT NEEDS.

Two years ago I urged our imperative need of more room for class work, horticultural museum, seed-room, office for propagation, etc. For the present our trustees think it wiser to ask for State appropriations to supply other and perhaps more urgent needs. But I will express the hope that two years hence the urgent needs of the horticultural department will be placed first on the list for the consideration of the legislature of 1892.

EXPERIMENT STATION.

R. P. SPEER, DIRECTOR.

In February, 1888, the legislature accepted the grants of money authorized by the act of congress known as the Hatch law, approved March 2, 1888, upon the terms and for the uses named in said law, and placed the organization and management of the Iowa Agricultural Experiment Station under the control of the board of trustees of the Iowa Agricultural College. On February 17th, the said board of trustees elected R. P. Speer director and Herman Knapp treasurer of the Station, and appointed Trustees J. W. Garner, Joseph Dysart and C. M. Dunbar a standing committee on Experiment Station. On March 14th it was determined by said committee that the work of the College and the work of the Experiment Station could not be connected in any manner without injury to the interests of both, except during the College vacation. On April 11, 1888, Geo. E. Patrick was elected Station chemist at a salary of $2,000 per year; A. A. Crozier was elected Station botanist at a salary of $1,800 per year, and C. P. Gillette was elected Station entomologist at a salary of $1,600 per year. On April 11th, eighty acres on the west side of the College farm was assigned to the Experimental Station for experimental purposes for an annual rent of $200 per year. The director was authorized to purchase the necessary teams, farm implements, book cases, and office furniture, books for Station library, apparatus and supplies for the chemical, botanical, and entomological laboratories of the Station, gas generator, and gas fixtures, and employ the necessary laborers to perform the work of the Station properly. The purchases referred to above, were made by the director for the sums named in his annual report to the Governor, for the fiscal year ending June 30, 1888. At a later meeting the committee contracted with Tresant & Smith, of Des Moines, for the erection of a substantial frame building for offices, laboratories, library, etc., for $3,000, which was completed June 30, 1888.

During the summer of 1888, the trees in a worthless old orchard on the Experiment Station grounds were grubbed out, seven acres of stump land were cleared up, 1,300 rods of new tile drains were put in, and 400 rods of improperly constructed old tile drains were repaired. As the old American varieties of apples, pears, cherries, and prunes had proved too tender for Iowa, a new six acre orchard of very promising apples, pears, cherries, and plums, from central Russia and northwestern China, was planted on the Experiment Station grounds for trial. For the purpose of producing hardier fruit trees, a large number of blossoms of hardy apples and plums in the College orchard were cross-fertilized, in the springs of 1888 and 1889, with pollen of the best American apples and plums.

In 1888 and 1889, many of the most popular varieties of wheat, oats, rye, barley, corn, buckwheat, potatoes, sorghum, grasses, garden vegetables, and small fruits were planted on the station grounds, that the director and station botanist might have opportunities to study their characteristics and save seeds of the best varieties for future planting.

As timothy and other tame grasses are injured frequently in some parts of the State by fungous diseases, it was considered advisable to test the most promising wild grasses of the northwestern States on the Station grounds. In August, 1888, the seeds of about forty varieties of native grasses were collected in Iowa, Minnesota, Dakota, Montana, Idaho, and Colorado, and planted last spring on the Experiment Station grounds, which will be watched carefully, and reports will be made on them in future station bulletins.

Different kinds of cultivators and other farm implements have been tested for the purpose of determining which was best.

The Station chemist has made many analyses of milk, butter, grasses, and other forage plants, ensilage, feed stuffs, and soils, besides inventing an accurate and rapid process for determining the butter fat in milk. Many analyses were made, also, last year and this year, of separate stalks of amber cane, for the purpose of selecting seeds from the stalks which contained the most crystallizable sugar, for future planting. Experiments were conducted by the director and Station chemist last fall in making sugar from sorghum, by the Jennings diffusion process, but on account of unavoidable delays in getting the machinery ready for work, and on account of the low quality of the sorghum (caused by drouth), less was accomplished than was expected.

Experiments, extending through several months, were conducted by the Experiment Station and the farm department of the College in feeding twelve steers, for the purpose of ascertaining the comparative value of corn and sorghum ensilage, corn fodder, timothy hay, wheat bran and ground and unground corn. The results of the feeding experiments will be found in Station Bulletin No. 6.

Many experiments were made by the Station entomologist, in 1888 and 1889, for the purpose of determining the best methods of destroying chinch bugs, corn root worms, cut worms, codling moths, and other injurious insects. The results of the work of the Station entomologist have been very satisfactory to the farmers of the State.

The results of many other experiments of minor importance have been published in the Experiment Station bulletins.

The director and Station botanist will give special attention to the improvement of the cereals, grasses, root crops for stock, fruits, sugar producing plants, and garden vegetables, by cross fertilization and careful selections of seeds.

Neither breeding, feeding, nor dairy experiments can be conducted in a satisfactory manner at the Experiment Station, as no buildings have been provided for the domestic animals or the storage of hay or grain. Seed rooms, and store rooms for farm implements, are needed very much, also; but the Station money cannot be used for the erection of the buildings which are necessary without violating the provisions of the Hatch law, under which the Experiment Station was established.

The following is

A STATEMENT

Of the receipts and expenditures of the Experiment Station from the time of its establishment, February, 1888, to November, 13, 1889, as prepared by Herman Knapp, treasurer of the Station.

RECEIPTS AND EXPENDITURES.	DR.	CR.
RECEIPTS.		
Amount received from the United States treasurer for United States fiscal year, ending June 30, 1888		$15,000.00
Amount received from the United States treasurer for United States fiscal year, ending June 30, 1889		15,000.00
Amount received from the United States treasurer for first quarter of United States fiscal year, ending June 30, 1890		3,750.00
Amount received from the sale of stock, produce, etc		689.11
EXPENDITURES.		
Paid for station building	$ 4,244.08	
Paid for station salaries	11,759.95	
Paid for station labor	2,595.54	
Paid for station apparatus and library	7,212.06	
Paid for station equipment	2,073.16	
Paid for station supplies and expenses	5,059.84	
Paid for station bulletins	1,356.50	
	$34,291.13	$34,439.11
Balance, cash on hand	147.98	
	$34,439.11	$34,439.11

REPORT OF THE SCHOOL OF VETERINARY SCIENCE.

M. STALKER, PROFESSOR.

No radical changes have been made in the school of veterinary medicine since the last biennial report. At that time a change had just been made from a two years' to a three years' course of study. Experience has shown the wisdom of the change. The students themselves fully appreciate the impossibility of giving them the requisite mental training and practical experience in a two years' course, that will qualify them for successfully meeting the higher demands that are made each year on the members of the profession. I do not think the addition of one year to the work of this course will in the end lessen the number of students in attendance. Twenty-seven special students have taken instruction in this school during the present year besides those from other courses who took some part of the work. I have endeavored to strengthen the course by supplementing the work of the regular professors, through courses of lectures by non-residents. I trust I shall be able to arrange for more of this class of work in the future, with slight cost to the institution.

The practical work of this school has been very satisfactory for the last two years. Free clinics are held at the veterinary hospital five days in the week, at 1 P. M. These clinics are largely patronized by farmers and other stock owners. Animals requiring continued treatment have been received into the hospital, where students could have an opportunity to see the progressive results of treatment. This class of patients has fully taxed the capacity of the hospital during the year. A moderate charge is made to cover the expense of feed and care for these boarding patients. The charge of $2.00 per week about meets this expense. The demand on the hospital for this class of work has been much greater during the present year than ever before.

I will renew the request made two years ago, looking to the enlargement of the facilities for instruction; and in so doing will quote from the report submitted at that time. I would emphasize what I then said as to the necessity for these increased facilities. They are absolutely essential to the well-being of the department, and I believe the legislature will cheerfully meet the requirement.

"The department has some small needs. We have but one lecture room, while two, and sometimes three, classes are in progress at the same time. I would earnestly request you to include in the list of appropriations asked from the legislature a sufficient sum to build an extension on the south end of the sanitary building, say twenty feet in width, and the height of the present structure. This would furnish us a convenient lecture room on the

first floor, and a microscopic laboratory on the second floor, with one or two additional rooms above. This would give us a laboratory of sufficient room to accommodate the class at one time. Our present accommodations are so restricted that only a limited number of students can engage in laboratory work at once, thereby dividing the class, so that four or five afternoons per week are required to do the work that could be performed in one afternoon.

"F. Turner estimates that a building could be constructed at a cost of $1,600 or $1,800."

There are some repairs which should be made on the veterinary hospital as soon as possible. The floors of the boxes on the ground floor have entirely given out, and will have to be replaced before horses can safely be put in them. Some plan of ventilation should be provided under this floor. Two or three openings through the foundation walls, properly grated to keep out small animals, is all that is required. I think the decay of the floors is due in part to this fault in the construction of the building. Several of the windows are in a condition to require slight repairs. An appropriation of $50 will meet the whole expense. It is important that this work be done at once, before the severe weather of the winter comes on, and that the building may be ready for the reception of patients when the term opens in the spring of 1890.

REPORT OF THE DEPARTMENT OF MECHANICAL ENGINEERING.

C. W. SCRIBNER, PROFESSOR.

In reporting upon the condition and needs of this department it is important to remember that this is at present the only school of Mechanical Engineering in the State of Iowa. It is, therefore, the more essential to make the most thorough preparation for doing the best work now, while the mechanical engineer is growing in Iowa with the growth of our manufactures, and since he must soon of necessity become an important factor in affecting the wealth and business success of our State. In the biennial report for 1887, my predecessor has well set forth some of the needs of this department, and he left the shop equipment certainly in a much improved condition. But much still remained to be done there, and the whole course of instruction needed thorough revision.

In the methods since introduced, and now well organized, a solid foundation has been insisted on by requiring all work done to conform to a carefully planned system.

Before being asked to take charge, in June, 1888, to an inquiry about the system advocated in teaching shop-work, I replied: "The *training* to be given a student would have to be *first* considered, so that exercises rather than manufacturing should form a large part of the work, especially at first. The latter, however, has many valuable features, the most prominent to my mind being the increased responsibility felt by students as to the value of time and material, and of proper *finish* of work, when the product of their labor is to be sold. But to make manufacturing successful, circumstances must be peculiarly favorable, and I would not think of introducing it to any great extent, until the exercise plan was being carried on successfully as a means of instruction."

In conformity with this idea the instruction in our shops has been reorganized on this basis, not merely in devising exercises for such purposes, but by laying out a complete and progressive system of work, involving the use of drawings of the pieces to be wrought, which with printed sets of directions, are given each student.

This method has been carried out in all the various branches, carpenter and pattern work, foundry work, blacksmithing, machine, tool, and vise work. The principles to be taught are now well systematized, and the material shapes best calculated to embody these principles have been determined. Later on, it will be a simple matter to add features which will provide for developing the construction faculty, and furnish enough practice in

manufacturing useful articles to embrace all the advantages belonging to that method, by choice of a few articles of use similar to certain exercise pieces, and at the same time sufficiently marketable. But through any such operation the good of the student rather than the sale of the product must be chiefly considered. To refer to actual changes besides the systematizing of the wood and iron working just named, the following must be mentioned:

The iron-working machinery has been moved with the engine to a much more convenient place in the rooms, giving more space for each tool and greater economy of labor. A new tool-room has been fitted up by partitioning off part of the shop, and all tools kept in first class order and dispensed to students on the check system. The basement has been converted into a fairly good brass foundry, and fitted with furnace and necessary appliances, and a course in molding and founding arranged for. Short courses in blacksmithing, boiler work, and millwrighting have also been added, and arrangements made for taking up steam and gas fitting and plumbing as soon as necessary tools and space can be provided. As to the success attained the new system has given great satisfaction as a progressive method, and, the details of adjusting it to the time and capacities of the students having been worked out, is growing in popularity.

The brass foundry has proved a special attraction; the freshmen can hardly get enough of it to satisfy them. The steam and gas fitting and plumbing courses will next receive attention; and, these details once in hand, care will be taken, by studying the tastes of the students, to further increase the attractiveness while retaining the instructiveness of their work.

The large number of mechanical engineers in this freshman class compelled the use of money for increasing the number of wood lathes instead of equipping the pipe-fitting courses. This shows the need of providing for increased numbers, as well as for extending lines of work to what we ought to have.

The following taken from the current catalogue, shows what we are equipped for, and what is still needed:

"The following are the subjects taught:

"In the Wood Shop—Bench work in carpentry and joinery; wood turning, pattern making, and handling of wood-working machinery.

"In the Machine Shop—Vise work with chisel and file, centering, cutting off, drillpress, shaper, planer, and lathe-work; also hand turning.

"In the Foundry—Molding, melting, and core-making.

"In the Smith Shop—Forging, hardening and tempering, and annealing. To these may be added: Millwrighting and boiler making, the shop system of taking care of small tools, running engines, firing, and care of boilers. There are now in preparation also courses in plumbing, and gas and steam fitting.

"The Shops and Equipment are as Follows: The carpenter and pattern shop is a two-story building 30 feet by 50 feet with a wing 24 feet by 32 feet, containing the Corliss engine, condenser and air-pump, feed-pumps, etc. The lower floor is used for the wood-working machines, the second story for tool-room and benches at which carpentering is taught. The equipment consists of seven wood-turning lathes, one pony planer, one mortising machine, one Fay rip and cross-cut circular saw, one jig saw, 1 3-foot grindstone, twelve sets of small tools in the tool room, also seventy-five tool lockers.

"The Foundry is located in the basement below the west wing of the machine shop. It is 28 feet by 61 feet long, and contains accommodations for eight students. These consist of molding tubes, core-benches, melting furnace, core-oven, spill-trough, crucibles, flasks, etc.

"Here the student is required to make green and dried sand-molds from patterns designed to bring out the most general principles of brass and iron casting.

"Loam molding is also explained; some work at the molds while others are making and drying cores and melting brass.

"The Machine and Forge Shop occupies the entire lower floor of Engineering Hall and is 28 feet wide by 61 feet long, with a wing 28 feet wide by 40 feet long, the latter containing a tool room 10 feet by 28 feet.

"Machine tools and general equipment comprise: One 20-inch Fitchburg engine-lathe, two 16-inch Reed engine-lathes, one 16-inch Washburn engine-lathe, one 10-inch Prentice Bros. engine-lathe, one 9-inch Brown & Sharp universal hand-lathe, one 9-inch Washburn engine lathe, one 20-inch Fitchburg drill-press, one 22 by 60-inch iron planer, one 7-inch shaper, one Brown & Sharp emery tool-grinder, one cutting-off machine, one Springfield Glue and Emery Wheel Co.'s 3 by 20-inch emery wheel for tool grinding, one 4 by 17-inch buffing wheel, twelve machinists' vises, 73½ feet of vise benches, one 38 by 51-inch Buffalo forge, one complete set of blacksmith tools, one wrought-iron anvil.

"The tool-room contains thirty-nine tool-lockers and five cases of small tools, which are sufficient to meet present wants."

To turn to progress in other lines, the instruction in drawing and engineering studies has been greatly advanced. By commencing mechanics of engineering in the first junior term, and completing it within the year, most satisfactory results have been produced, and the course has practically been advanced one term without increasing the entrance requirements or the difficulty of the work beyond what the students can do. So it has been possible to put into the senior year new and more important studies, which bring our work right up to the same relative basis with the best schools of the country.

The advance in drawing has been radical and very great, but is not yet complete. It does not yet show in the arrangement of the outfit or equipment, but will appear in a study of the drawings just finished by the classes. A few new tables, erected for the drawing boards, and a large and carefully selected supply of drawings from the best manufacturing establishments in the country, are soon to be added. Then, as soon as possible, a variety of samples of small machine tables for studies, from which to sketch, and further systemizing the course, will fit us to compete with the best institutions in that important line. The free hand drawing remains under the control of this department, and has also been completely reorganized, and is thoroughly taught as specifically outlined in the current catalogue.

In addition to the above, an entirely new and most important line of instruction has been added, by arranging the course to admit of regular

instruction in practical tests of engines, boilers, and all machinery used in manufacturing, as well as by providing for practical tests of the strength and durability of iron, steel, wood, cement, brick, stone and other materials used in engineering. For this purpose considerable has been done in collecting the necessary machinery and instruments for such work. Much has yet to be done, and space and special rooms will soon be needed for this most important feature of our course. The following is inserted as given in our catalogue for this year, and affords an idea of what we have, as well as a strong argument for completing the needed equipment, and providing more room for accommodating this part of our work.

"Provision is already made for the following:

"A boiler test, including gas analysis and observation of quality of steam, by steam jet and calorimeter methods.

"An engine test, including dynamometer and indicator power measurements, with estimate of quality and weight of steam used.

"Efficiency and duty of injectors.

"Efficiency and duty of steam pumps.

"Efficiency of mechanical power pumps.

"Ultimate tensile, compressive and bending strength of wrought iron, cast iron, steel, wood, etc.

"Moduli of elasticity of the same.

"Strength of welded and riveted joints.

"Shearing strength of bolts, nuts, and rivets:

"The apparatus for this purpose is as follows: One 35 H. P. horizontal tubular boiler; one 25 H. P. Harris-Corliss engine; one 5 H. P. plane slide valve engine; one Prony brake dynamometer; one No. 9 Sturtevant fan blower, (serving as power absorber); one transmission dynamometer; one 50 H. P. Wheeler's patent surface condenser; one Blake air pump for above; one 2 inch Worthington water meter; one Elliott gas analysis apparatus; one standard pyrometer; one mercury flue thermometer; two Thomson steam engine indicators; one Richards steam indicator; four standard thermometers for steam and water; one Dodge injector and Hancock inspirator, fitted for tests; one American Steam Gauge Co.'s engine register; one Schaeffer & Budenberg's tachometer; one 50,000 pound-testing machine. Also scales, steam and power pumps for tests.

"Arrangements can also be made for tests of the 35 H. P. Buckeye engine running the Edison electric light station, furnishing light to the college, the dynamo machines being also available for certain tests."

For our most essential needs in the way of equipment, I would suggest the following:

First: A new boiler, boiler-house and steam heating apparatus for Engineering Hall is urged as being absolutely necessary.

The present boiler has now been in use for twenty years, a period universally recognized as the limit of life for an ordinary boiler.

In August, I got into the fire-box under the boiler and examined that part of the boiler myself. Along the second seam, where the flames impinge on the plates is a deep groove—the result of expansion and contraction, added to the direct effect of the fire. This, of itself, should condemn the boiler for more than temporary use, while its leaky and damaged condition in other ways makes its use for two years more out of the question. Add to this the fact that a single boiler, even if new, should be expected to serve in case of electric lighting, with no reserve in chances of accident, and the absolute necessity of the case is apparent.

Meanwhile, should the two new boilers thus called for be provided (a separate one being needed for the electric lighting plant) it would be just as needful to furnish a building to cover them. The present boiler is simply under a flimsy shed, which is not located in the best place, and is not nearly large enough for its purpose. Again, it is needless to call attention to the wastefulness of using stoves to heat Engineering Hall, when a boiler, (making steam heating a simple matter) is right at hand. Besides, a certain amount of risk of fires and the difficulties of keeping up five stove fires, with the dust and dirt resulting, would strongly recommend the use of steam.

It is estimated that the whole builing, as it now is, could be fitted with the needful heating apparatus for some $75 to $100.

The need of a boiler and boiler-house is no new thing. It was named as a necessity by Prof Bassett in the last biennial report.

I would emphasize, therefore, the need of getting a new boiler *solely for the use* of the Mechanical Engineering Department, which, if of an improved design, would cost some $900 to $1,000, and which, with such a building as we need to cover it, to accommodate also the large engine and a room for the necessary boiler testing, would (including steam heating), amount to at least $5,000.

One further topic needs careful consideration all over the country. Engineering schools are awake to the demand for instruction in electrical engineering. Nearly all our students in the mechanical course and many of our civil engineering students are looking to that as an object. There is a very great demand for well equipped young men in this line.

Des Moines is just now arranging for rapid transit by electricity all over the city, and soon there will be a call for electrical engineers. Davenport and other cities of our State are doing the same. Why should these come from other States? On the authority of the world's greatest electrician, as well as by the verdict of the latest experience in these matters, an electrical engineer must first of all be well trained in mechanical engineering; just the thing we are prepared to do. All we need is some equipment in the way of a dynamo room, under the joint control of this department and that of physics, to complete our provision for giving the full electrical engineering course.

The engineering department at Madison, Wisconsin, is being rapidly pushed forward, and has recently added courses in railway engineering as well as in electrical engineering.

We must provide some answer to this call at an early day, and there is every reason to believe that if our present facilities for this work are well advertised, and even a small amount of money provided for an outfit, much can be done to bring our State to the front in these matters.

The students taking this course for the past year have numbered as follows:

Seniors	4
Juniors	7
Sophomores	8
Freshmen	14

DEPARTMENT OF CIVIL ENGINEERING.

CHARLES F. MOUNT, PROFESSOR.

The growth of this department during the past two years has been very satisfactory, and its course of study is proving to be a practical one. Its recent graduates are filling many important positions with railway and bridge companies, from chief engineers down. Its graduates are in demand, nearly all of this year's graduates (1889) having secured positions with bridge or railway companies within three weeks of graduation. The graduates of previous years are almost without exception employed in engineering work, and have shown by their progress after leaving college that they are prepared for actual service. They have in several cases risen from subordinate positions to the highest in the engineering departments of the companies employing them, and this within four or five years of graduation.

The aim of the department is to *better* its course, not to *change* it simply for the sake of change, hence there have been but few changes within the last two years.

Trigonometry is made to embrace a full appreciation of the relations of functions to each other, as well as the application of those relations to the solution of problems.

In land surveying, the student is taught to make accurate surveys of areas of land in the vicinity of the College, to calculate the exact area embraced in such survey, and to map the same, with all roads, streams, buildings, etc., contained in the same.

In railway surveying, besides the regular recitations, the student works out various problems in curves, turnouts, etc., and stakes them out as in actual practice. Earth-work is staked out and contents calculated, and plats and profiles made. A short line of railway (two to four or five miles) is surveyed, profiles taken, grades taken and a topographical map made. This survey includes one, two, or more preliminary surveys and the location. In bridge work the student *designs* one or more bridges for either highways or railways. During the present year (1889) designs were made for five railway, two swing, and two cantilever bridges. The designs include the working drawings, giving all dimensions, bills of material, and details. Copies (blue prints) of any of these or previous designs will be sent to any-one interested.

In sanitary engineering, the object is to make the student familiar with the requirements of modern water-supply, sewage, and drainage system, together with the various details of construction. In specifications and contracts the student becomes familiar with the forms used, and also the

duties of engineer, contractor, etc. Retaining walls include the methods of obtaining the resistances of various forms of walls, forces acting upon them, classes of masonry, composition and manufacture of cements, mortars, artificial stone, and kindred subjects. The course throughout is shaped to the needs of the engineer *after he leaves college*, so that he can—as most of them must do—make a living from the close of his college life, and by the aid of the knowledge obtained in his engineering course, rise rapidly in his profession. No study is put in the course because it is in some other civil engineering course, or because it would look well when printed in the course of study. But each and every study is put there and taught for the sole benefit of those most interested, viz.: the students.

As to methods of teaching, these must vary with the subject and *size of classes*. The same methods cannot be employed in a class of fifty as can with fifteen, nor with fifteen as can with five. Nor the same with students just commencing the course as with those who have nearly completed it. The equipments of the department are not excelled anywhere in the West, and we consider the course of study, *as tested by results*, to be one of the best to be found anywhere in the country. The question asked the young engineer seeking employment is, what can you do? hence the object of the instruction given is to teach the student *to do* and to depend on *his own resources* in doing. Nothing is more valuable to a student than to work out in his own way the various problems, and to find his own mistakes by comparison with his fellow student. And this is especially valuable in engineering, where one never knows in what shape a problem may present itself.

REPORT OF THE DEPARTMENT OF BOTANY.

BY L. A. PAMMEL, PROFESSOR.

I have the honor to present my first annual report as professor of botany. That you may understand how this study is taught in the college, I will briefly outline the work of this department. The freshmen begin the study of botany in the second term. In this course they are expected to become familiar with roots, stems, leaves, and such terms as are used in descriptive botany, thus leading up to the determination of our native plants.

In an agricultural college it is proper that the subject of vegetable physiology, and the diseases our crops are subject to, should receive considerable attention. With this end in view the sophomore student familiarizes himself with some of the native plants of Iowa, making a collection of seventy different species. In the laboratory the student takes up the minute anatomy of plants and vegetable physiology. He learns something about the function of roots, stems and leaves, how the plant prepares its food, and how these materials are conducted through the stem, leaf and root, where and why these materials are stored away. In the second term special attention is given to the lower forms of plant life, such as "rusts," "smuts," "molds," "mildews," and the diseases of cultivated plants that are most troublesome to the farmer and horticulturist.

In the veterinary course three terms of botany are required. In the second term of the freshman year the students become familiar with the principles upon which the subject of botany is founded. After having acquired this elementary knowledge, they are ready to take up medicinal plants. In this course it is intended to show the relationship, origin, and history of some of the medicinal plants. Some of these are also studied in the laboratory. No veterinarian can call himself up with the times, unless he has some knowledge of the various minute organisms that cause so many of our contagious diseases in man and the lower animals. It is of the utmost importance to the community that the contagious diseases of our domestic animals should be recognized by the veterinarian, to prevent the loss of human life; as such diseases as anthrax, glanders, and tuberculosis, produce fatal diseases in man as well as in our domestic animals. It is, therefore, important that veterinary students should study these low vegetable organisms. To accommodate these and other students who are interested in this subject, the Botanical department has purchased some of the apparatus for doing bacteriological work.

WEEDS.

In a previous report, Dr. Halsted, now of New Brunswick, New Jersey, has called your attention to several troublesome weeds, and as this is a subject of considerable importance to the farmer, I shall discuss a few which have come under my notice during the year. It will certainly be of great interest to the farmers of Iowa to know that the troublesome European parasite, "Clover Dodder," has made its appearance in Missouri.

A short time ago, I received from Mr. Henry Wallace, of the *Homestead*, a specimen of what he thought might be Clover Dodder. The material was carefully compared with specimens in the herbarium of the Agricultural College, and the conclusion I reached was that it could be nothing else but Clover Dodder (*Cuscuta epithymum*, L.) I republish a part of the *Homestead* article, and some more additional facts concerning this pest, that farmers may be on their guard.

Mr. Downing's letter to the *Homestead* is as follows:

"I send sample of a vine that is killing clover, not on my farm alone, but it has quite a start in this section, and all from seed shipped here last spring. I send you some that has dried up, and some green. As soon as it kills the clover (or anything else that it gets hold of) it dies and leaves the ground bare; but the ends of the vine keep on spreading among anything green. There are spots now already dead that are two or three rods across. I hope you will give information as to what it is, also how to get rid of it."

Mr. Downing's plant is without doubt Clover Dodder (*Cuscuta Trifolii Bab*, or, as it is now called, *C. epithymum*, L). The dodders belong to the Morning-glory family (*Convolvulaceae*), to which the common wild Morning-glory, or Bindweed Sweet potato belong. This order contains a good many plants which are troublesome weeds in many parts of the world.

The genus *Cuscuta* or Dodder contains a good many species, upwards of a hundred having been described by botanists. Of these, forty-four are found in America, twenty-nine of which are indigenous to the United States. Among these American dodders one is frequently found on the high bush blackberry (*rubus villosus*). The others are found on various native plants, such as smart weeds, willows, hazels, on various composites, like golden-rod, sunflowers, etc.

The dodders are leafless (excepting the small scales on the stem) herbs of reddish or yellowish color, with thread-like stems twining around the plants upon which they live. They pierce the bark with their small and short rootlets, which are called suckers, or haustoria. The seeds are small; yet there is stored sufficient nourishment in them to give the growing plants a good start. Germination takes place in the soil, the young plantlet grows sufficient in length to allow it to come in contact with the plant upon which it lives, when it immediately sends in its suckers and thus becomes established upon the plant as though it were a part of it. It is usually stated that dodders contain no chlorophyll, but recent investigations show that they contain at least a small amount, but probably not enough to enable them to make very much starch out of crude material. Ordinary green leaves contain a great deal of this chlorophyll, or green coloring matter, and, hence, are able to prepare their own food. Plants like dodders, which derive their nourishment from the host upon which they live, are said to be parasitic.

As a troublesome parasite, Clover Dodder seems to have been observed in Germany about the beginning of this century. Flax Dodder seems to have been known for a much longer period, as it is mentioned by writers as early as 1760. Flax Dodder occurs in this country, but is not troublesome. In Europe it does much damage. The South American *Cuscuta racemosa—Martius var, Chiliana engelm*—has occasioned some trouble in European alfalfa. It has also been introduced with the seed of this plant into California, where it now injures the crop to some extent.

Professor Macoun reports Clover Dodder in his catalogue of Canadian plants, published in 1884, as occurring in Ontario, and introduced with clover seed. It may possibly occur in other parts of the United States and that I have failed to see the reference.

Fortunately all these pests are not so common in this country as to materially affect our crops. Whole clover fields are destroyed by the Clover Dodder in England and on the continent. It should, therefore, not be allowed to spread in this country. The existing patch should be exterminated immediately.

HOW TO EXTERMINATE THE WEED.

Several means suggest themselves. Cover the patch with straw and burn it with the clover. A more radical way would be to use oil of vitriol and water in the proportion of one of the oil of vitriol to three thousand of water; but this must render the soil quite unfit for use at least for a year or two. If it covers large areas clover ought to be followed by plants upon which dodder will not grow. It has been found to grow with preference on leguminous plants, showing its best development on clover vetch. The common bean is seldom affected. At times it occurs on other leguminous plants, on various weeds growing near clover patches, on some members of the carrot family (*Umbelliferae*) and on common nettle (*Urticaceae*): it produces both flowers and seeds. Haberlandt found that it would not even start on flax, sunflowers, and hemp, but can be made to grow for a short time on mangolds, common bean, and Indian corn.

It will be well, therefore, to follow clover with oats, wheat, and barley, or such other plants upon which it will not grow. Above all, we should prevent its appearance. It must be remembered that dodder seed maintains its vitality for several years in the soil, and that the seeds are distributed in several ways, first, by animals; second, by sowing clover and the like containing dodder seed. Animals eating clover containing dodder seed carry it for some distance. It has been shown that after it has passed the alimentary canal the seeds are still capable of germinating. In Europe sieves are used to separate dodder from the clover seed, as the latter is very much smaller. It seems proper in this connection to say that suspected seed should be sent to some of the experiment stations, as many seeds have a characteristic structure, and can easily be recognized by aid of the microscope.*

*A most excellent account of this parasite may be found in Sorauer, Diseases of Plants (*Pflanzenkrankheiten*) Vol. II, page 32. Also N. G. Smith, Diseases of Field and Garden Crops.

HORSE-NETTLE.

In the last biennial report Dr. Halsted reported the appearance of Horse-Nettle (*Solanum Carolinense*, L.) on the College farm. This species has certainly come to stay. The past summer it was found in several places on the farm. In Missouri and Southern Illinois it is a very troublesome pest in grain fields. The leaves and stem are prickly. The flowers resemble those of a potato; pale blue or whitish in color, while the "seeds" (berries) are yellow. The plant is a perennial, that is, living from year to year, and therefore somewhat difficult to destroy. The only effective measure of dealing with this pest is to stamp out its first appearance. This may be done by digging it up roots and all, and allowing none of the leaves to grow, as these are the organs in which the food of the plant is made.

SPINY-NIGHTSHADE.

Another very troublesome pest, and closely related to the Horse-Nettle, is the Spiny-Nightshade (*Solanum rostratum Dunal*) or thistle as it is called in some places. This weed occurs in parts of Iowa. It is to be hoped that this pest will not get a strong foothold in our loose, fertile prairie soil. The Spiny-Nightshade is a native of the Rocky Mountains, and the plains from Nebraska to Texas. It has spread eastward and southward to a considerable degree. Prof. Henry has well said, it is following up the "Potato Bug." Anyone who has traveled in Texas or parts of Kansas and Missouri knows how troublesome it is to the farmer. In these States it is well established; occurring in streets, door-yards, and fields. In pastures, cattle avoid it, thus leaving it to go to seed. Texas parties inform me that this plant scatters its seeds like our tumble weeds (*Amarantus, Cycloloma*, etc.). How long will it be before it becomes a serious pest in the grain and corn fields of the Mississippi valley? It has already been reported from Wisconsin, New York, and Massachusetts. The Wisconsin plants which I collected were only strays, accidentally introduced by seed.

PRICKLY LETTUCE AND FIELD SOW-THISTLE.

From time to time I have made observations on several other introduced plants. I was therefore much interested in a little patch of Prickly Lettuce (*Lactuca Scariola*, L.) occurring on the College grounds. Dr. Halsted informs me that he first observed it several years ago near some rubbish on the College farm. I also noticed some in the streets of Ames and Des Moines. The spreading of this weed is rather interesting. In Dr. Gray's Synoptical Flora of North America it is recorded as "spreading near towns and habitations in the Atlantic States." It seems that Mr. Eggert collected it as early as 1877 near St. Louis. Mr. David F. Day found it at Mukwanago, forty miles west of Milwaukee, in 1880 (Bot. Gazette, page 159. See also page 139 for other localities). In the fall of 1883 it was quite common at Madison, Wisconsin, and in 1885 it was plentiful in a good many of the vacant lots in North Chicago. In the summer of 1887, I found it near LaCrosse, Wisconsin, in Vernon county, growing on a manure heap only a few yards from a nursery. There can be little question that it was introduced in some way by the nursery man, as much of his stock was purchased

in the East. Recently I also noticed it in Northern Texas. In Missouri it is common in the streets of cities, along railroads, and even growing in woods.

The field Sow-Thistle (*Sonchus Arvensis*, L.), which in one of our adjoining States, Wisconsin, has been recognized in the weed law, is found in considerable quantity along one of the great trunk lines entering Chicago. This is a pest somewhat to be dreaded if it should appear in Iowa, as it is a perennial and is much harder to stamp out than the common Sow-Thistle (*Sonchus oleraceus*, L.) In Chicago and near St. Louis I have seen one of the Pigweeds (*Atriplex patula*, L. *var. hastata*) in large numbers. Mr. Hitchcock has recently reported it from Iowa City.

A great many more troublesome weeds could be added to this list, especially such as are found in the streets, and along public highways; but those may be considered at some other time. It would be a great aid to the Botanical Department if the farmers of the State would send in weeds of various kinds, giving their common names, and stating how troublesome they are.

PLANT DISEASES.

During the past summer some of the cherry and pear trees in the orchard were seriously affected with fungous parasites. These diseases were especially troublesome in the new orchard set out by Captain Speer, of the experiment station, and some of the seedlings in the nursery of the horticultural department.

These diseases were chosen as thesis work by some of the special students in the laboratory, and as some of the facts may be of interest I give abstracts of their papers below.* The first paper was prepared by J. A. Kelsey.

LEAF BLIGHT AND CRACKING OF THE PEAR. (*Entomosponium maculatum*, L.)

That pear trees were attacked by some destructive agent other than the common fire-blight has been a well known fact to botanists of Europe and America for almost a century. The loss from this disease must amount to a great many thousand dollars annually. Every year large numbers of seedlings are completely destroyed by this fungus, while older trees are frequently defoliated by the 4th of July. This not only prevents the development of the fruit during the same year, but often destroys the prospect of a crop the succeeding year, since it not unfrequently happens that a second set of leaves and blossoms is put forth the same autumn. The value of the fruit is greatly deteriorated if not completely destroyed by the unsightly appearance or cracking which the malady produces. The bark is also attacked, so that all parts of the tree except the roots are subject to more or less injury. The disease makes itself manifest in early spring. Many of the leaves instead of retaining a uniformly green appearance are dotted with small carmine-red spots, first appearing on the upper and later on the lower surface of the leaf. The carmine-red color soon changes to a dull brown. During the early stages the fungus remains hidden beneath the cuticle of the leaf, but later it is ruptured and exposes to the surface a countless number

*In these abstracts it is not intended to give references to the valuable papers which have been published on the subjects treated, but rather to some facts about a few common and troublesome diseases.

of spores. On the leaves of a few of the Russian pears on the College grounds, particularly on those of the Bessmanka pear, I found this eruption had taken place without producing the brown spot. I believe that most of the Russian varieties, on account of having thicker leaves than those originating in southwestern Europe, will prove to be much less affected by this disease.

Other species of the genus *Pyrus* are also infested by a fungus, that to all appearances is the same thing. Many of the quinces brought into our market this fall from the East were almost completely covered with this destructive parasite. This fungus seems to be identical with that on the pear. Some apple seedlings on the ground, growing pear seedlings, were found to be quite seriously attacked by it.

The fungus is carried over winter not only by the winter spores which are produced late in the fall and winter, but also by summer spores, if they succeed in finding lodgement in the buds of next year's growth. Concerning its prevention and destruction nothing very definite can as yet be said, since practical experiments have only been begun.

A number of the leading nurserymen of this country claim that seedlings are much less liable to be attacked if planted in a new soil, or at least soil which has not been occupied by trees.

Barry recommends that the ground be prepared by sub-soil plowing to a depth of two feet the preceding autumn, and also by a liberal application of a compost of lime and leaf mold to be well plowed the following spring, the object being to secure a vigorous growth as early as possible in the season, in order that the young trees may be better able to stand attack. All diseased leaves should be raked up as soon as they fall, and burned.

Prof. Galloway has been highly successful during the past season in preventing the disease, by the application of a mixture of copper, lime and water, in the following proportions: Copper sulphate, six pounds; lime, six pounds; water, twenty-two gallons. A block of five thousand pear trees, treated at intervals of ten days, beginning June 5th, were reported August 11th as being nearly free from the fungus. At the same time another block of young pear trees adjoining these were very severely injured by the fungus.

THE SEED COATS OF CROTALARIA SAGITTALIS AND ASTRAGALUS MOLLISSIMUS.

The subject of Crotalism and Loco-poisoning has attracted considerable attention in late years. It is sufficiently important to demand a short place in this report. One of the veterinary students, Mr. Ashworth, has studied the seed coats of *Crotalaria sagittalis* and *Astragalus mollissimus* for the purpose of obtaining some characters to aid in the diagnosis of these diseases, especially after parts of the seed have passed through the alimentary canal.

Crotalaria sagittalis, L., or Rattle-box, is an annual common in the western part of the State, along the Missouri river. It has a rather wide distribution in the United States, occurring in sandy soil from Massachusetts to Illinois, Missouri, Iowa, Nebraska, and south to Texas. *Astragalus mollissimus*, one of the Loco plants, is a perennial and occurs on high sandy soil, distributed throughout the plains and table-lands of Colorado, New Mexico, Utah, Wyoming, Texas, Indian Territory and Arkansas. In Astragalus

mollissimus, the outer or palisade layer, is thick and dark, the cells are elongated, like the palisade cells in leaves. They are marked in the upper one third by a light line. The cell cavity is larger at the base, and gradually tapers upwards until it is quite narrow. The palisade cells show four rather distinct folds, the middle one refracting light strongly; the second layer is composed of thick walled cells; the cavity resembles a dumb-bell in outline. The third layer is composed of several rows of thin walled—really differentiated—cells, in two parts; the cells of the lower part of the third layer are more irregular than the first. The fourth layer is made up of four rows of cells, which are elliptical in outline, with a small cell-cavity. The fifth layer is composed of elongated cells similar to those of the fourth. The cells of the sixth layer are very small; some of these occasionally contain an oil globule. The testa of *Crotalaria sagittalis* is made up of four differentiated layers. The outer is fully one third larger than in *Astragalus mollissimus*. The light line runs horizontally one fourth the way down from the cuticle. The remaining layers are much like those of Astragalus, excepting the third, which contains three rows of thin walled cells. The aleurone layer and the starch cells of the embryo join the inner layer of seed coats.

DEPARTMENT OF ZOOLOGY, ENTOMOLOGY, AND GEOLOGY.

HERBERT OSBORN, PROFESSOR.

Work with the general students 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 recitations from text book, occasional lectures, and quiz on laboratory work, etc. 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.

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 histology, life histories of insects, etc. 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.

The laboratory is supplied with twenty-five microscopes, various microtomes, including a Thoma, and other apparatus for microscopical study 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 museum contains typical examples in all the principal groups of animals, and in some departments is especially useful for students who wish to make special studies of our State fauna or of certain groups of animals.

Several important additions to the equipment of the laboratory have been made during the past two years, and the collections have been increased by numerous specimens collected in the State by students and myself, and also by some fine series of insects from the Pacific region. Dr. T. W. Shearer, of Wallisville, Texas, a graduate of the class of '81, presented us last year with a magnificent alligator and two alligator gars, and has shown his continued interest in our collection by the donation the present year of a logger-head turtle.

The most urgent need of the department is for more room where museum, laboratory, and class-rooms can be connected. At present the use of the museum as a means of illustration in the classes of geology and zoology, is attended with much inconvenience and loss of time, and is often practically impossible; and the collections are unavailable for the purposes for which they are designed.

The museum is in an inconvenient position for visitors, too small for the collections already on hand, and not well adapted in plan for further improvement. Moreover, it should at the earliest possible day be put in a fireproof building. The presence of quantities of alcohol, essential in the preservation of specimens, is a constant source of danger in a building so largely occupied by students, and where all the materials surrounding it are of such an inflammable nature. The fact that museums, in case of fire, are almost invariably a total loss, is due in large part to the presence of this very combustible material. Not only for the sake of our museum, which is becoming too valuable to be so exposed, but for the safety of the many people living in the building, I would urge that you give this matter the consideration it demands.

The plans which were secured in accordance with your authority, six years ago, call for a building that would cost $18,000 to $20,000; but these plans could be modified or the rooms included in a building to provide for other purposes if deemed best. The essential feature of freedom from danger by fire should, however, be carefully considered in determining such connection.

The rooms essential at the present time are a large, well lighted and conveniently arranged room for general museum, and connected with this, room for storage of alcoholic specimens, geological material, preparation of museum specimens, breeding rooms for insects, etc., which could very properly be placed on a ground or basement floor; also, laboratory room sufficient for at least twenty students, and a lecture room and office.

REPORT OF THE DEPARTMENT OF PHYSICS.

J. C. HAINER, PROFESSOR.

The growth of the department has been steady and uniform during the past two years. The course of study in Physics was revised during the year 1888; and the past year the course of instruction was substantially as laid down on pp. 38–40 of the College catalogue for 1889.

The subject is taught by lectures, text-books, and recitations thereon. The work offered in the course in science and agriculture is fairly equivalent to that found in Deschanel's Natural Philosophy, or Daniell's Principles of Physics. Experimental demonstrations are given for the fundamental facts of the science, illustrating the various laws; and the application of these laws in the various industries and arts are indicated. The object of lecture-room experiment is to illustrate scientific doctrine. What the student wants is not a large number of experimental facts, however well classified, but a few well selected fundamental facts, and the scientific doctrine which those facts represent. The method of instruction in this department is in harmony with the above statement. By this plan it is hoped that the *thoughtful* student will discriminate clearly between principle and illustration, and lay them away in memory accordingly.

The first term sophomore year is given to mechanics. Particular attention is given to the laws of motion, and to the doctrine of energy, and the application of this doctrine in this branch of the subject. Text-book, Deschanel's, Part I. Heat is studied the second term sophomore year. Heat is energy; and it is from this standpoint that the whole subject is studied. More attention is given to the quantitative relations of the various phenomena studied than to gathering statistics on the subject. Text-book, Maxwell's Theory of Heat. The first term junior year the subject of electricity and magnetism is studied. The doctrine of Potential is made the co-ordinating principle in this ever-widening field of physics. Particular attention is given to the relation of electricity to magnetism, as manifested in the fact of induction currents; the relation of electrical energy to heat; and hence its relation to mechanical power. In short, that the propositions of mechanics apply to electrical and magnetic phenomena. The c. g. s. system of units is explained, and their relations to the practical units developed. Text-book, Thompson's Elementary Lessons.

In fall term, junior year, general course, optics and acoustics are studied. The undulatory theory is made the basis of instruction; and hence the fundamental properties of the wave-surface are examined. Text-books, optics, Lommel; acoustics, Tyndall. The juniors of this term in the engineering courses continue the study of electricity and magnetism. The dynamo is made the basis of instruction. Text-book, Thompson's Dynamo-Electric Machinery.

The laboratory instruction in physics comes in the fall terms of both junior and senior years, in the M. E. course, and in fall term of junior year in the other courses. The exercises are progressive and entirely quantitative; illustrating general laws in all branches of physics. The work consists of the theory and use of instruments of precision; their calibration, the determination of physical constants; the measurement of mechanical, thermal, optical, acoustical, electrical, and magnetical properties of bodies; in such order and to such extent as the equipment of the laboratory will permit.

APPARATUS.—The value of physical apparatus owned by the department is about $8,000, among which are: a standard of length, a standard clock, a physical balance, a chronograph, a cathetometer, a calorimeter, resistance coils, wheatstones bridge, current and potential galvanometers, high and low resistance reflecting galvanometers, a condenser, a standard B. A. Ohm, a Kew magnetometer, an electrometer—these are all, with the exception of the clock, imported apparatus from the best European makers. A Thompson-Houston dynamo (old pattern), several motors, and the electric light circuit on the grounds afford opportunities of studying this branch of electrical science. Through the courtesy of the Steward the electric light plant is made available to students to make such tests and measurements as actually obtain in practice.

In comparing the above facilities with what is offered in the mechanical engineering course, it is readily understood that the elements of electrical engineering, both theory and practice, are open to the student. The laboratory used by the department at present, consists of the physical lecture and apparatus rooms, and the two draughting rooms in the third story, elsewhere described. It is hoped that this strange anomaly will be rectified within another year.

ASTRONOMY is a five hour elective in the senior year. Text-book, Young's General Astronomy. As aids to the study of this subject, 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 declination circles attached; and a two prism Browning spectroscope.

SPHERICAL TRIGONOMETRY is a one hour study in fall term sophomore year. This time is thought sufficient to familiarize the student with the fundamental theorems of this branch of mathematics; and, to give sufficient practice so as readily to apply the same in problems relating to theoretical mechanics, geodesy, and its simpler applications to spherical astronomy.

ADVANCED PHYSICS may be taken in senior year; students looking forward to this work should be classified in analytical mechanics, and Calculus

of junior year. This work consists of two parts: (1) Laboratory work at least six hours per week; (2) Text-book work five hours per week.

For the year 1890, I respectfully recommend:

(1) That students who take laboratory work in physics be required to pay for the materials consumed in their work. Judging from the experience of the past two years, this will be about $2.50 per student. It should be remembered that this item is a dead loss to the department. The number of students in laboratory work this year was twenty-five; and I estimate the number for the coming year at thirty-two.

(2) I again, in view of the approaching session of the General Assembly, renew my recommendation of 1887 with the reasons therefor:

"As is seen in the outline of the course of physics, laboratory work in this study is now given, not only to special students in physics, as heretofore, but also in the regular course. This is an advance in the proper direction. Laboratory practice in physics is just as essential to the student in natural philosophy as is the same kind of practice in chemistry or botany or zoology. Physics is an experimental science and must be studied from that standpoint, if *studied* at all. To make this work of greater educational value and practical utility, the board appropriated $1,600 to this department for the purchase of instruments of precision. These were ordered from abroad early in 1887. This addition to the apparatus already in possession of the department places the instrumental equipment of the department in reasonably good condition for the work offered in physics. Not that all the apparatus necessary to a well equipped physical laboratory is collected, but an advance has been made in that direction. Yearly additions can be made of special apparatus as their need becomes urgent.

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

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

The reasons for this additional room for the Department of Physics becomes more and more urgent with each year. The laboratory work in physics was made a permanent feature of the instruction in this science in

1887. The number of students taking this work has steadily increased each year. A suitable working laboratory has become a necessity.

There is now, and from all indications there will be for an indefinite period an urgent demand for men educated in the theory and practice of electricity and its applications, popularly called "electrical engineers."

To become proficient in this field of modern enterprise, it is necessary that the student should have personal access to and contact with the subject matter underlying the forces and phenomena of modern electrical appliances. *The whole theory and practice of educational engineering centers about the dynamo, the heart of the matter.*

The needed instruction on the labaratory side cannot be given without an additional expense. The dynamo and accessories for successful experimental work will cost $400.

The other apparatus needed the department already has; in fact, the purchases made a few years ago were made with a view to building up a course in practical electric work.

It is, however, useless to attempt this work unless a proper laboratory is equipped, wherein the student can successfully prosecute his studies.

The leading institutions of this country, Boston Institute of Technology, Steven's Institute of Technology, Cornell University New York, Rose Polytechnic Institute, the Universities of Wisconsin, Nebraska, Michigan, and many others, have already established courses of study and equipped laboratories to fit young men for this field of work, or have taken the initiatory steps in this direction.

The industrial aspect of this institution is the never-failing theme and pride of its friends throughout the State. Here is an opportunity, at a very small expense, to enlarge the industrial feature of the school. The leading institutions of the country have set the example; then why not heed the signs of the times and fall into line?

REPORT OF THE DEPARTMENT OF DOMESTIC ECONOMY.

MRS. ELISA OWENS, PROFESSOR.

There is a growing interest in the work connected with this department on the part of the young women attending the College.

There being no special course in this department, the time devoted to it is too limited for the very best results, practically.

During the last year a change has been made in the course, whereby two terms of consecutive work have been secured, *i. e.:* Second term Freshman and first term Sophomore, with optional work in second term Senior. The work of this course may be outlined as follows:

The time during the second term of the Freshman year is devoted mainly to the study of the Boston School Kitchen text-book, combined with laboratory practice.

This text-book gives instruction in regard to the elements contained in our daily food and their proper combinations. Also the right adaptation of food to age, temperament, occupation and climate, as based upon scientific principles of hygiene and dietetics.

In the first term of the Sophomore year special attention is given to the cooking and serving of meals, the purchase and care of family supplies, and to general household management, including household accounts. Also invalid cookery, the care of the sick and special hygiene, consisting of a course of lectures on the laws of life and health, especially woman's health and well being.

During the last term of the Senior year there will be a general review of the work here outlined in preparation for the systematic and intelligent performance of the serious duties and responsibilities, which it is woman's highest privilege to assume in her capacity of housekeeper.

The whole interest and purpose of the present instructor is to secure to the students a knowledge of practical and systematic methods of rendering home a pleasant and healthful abode. All the young women who have come into the classes during the past two years have received instruction along the line above given, adapted to the varying seasons and the previous instruction that the sophomores and juniors of the classes of '90 and '91 had

already received before the taking charge of the department by its present instructor.

The number of young women who have attended these classes during the past two years may be tabulated as follows:

	1888.	1889.
Freshmen	22	21
Sophomores	13	9
Juniors	4	11

The essays prepared by the sophomores and juniors as part of their work in the department, calling for synopses of subjects taken up in the lecture room during the course, and calling for some originality in matters pertaining to the adaptation of home work to circumstances and individual taste, have, with very few exceptions, shown such intelligence, good judgment, common sense and true womanliness, as promise much for the homes over which they may in the future preside.

The results of the laboratory practice in all the classes have been most satisfactory, showing interest, care, and many times culinary skill. These results have been brought about largely by the kindly interest taken in the department work, by the members of the faculty comprising the committee on courses of study, whereby a change in the course was made possible, and the generous action on the part of the board of trustees whereby the recommendations on this subject from the committee on courses of study were adopted, and the further action of the board of trustees increasing the inadequate appropriation of $200 to $350, thus furnishing the means to make the work more practical and attractive than would otherwise have been possible.

REPORT OF THE DEPARTMENT OF CHEMISTRY.

A. A. BENNETT, PROFESSOR.

Comparatively few changes have been made in the courses of study in this department during the last two years. New apparatus and improvements in the facilities for work, and in the rooms devoted to laboratory practice, cover the changes that have been made. Among the additional pieces of apparatus may be mentioned—apparatus for gas analysis, new balances, combustion apparatus, digestion oven, and many minor pieces of apparatus.

As to methods of instruction the changes have been mainly to unite more closely the laboratory practice with the class room work. The laboratory practice is manual training, is sense training, and should be the highest mental training. The endeavor is to make this practice the means of making clear the statement of text or lecture. Experiments are not performed for the student, but by the student.

During the past biennial period students have done laboratory and recitation work in the following lines of study: General and theoretical chemistry; inorganic qualitative analysis, including the ordinary separations and identifications of elements and compounds; work on ores and minerals, and commercial manufactured compounds; quantitative analysis of pure and crude materials, the latter consisting of iron, copper, cobalt, etc., ores; preparation of organic and inorganic compounds, especially those of pharmaceutical interest; analysis of agricultural substances, such as butter, milk, ensilage and fodders; ultimate and proximate organic analysis.

The facilities and room may be summarized as follows: Apparatus and chemicals are sufficient for good work in nearly all branches of chemical study; room is furnished for one hundred students working at one time; water and gas are furnished at each table.

Graduates of this or other colleges are furnished facilities for advanced study in a variety of subjects.

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

The expenses are made to barely cover the cost of chemicals and apparatus destroyed.

DEPARTMENT OF MILITARY SCIENCE AND TACTICS.

JAMES RUSH LINCOLN, PROFESSOR.

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

In addition to the demand for cadet officers in the National Guard, in which our cadets have taken positions, and are looked upon with respect, and recognized as officers of knowledge and ability, a demand for military instructors for our schools and colleges has already taken two of the class of 1889, and they are performing their new duties in a very satisfactory manner. The ladies' company continues to do good work and give a healthful and pleasant exercise. Other colleges have followed our lead, and several companies of ladies are now regularly drilling.

Military training and discipline are becoming more generally recognized as desirable factors in education, and as a mental drill has worth, as it requires a quick action of the mind in the interpretation and execution of orders in military maneuvers. The volunteer work now done by students, in drill and class work, is on the increase; as well as the number in the two higher classes taking military instruction.

The graduating class of '89 numbered forty-five. Of this number eighteen were enrolled in the battalion.

It is to be regretted that more time cannot be given to military instruction in the class-room as well as upon the parade ground.

An armory is badly needed for the work of the department, bad weather necessarily greatly interfering with the work.

An armory and gymnasium combined would be of great use to the College, outside of its advantage to the military department, in furnishing an assembly room for the students in which games and sports could be engaged in which are very damaging to the other buildings and tend to disorderly conduct and noise.

DEPARTMENT OF MATHEMATICS, POLITICAL ECONOMY AND COMMERCIAL LAW.

E. W. STANTON, PROFESSOR.

MATHEMATICS.

Students entering the Freshman class are required to pass an examination in arithmetic and in algebra through equations of the first degree. They are then assigned for their mathematical work to one of the two divisions in algebra. The first of these divisions is composed of those who have thoroughly mastered arithmetic and have met the entrance requirements in regard to algebra; the second includes all students who obtain a high standing in the former study and pass the required examination in the latter, but who show a want of thoroughness in their algebraic knowledge. Particular attention is given in this study to the explanation of the cardinal principles, and the class drill is conducted with reference to fixing these principles in the minds of the student. Both of the regular Freshman divisions complete the subject in one term. During each of the past two years a third division has been formed for those who failed to pass the entrance examination in algebra. Students in this division developing marked ability have been allowed at the beginning of the second term to take up the regular work of the Freshman course leaving the remainder of the algebra to be passed by examination in the following spring; the others in the division have continued the study during the entire year, thus completing the subject. The division during both years has been under the charge of my assistant, Mr. E. A. Kirkpatrick. In the future, now that a preparatory department has been established, students not fully prepared in mathematics should commence their work here in the fall so as to take advantage of the instruction given in that department. No student will hereafter be admitted in the spring to the regular College courses who is not sufficiently prepared in mathematics to enable him by the commencement of the second term to enter upon and carry the full work of the Freshman class. In the second term of the Freshman year geometery is taken up. At the beginning of this study an earnest effort is made to bring the student to fully comprehend the meaning of a geometrical demonstration. He is warned against learning any proposition by rote; and in order that he may not fall into this error, he is, at the end of the first book, assigned original theorems, which he is required to demonstrate. He is expected not only to understand thoroughly each proposition, but to be able to so arrange and present the points of proof as to form a complete and perfect demonstration. One division of this class has been under my instruction; the other was conducted by Mr. Kirkpatrick.

Analytical 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 pursue the higher lines of mathematical work. It pre-supposes a working knowledge of the nature and use of trignometrical 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 underlying principles are brought prominently forward and discussed. The student is required to carefully analyze each article, and to secure thoroughness frequent reviews are given.

Instruction in calculus is given during the spring term of the junior year. To enter this class it is necessary that the student should have passed the lower mathematical studies of the course. In no case can this study be pursued successfully without previous drill in analytical geometry. The abstruse principles of this method of mathematical investigation are explained upon the theory of *rates*, rather than upon the theory of *infinitesimals*. Instruction is given by daily recitations and lectures, with a review of the week's work each Friday. Twelve weeks are devoted to differential, and the remainder of the term to integral calculus.

Three members of the senior class have, during the past year, taken advanced work in this study. Their attention has been directed especially to the integral calculus, with the machinery of which they have made themselves familiar, through the solution of several hundred practical problems.

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 statute of the State, are set forth by means of 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.

The class is divided into two divisions, one of which recites three, and the other five times per week. Those classified in the first of these divisions use "Walker's Political Economy," and, because of the limited time, confine themselves quite closely to the text; those in the second division employ the method of study known as the library method. The work of each day is carefully assigned them and they are held responsible for a full presentation of the views of the different authors to which they are referred. The library is their laboratory; they are required to make diligent use of it. They thus acquire a familiarity with the standard works of economic literature, and are forced to look at economic questions from different standpoints. The student thus acquires power as an investigator, and, finally, learns to

form conclusions which are the result of careful research. Value, land, labor, capital, money, credit, foreign and domestic trade, are some of the subjects studied.

Students in the senior year are permitted to take advanced work in economic science. Six members of the last class availed themselves of this privilege. A term of solid work (five recitations per week) was given to a study of the historical development of the science. The gradual growth of its leading ideas were traced, and their relation to the perplexing questions of the present shown. It is through such preparatory work that a study of the difficult economic problems of to-day can best be reached. It is intended hereafter to fully adopt this method.

The department was never more prosperous than during the past two years. The work done is shown by the following table:

CLASSES AND NUMBER OF RECITATIONS PER WEEK.	NUMBER OF STUDENTS.	
	1888.	1889.
FIRST TERM.		
Algebra, first division, five recitations per week	36	50
Algebra, second division, five recitations per week	26	26
Calculus, five recitations per week	19	20
Special work in mathematics, three recitations per week	.....	1
Commercial law, two recitations per week	37	32
SECOND TERM.		
Geometry, first division, five recitations per week	40	43
Geometry, second division, five recitations per week	21	26
Advanced calculus, five recitations per week	.....	3
Political economy, five recitations per week	20	10
Political economy, three recitations per week	18	29
Political economy, advanced work, five recitations per week	.....	6
	217	246

All of the above classes, except one division in geometry, have been under my instruction.

PSYCHOLOGY, ETHICS AND CIVICS.

W. I. CHAMBERLAIN, PROFESSOR.

Owing to the sickness of Dr. Welch, and his death, March 14, 1889, I took the instruction in psychology, temporarily, in March, and at their May meeting the trustees assigned the chair to me permanently. It is an optional or elective study in one sense and not in another. Students in the ladies' course, the course in science and agriculture, and in civil engineering, may, under our rules, elect *not* to take it; but no student in the veterinary or the mechanical engineering course *can* take it. All who could do so chose the study, thirty-four in all.

Notwithstanding the fact that I took the study unexpectedly, suddenly, and without special recent preparation, the term's work was most interesting and profitable to the instructor, and, I believe, also, to the students.

The study of psychology supplies two wants. *First*—It gives an analysis of the intellectual powers and discovers the laws of thought, thereby enabling the student to think with greater accuracy and clearness on any subject; and since success in every kind of activity depends on clearness of thought, psychology is one of the most "practical" studies.

Since our course, crowded as it is with the physical sciences, gives no time for a term in logic, as in most other colleges, the main principles of logic are taught here under the "laws of thought."

Second—Psychology as taught here clearly sets forth the fundamental principles and mutual relations of the industrial sciences, the incipient unit in each, the processes of experimentation, discovery and research, and the underlying principles of association which render the classifications of the various sciences possible, and naturally place the industrial sciences in closely related groups.

The study occupies five hours per week of recitations and lectures the first half of the senior year, including three weeks of lectures by Professor Fairchild upon the anatomy and physiology of the human brain as the organ of thought. Welch's Psychology is used as a text-book. It is supplemented by brief lectures and by library work, with Hamilton, Cousin, Porter, Dewey, Spencer, Bain, Carpenter, Bastian and Ladd as the principal collateral works. Written essays and discussions are required from each member of the class.

ETHICS.

The last term of the senior year is devoted to a study of the groundwork of moral science. This is an optional study in the ladies' and science courses, but not open to the veterinary or the civil and mechanical engineering students. All chose it who could, except four who chose instead special work in chemistry or some other science directly related to agriculture and the industries. Cutler's Beginnings of Ethics and parts of Janet's Theory of Morals are used as text-books, supplemented by library work and by lectures; the main object of the whole being to impress upon the mind of the student the belief that man has a moral nature as well as a physical being, that this world is, for man, a moral work, created and ruled under intelligible law by a Moral Being for moral ends; that, in no narrow sense, "honesty is the best policy;" that is, right conduct morally is the wisest settled principle of action; that our spiritual environment favors right conduct; that there is "a Power not ourselves that makes for righteousness," and that it is, in the highest sense, wise to work with, and not against, that Power; and finally, that the Christian Scriptures, apprehended by our reason, are on the whole our best means of learning what is the mind and will of that Power. Principles are sought; mere questions of casuistry are avoided. The last four weeks of the term are devoted to lectures on civics; a careful study of our republican government, and especially of our rights and their limitations under, and our duties toward, such a government.

The main topics especially treated in this course of lectures, with special reference to their philosophic and ethical basis and their necessary limitations for the good of society, are the following: *Ownership*, of land, other realty and of personal property; *Taxation*, national, State, county, etc.; *Exchange*, and its abuses, especially counterfeiting and adulteration; *Contract*, and its dangers and evils, as for example, in stock and grain gambling by "margins;" *Association*, and its abuses by pools, trusts and other more or less secret and harmful combinations; *Monopolies*, natural and artificial, such as railways, street car service, telegraph, telephone, electric light and motor, gas, water, mail, express and other general service liable to monopolistic abuse; *Patent right* and copy right, marriage, the family, divorce, intemperance, etc., with the ethical and philosophic principles that underlie all such questions, and the proper functions of our national, State, county and municipal government with reference to each. The question made prominent throughout the whole was this: how far may and must government justly abridge personal liberty for the public good? Living questions of vast importance to the educated citizen were thus discussed dispassionately.

LATIN.

In the adjustment of work after Dr. Welch's death, it seemed best to give the History of Civilization permanently to Professor Barrows, professor of General History. To relieve him of over-work until an instructor of Latin should be found, I taught the sophomore class, ladies' course in Virgil's Æneid through the second term, taking most of the first, second and fourth books.

DEPARTMENT OF ENGLISH LITERATURE, LATIN AND HISTORY.

A. C. BARROWS, PROFESSOR.

Herewith I have the honor respectfully to submit my report for the year 1889, covering the Departments of History, History of Civilization, Latin, English Literature and preaching.

I. LATIN.

I have instructed a mixed class of freshmen numbering thirty-five the first term and twenty-seven the second term, five hours a week throughout the year. This class began Latin, using as a text-book Ahn-Henn's "Short Latin Course." The class completed the book, omitting a few less important parts, and has read, besides the exercises, 34 pages of solid Latin. I instructed a sophomore class of nine, all but one ladies, in Latin, four hours each week the first term. We read "Caesar" through the Fourth Book. I did not meet this class the second term, owing to my taking up work in the History of Civilization.

II. HISTORY.

The freshman class in History numbered thirty-three, all gentlemen. We met five times each week during the first term. The History of England was studied as carefully as the time allowed permitted. The text-book used was the "Epochs of English History—Complete." The attention of the class was constantly fixed upon those facts and movements of English History which have been most influential in shaping American ideas and institutions.

The sophomores of the ladies' course pursued the same historic study two hours a week throughout the year. The class numbered fifteen the first and fifteen the second term.

III. HISTORY OF CIVILIZATION.

Through the second term I discussed the History of Civilization with a mixed class of twenty-nine seniors. "Andrews' Institutes of General History" was used as a manual during twelve weeks. A large part of the time

was given to lectures and talks, of which I kept no account. After having thus secured a general view of the world's progress, each student wrote five essays upon the history of some element of civilization. I have given but very little time to the study of barbarian or savage life, and none to the various theories of the origin of human faculties, such as speech, the perception of beauty, etc., etc., as my time was too limited for a full study of the progress of man, after he became truly man.

IV. ENGLISH LITERATURE.

The study of English Literature was continued by the juniors through the year. A mixed class of thirty-nine met me three times each week the first term. The development of English prose from Wycliff to the present time was traced out. "Shaw's New English Literature" was used as a manual of reference. Each student wrote out a series of brief biographies, with notices of the writings and influence of the more significant authors. The class also studied select works of the most famous writers. In the second term a mixed class of thirty studied English poetry four times a week through fourteen weeks. The last weeks of the term were given to American Literature. The method of study this term was the same as that of the first term.

V. PREACHING.

During the first term I preached on Sunday eleven times, but only twice the second term.

VI. ORATIONS.

Though it strictly is an adjunct of the Professorship of Applied Rhetoric, the work of revising and correcting the orations of both juniors and seniors has fallen to me. I have given to this an amount of labor fully equal to one regular exercise a week throughout the year, having in many cases gone through these productions three times. I have also given many students the same aid in the preparation of orations for use in the literary societies and on various public occasions.

FRENCH AND GERMAN.

MISS LILLIE M. GUNN, PROFESSOR.

French is an elective study in the freshman and sophomore years in the ladies' course, and is obligatory in the freshman year of the civil and mechanical engineering courses. The primary object in the study of French is reading, therefore only so much of the grammar is taught as will facilitate fluency of translation.

During the first term, freshman year, attention is given to pronunciation and to exercises both oral and written.

Thorough drill is given in verbs and the student has some practice in translation. In the second term the student will have mastered the most of Part I.

The study of German is confined to the junior year and first term senior year. During the first year the student is instructed in the principles of grammar, and gains a knowledge of declension, gender and conjugation so that he may with ease translate ordinary German prose. "Otis' Elementary German" and "Grimm's Maerchen" are used. The third term is devoted to reading Schiller and selections from the best German novelists, while special attention is given to reading at sight.

This short course is not sufficient to give one a mastery of the language nor make him familiar with its literature.

The object in view is that of securing a reading knowledge of German. By the methods pursued, the student gains a practical vocabulary and may, with a little practice, write and speak with correctness.

The classes during the past two years have been enthusiastic and the work successful.

The following table shows the classes taught and the students in each class:

SPRING TERM.

	1888.	1889.
French freshman, 5 recitations per week	36	20
French sophomore, 4 recitations per week	2	6
German junior, 5 recitations per week	28	22
German senior, 5 recitations per week	6	15

SECOND TERM.

French freshman, 5 recitations per week	27	23
French sophomore, 4 recitations per week	2	1
German junior, 5 recitations per week	20	20
German senior (special), 5 recitations per week	..	8
Totals	121	115

ELOCUTION.

CORA MARSLAND, PROFESSOR.

The system of instruction in elocution is that taught in the Emerson College of Oratory, Boston. It is based upon natural laws. The object of the instruction is to secure the health, freedom and grace of the body, purity and volume of voice, and culture of the mind.

The work in physical culture is a course of Delsarte exercises, arranged, modified and enlarged by Dr. Emerson, President of the Emerson College of Oratory. They free and strengthen every part of the body, and in a series of rhythmical exercises promote dignity and grace of carriage.

The methods of eminent instructors for the singing voice, arranged and adapted to the speaking voice, promoting freedom of the throat, and purity and strength of tone.

In rendering, careful attention is given to thought analysis, and leads, by successive steps, to artistic delivery.

Talks on physiology, as related to the study of expression, are given throughout the course.

Public recitals are occasionally given by the students, thus enabling them to gain ease and confidence in appearing before an audience.

DEPARTMENT OF MUSIC.

CORA F. PIKE, INSTRUCTOR.

During the last two years instruction has been given on the pianoforte, pipe organ and violin, in voice culture, harmony, sight-singing and chorus work.

It has been the aim of the department to raise the standard of music throughout the College, to benefit not only the special students, but every member of the institution.

The course of instruction on the piano is in substance the same as in the New England Conservatory of Music, and students may complete the first four grades and enter the fifth grade in that institution without examination. On the organ, special attention is given to the art of accompanying, and to the study of registration and pedal phrasing. In the cultivation of the voice attention is first given to the same timbre and purity of tone throughout the entire compass of the voice, correct management of the breath, vowel formation, distinct articulation and expression. In harmony the attention of the pupil is drawn to the treatment of intervals, chord progressions, modulations, and the writing of chorals. In sight-singing the pupil is taught to *think* sounds, and thereby sing correctly new music without the aid of an instrument. The system of instruction is similar to that used in the public schools of Boston.

The music for all Chapel services is conducted by the department. A choir of twenty-four selected voices receive instruction for an hour and a half each week. They lead in the singing of hymns, and usually furnish a voluntary each Sabbath; two organ voluntaries are also furnished for this service.

In 1888 there were sixty-five students in the sight-singing classes, and thirty-six private pupils. The Cecilia ladies quartette and the I. A. C glee club was formed in the fall term.

In 1889 the old pianos were sold and four new ones purchased (three upright and one parlor grand); the entire transaction only requiring an appropriation of a trifle over one thousand dollars.

Arrangements were made whereby the Freshmen class might receive instruction in sight-singing free, a privilege taken advantage of by about sixty of the class.

The Philomela club was formed for the ladies, and four male voices were selected to form the Q. B. X. quartette. There have been forty-three private pupils under instruction and thirty-seven in the glee clubs.

During the years 1888-9 the department has furnished music for thirteen public exercises of the College, given seven concerts, two readings on the life and works of eminent musicians, with illustrations from their compositions, and assisted at two concerts given under the auspices of the Lecture Association. The services of Miss Maria Chambers and Mr. F. E. Barrows were secured for a special recital for the private pupils.

REPORT OF LIBRARIAN.

CORA MARSLAND.

During 1889 there were added to the library—

By purchase, volumes	282
By donation, volumes	43
By binding periodical volumes	99
Total	424

In 1888 an author and title catalogue on the Dewy system was commenced by Miss Crawford, the cataloguer, and has been completed by her during the current year. It is almost invaluable. That with the aid of shelf guides and a library directory, enables any one to readily find a specific book in the library.

During 1889 a subject catalogue has been in progress. When completed it will give references to the volume and page of all books in the library containing information on the most important topics.

In determining what shall constitute the important headings, the Dewy classification has been taken as a guide.

It is important that the subject catalogue be continued.

HEALTH REPORT OF THE IOWA AGRICULTURAL COLLEGE FOR THE YEARS 1888-89.

D. S. FAIRCHILD, COLLEGE PHYSICIAN.

During the College year of 1888 fifty-seven cases of sickness occurred. The nature of the cases being as follows:

Pneumonia	4
Fracture of clavich	1
Tonsilitis	1
Malarial fever (remittent)	7
Catarrhal fever	1
Inflamation of middle ear	1
Rheumatism	1
Measles	18
German measles	23
Total	57

The total number of cases excluding contagious diseases, sixteen. Seven cases of malarial fever occurred. The first case appeared in the old cottage, and led me to fear that some local cause existed, but on careful examination nothing was discovered, and as cases immediately followed in the new cottage and in the main building, and also in the surrounding country, any such fears were dismissed.

The first case of German measles was imported from Des Moines, and was fully developed before it was discovered. Others were therefore exposed before (the prevailing doctrine of) protection could be adopted.

The same can be said of the first case of measles, which came from Ames.

I regret to be obliged to report one fatal case of pneumonia. The disease first involved a large part of the right lung, and on the third day suddenly invaded the left lung, and notwithstanding the most constant and zealous efforts of Dr. Richmond (who was called in consultation) and myself the case progressed rapidly to a fatal termination. The young man was at once taken to the hospital and carefully nursed by Mr. Bousquette, who is especially fitted for this work, having had two years of medical training.

In 1889 the total number of cases of sickness was forty.

NATURE OF CASES.

Mumps	26
Diphtheria	1
Peritonitis	1
Rheumatism	2
Dislocation of shoulder joint	1
Inflammation of middle ear	1
Sprain of ankle joint	2
Accute Diarrhoea	1
Catarrhal fever	1
Pneumonia, Catarrhal	2
Incised wounds of forehead, accidental	2
Total	40

In relation to the sanitary condition of the College I believe, that with the new arrangements it has reached a very high degree of perfection.

FINANCIAL REPORTS.

REPORT OF THE SECRETARY.

[FOR THE BIENNIAL PERIOD ENDING NOVEMBER 13, 1889.]

AMES, November 13, 1889.

To the Honorable Board of Trustees:

Successive acts of the legislature, supplemented by orders of the Board of Trustees, require your Secretary to keep in his office a record of every financial transaction connected with the College funds. The evident purpose of these enactments is to enable your honorable body to readily obtain full information of the condition of the College endowment, and the revenue derived therefrom. To present this information in available form I have united my statements of the accounts kept by me with the different financial officers, and the settlements made with them, into one report.

ENDOWMENT FUND.

The endowment fund of the College has been increased during the biennial period by the re-appraisement of forfeited lands in the sum of $480.00, and now amounts to $649,396.16, or in round numbers, $650,000.

This fund is derived from the following sources:

From the congressional land grant	$ 582,716.65
From the transfer and investment of interest fund	66,679.51
Total	$ 649,396.16

The portion of the fund at preset yielding an income is invested in land, farm mortgages, and bonds. Taking up these in their order:

(1) THE LAND DEPARTMENT.

The books in my office show that at the beginning of the biennial period the land charged to the agent was as follows:

Land included in the congressional grant, acres	97,808.74
Land purchased with accumulated interest money, acres	10,133.17
Total acres	107,941.91

This land is accounted for as follows:

Endownment fund land—	
Patented during the biennial period, acres	17,537.08
Under lease, acres	78,271.72
Not under lease, acres	1,999.94
	97,808.74
Land purchased with accumulated interest—	
Patented during the biennial period, acres	2,360.00
Under lease, acres	7,453.17
Not under lease, acres	320.00
	10,133.17
Total accounted for, acres	107,941.91

The following lands are owned by the College:

Land under lease, acres	85,724.89
Land not under lease, acres	2,319.94
Total acres	88,044.83

Or, in round numbers, 88,000 acres.

The receipts from the sales during the biennial period are as follows:

From the sales of lands belonging to the congressional grant	$ 52443.61
From the sales of lands purchased with accumulated interest money	8,400.00
Total	60,843.61

This amount has been duly forwarded to the Treasurer of State and duplicate receipts therefor are on file in my office.

The following are the total receipts from the sales of College lands to date:

From sales of land belonging to the congressional grant	$321,473.86
From sales of land purchased with interest fund	20,640.00

Under a contract with the Board of Trustees, the land agent has also charge of the loaning of accumulated interest fund.

Of this fund there was on hand at the beginning of the biennial period a balance of		$ 5,325.00
During the biennial period there has been received from the sale of lands	$ 8,400.00	
From payment of principal of loans	12,150.00	20,550.00
Making a total to be invested of		$ 25,875.00
Invested by the agent		25,800.00
Balance uninvested		$ 75.00

The amount and condition of the College endowment controlled by the land agent are as follows:

Land under lease, eight per cent	$278,287.05	
Invested in farm mortgages, seven per cent	39,165.00	
		$317,452.05
Land not under lease	$ 10,395.25	
Cash balance awaiting investment	75.00	
Total		$327,922.30

(2) THE FINANCIAL AGENCY.

The financial agent has charge of the loaning of the fund arising from the sale of land belonging to the congressional grant, in so far as this fund is invested in farm mortgages. During the biennial period he has negotiated loans amounting to $87,600. These loans are recorded in a "Register of Loans" kept in my office. All papers connected therewith are afterwards forwarded to the State Treasurer. The principal on loans amounting to $37,475, has been paid in. The release of mortgages is in each case signed by the Chairman and the Secretary of the Board of Trustees, and an account of the payment of principal is thus taken in this office. The investments of the financial agency are thus shown to have been increased by the sum of $50,125. This amount, added to the $250,875 invested at the beginning of the biennial period, makes a total present investment of $301,000.

The following shows the present condition of the investment:

Loans in force, eight per cent	$233,800.00
Loans in force, seven per cent	62,500.00
Loans 186 and 202, mortgages ordered foreclosed	3,500.00
Loan 168, mortgage on 120 acres in Ringgold county, foreclosed, and sheriff's deed issued	1,200.00
	$301,000.00

(3) THE BOND DEPARTMENT.

During the biennial period a bond of $500 of the independent school district of Maquoketa has been paid, leaving the following as the only bonds now owned by the College:

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

SUMMARY OF ENDOWMENT FUND.

Summarizing the entire endowment fund, the following is its present condition:

Yielding income—		
Invested in land under lease, eight per cent	$278,287.05	
Invested in land obtained under foreclosure of mortgage (leased)	1,200.00	
Invested in farm mortgages, eight per cent	237,300.00	
Invested in farm mortgages, seven per cent	101,665.00	
Invested in bonds, six per cent	5,500.00	$623,952.05
Not yielding income—		
Invested in land not under lease	$ 10,395.25	
Cash balance awaiting investment	15,048.86	25,444.11
Total		$649,396.16

THE INCOME OF THE COLLEGE.

Passing now to a statement of the income of the College derived from its endowment fund, the receipts during the past two years have been as follows:

For 1888—		
Rental on land belonging to the congressional grant	$ 23,840.77	
Rental on land purchase with interest fund	2,260.75	
Interest on mortgage loans of interest fund	2,029.46	
Total collected by Agent Knapp		$ 28,130.98
Interest on mortgage loans of endowment fund	$ 17,742.08	
Interest on bonds	360.00	
Total collected by Agent Sigler and State Treasurer		$ 18,102.08
Interest on interest fund invested in sale notes, (collected by College Treasurer)		5.95
Total income for the year from endowment fund		$ 46,239.01

For 1889—		
Rental on land belonging to the congressional grant	$ 21,637.06	
Rental on land purchased with interest fund	2,248.47	
Interest on mortgage loans of interest fund	2,119.37	
Total collected by Agent Knapp		$ 26,004.90
Interest on mortgage loans of endowment fund	$ 20,378.63	
Interest on bonds	359.40	
Interest on endowment fund invested in State warrants	1,108.94	
Total collected by State Treasurer		$ 21,846.97
Interest on interest fund invested in sale notes (collected by College Treasurer)		40.00
Total income for the year from endowment fund		$ 47,891.87
Total for the biennial period		$ 94,130.88

All rental on land and interest on mortgage loans of accumulated interest are collected by the agent in charge of the land department, as provided in the contract with the present agent, Herman Knapp. I have made a thorough examination of the books and accounts of the department. Comparing the same with the duplicate books in my office I find that the two sets of books agree, that the accounts of the agent are correct, and that he has accounted for all sums coming into his hands by paying the same over, either to the State or College treasurer as the law requires.

Interest on all investments of endowment fund not included in the land department is collected by the State Treasurer monthly. Remittances of the amounts thus collected are made to the treasurer of the College, and monthly reports of such collections and remittances are filed in my office. My books thus show the condition of each investment, and immediately disclose any failure to make payment of interest when due. My books and the accounts of the Treasurer of State agree. In the main, payments of interest are promptly made. The amount at present overdue is less than $2,000.

The total cash from all sources charged against the College Treasurer for each of the years of the biennial period, as shown by the books of my office, is as follows:

1888.

Cash on hand at the beginning of the fiscal year	$ 12,276.81
Income from the endowment fund	46,239.01
Experiment Station fund	18,906.74
State appropriations	6,000.00
Sales by departments	8,628.95
Room rent, payments by students	1,312.00
College Hospital, payments by students	336.00
Payments by students for diplomas	90.00
Sale notes falling due	35.00
Rent on land belonging to donation fund	3.20
Principal on loans of accumulated interest	2,000.00
Sales of land purchased with accumulated interest	4,200.00
Total	$ 100,027.71

1889.

Cash on hand at the beginning of the fiscal year		$ 3,480.01
Income from endowment fund		47,891.87
Sales by College departments		8,194.06
Sales by State Experiment fund		403.35
State appropriations		6,000.00
Room rent		1,315.00
College Hospital, payments by students		335.25
Diplomas, payments by students		330.00
Sale notes falling due		30.00
Rent on land belonging to donation fund		3.20
Principal on loans of accumulated interest		10,150.00
Contingent principal fund		4,200.00
Experiment station, annual appropriation	$ 15,000.00	
Sales	532.37	$ 15,532.37
Cash balance of other funds than interest funds, at beginning of year		$ 5,898.94
Total		$ 103,764.05

Duplicate receipts of the items making up this amount are presented with this report. Careful comparisons have been made with the reports of other officers, and the cash reports of the heads of departments. The amount above given has thus been tested and found correct.

COLLEGE EXPENDITURES.

All expenditures of College funds must be in accordance with appropriations made by the Board of Trustees and upon bills approved by the Board of Audit. The auditing board require that all bills allowed by them shall be just and legal claims against the College properly payable from its funds; that they shall be fully itemized, and that they shall be certified to as correct by the head of the department making the purchase or employing the labor. All bills audited during the biennial period are believed to be in strict accordance with the laws and the rules and regulations of your honorable body.

Examinations, as required by the State statute, have been made of the treasurer's accounts. 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 additions have been accurately made, and the balance with which the treasurer should now stand charged correctly determined. The account kept by me with the treasurer has been compared with the books of this office and the two found to agree. They show the following expenditures:

Expended on account of the various College departments	$ 54,687.55
Expended on account of State appropriations	5,359.84
Expended on account of experiment station	18,906.74
Expended on account of room rent	1,364.85
Expended on account of College hospital fund	320.31
Expended on account of diploma fund	259.47
Contingent principal fund invested in farm mortgages	9,750.00
Total disbursements during the year	$ 90,648.76
Balance on hand at close of year	9,378.95
Total cash accounted for	$100,027.71

1889.

Expended on account of the various College departments	$ 49,933.80
Expended on account of State appropriations	5,859.06
Expended on account of experiment station	15,384.39
Expended on account of room rent	1,031.91
Expended on account of College hospital fund	296.29
Expended on account of diploma fund	59.73
Contingent principal fund invested in farm mortgages	16,050.00
Total disbursements during the year	$ 88,615.18
Cash balance on hand	15,148.87
Total cash accounted for	$103,764.05

The exhibits attached to this report show in detail the expenditures on account of the College departments. The cash balance on hand belongs to the following departments:

State appropriations	$ 3,175.63	
Interest on State warrants	2.08	
Right of way damages	593.50	
Room rent fund	1,096.30	
College hospital fund	112.04	
Donation fund	6.40	
Diploma fund	277.80	
Contingent principal fund	75.00	
Experiment station	147.98	$ 5,486.73
Interest fund		9,662.14
		$ 15,148.87

FUTURE INCOME OF THE COLLEGE.

This institution, during all the years of its history, has enjoyed a steadily increasing revenue. Changes in its investments and a lower rate of interest must in the near future bring about a decided reduction in its income. I estimated in 1888 that the income of the College would warrant during the three fiscal years of 1889, 1890 and 1891, an average annual expenditure of $42,000. The appropriations for the past year, after the work of Dr. Welch had been provided for, amounted to $43,000. The actual expenditures, however, fell short of the limit of $42,000, by nearly $300. The income for the year was moreover unexpectedly increased by an investment of the balance in the State treasury in State warrants. The interest on these warrants amounted to $1,108.94. The balance on hand at the close of the present year is consequently in excess of my estimate of $8,000, being in round numbers $9,600. I therefore estimate that the appropriations for the fiscal year of 1890 can run up to $43,000, without danger of financial embarrassment to the College. In making such estimate, I have not taken into consideration the refunding of interest to lessees making claims against the College because of conflict between the selections under the College grant and those under the swamp land act. If such claims were allowed and paid, the available income of the College would be seriously affected.

The title of the land received under the congressional grant rests in the State. These lands were selected by a commissioner appointed by the State. If conflict of titles arises, it is because of his selections of land already conveyed under the Swamp Land act, and the responsibility therefore clearly rests with the State. The State is obligated to the national government to preserve the endowment fund undiminished. It would thus seem that the State is the proper party

to defend its title in the cases in question, and in case of failure to sustain such title, to make settlement with the lessee. A legislative act placing this matter under the charge of the Attorney-general and the State Executive Council would relieve the board of a question which has grown to be very annoying. Such a law would need to be carefully drawn under legal advice.

The balance of interest fund on hand is much larger in November than at some other times in the year; yet I believe it would be safe to loan $3,000 of the balance now on hand, providing that the board would direct the refunding of this amount, as it should be from the moneys paid in on contingent fund land or loans.

The usual exhibits, showing in condensed shape the condition of the endowment fund and the receipts and disbursements on account of the income derived therefrom, are attached to this report.

All of which is respectfully submitted,

E. W. STANTON,
Secretary.

EXHIBIT A.

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

Land under lease, 85,724.89 acres	$278,287.05
Land not under lease, 2,319.94 acres	10,395.25
Proceeds of sales of endowment fund land	321,473.86
Proceeds of sales of land purchased with interest money	20,640.00
Amount transferred from interest fund	18,600.00
Total endowment fund	$649,396.16

The lands and funds yielding income are as follows:

Land under lease, eight per cent	$278,287.05
Amount invested in bonds at six per cent	5,500.00
Amount invested in land obtained under foreclosure of mortgage (leased)	1,200.00
Amount invested in farm mortgages at eight per cent	237,300.00
Amount invested in farm mortgages at seven per cent	101,665.00
Total investments	$623,952.05

The lands and funds not yielding income are as follows:

Lands not yielding income	$ 10,395.25
Cash in hands of State Treasurer awaiting investment	8,473.86
Cash in hands of financial agent awaiting investment	6,500.00
Cash in hands of College treasurer awaiting investment	75.00
Total amount not yielding income	$25,444.11

EXHIBIT B.

The following statement shows the ordinary income of the College for the fiscal year ending November 14, 1888, together with the expenditures on account of the different departments.

INCOME.

Cash balance on hand November 9, 1887	$ 3,264.60	
Received on sale notes on hand at beginning of year	35.00	$ 3,299.60
Rental on endowment fund land	$ 23,840.77	
Rental on land purchased with interest fund	2,260.75	
Interest on bonds held by State Treasurer	360.00	
Interest on endowment fund invested in farm mortgages	17,742.08	
Interest on interest fund invested in farm mortgages	2,029.46	
Interest on sale notes	5.95	46,239.01
		$ 49,538.61

EXPENDITURES.

Salaries		$ 28,786.57
Farm Department:		
Current expenses	$ 714.37	
Permanent improvement	181.98	
Foreman	635.66	
Lecturer	12.91	
		$ 1,544.92
Mechanical Department:		
Current expenses and apparatus	$ 1,675.34	
Foreman	940.29	
		$ 2,615.63
Veterinary Department:		
Expenses and apparatus	$ 400.00	
House surgeon	200.00	
Lecturers for 1887-8	71.82	
		$ 671.82
Chemical Department:		
Expenses and apparatus	$ 489.97	
Assistant	391.66	
		$ 881.63
Horticultural department		978.02
Civil engineering		337.07
Domestic economy		200.00
Military department		304.22
Physics		1,150.00
Botany		374.75
Entomology and zoology		885.84
Library:		
Assistant	$ 75.00	
Books, periodicals and expenses	1,000.00	
Catalogue	269.88	
		$ 1,344.88
Public grounds		775.00
Public Rooms:		
Public rooms in main building	$ 1,006.34	
Office building	233.21	
North hall	175.70	
Chemical and physical laboratories	158.78	
		$ 1,574.03
Contingent expense		3,179.98
Sabbath services and lecturers		185.50
Department bulletins		318.74
Total ordinary expenses for the year		$ 46,058.60
Cash balance on hand		3,480.01
		$ 49,538.61

EXHIBIT C.

The following statement shows the ordinary income of the College for the fiscal year ending November 14, 1889, together with the expenditures on account of the different departments:

INCOME.

Cash balance on hand November 14, 1888	$ 3,480.01	
Received on sale notes on hand at beginning of year	30.00	
		$ 3,510.01
Rental on endowment fund land	$ 21,637.06	
Rental on land purchased with interest money	2,248.47	
Interest on bonds held by State Treasurer	359.40	
Interest on endowment fund invested in farm	20,378.63	
Interest on interest fund invested in farm	2,119.37	
Interest on sale notes	40.00	
Interest on endowment fund balance invested in State	1,108.94	
		$ 47,891.87

EXPENDITURES.

Salaries		$ 27,218.75
Farm department:		
Current expenses	$ 547.45	
Permanent improvements	342.97	
Foreman	524.04	
		$ 1,414.46
Mechanical department:		
Current expenses and apparatus	$ 1,492.85	
Foreman	1,000.00	
		$ 2,492.85
Veterinary department:		
Expenses and apparatus	$ 434.79	
House surgeon	200.00	
Lecturers	11.58	
		$ 646.37
Chemical department:		
Expenses and apparatus	$ 385.71	
Assistant	300.00	
		$ 685.71
Horticultural department		460.91
Civil engineering		192.11
Domestic economy		340.00
Military department		196.42
Physics		343.41
Botany		300.00
Entomology and zoology		449.67
Library:		
Assistant	$ 75.00	
Books, periodicals and expenses	761.33	
Catalogue	246.98	
		$ 1,083.31
Public grounds		590.77
Public rooms:		
Public rooms in main building	$ 1,104.82	
Office building	125.14	
North hall	141.10	
Chemical and physical laboratories	144.30	
		$ 1,515.36
Contingent expenses		2,601.66
Sabbath services and lectures		195.08
Pianos		1,012.90
Total ordinary expense for the year		$ 41,739.74
Cash balance on hand		9,662.14
		$ 51,401.88

EXHIBIT D.

The following statement shows for the fiscal year ending Nov. 13, 1889:

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

DEPARTMENTS.	Total expenditures.	Total income from sales.	Amount of appropriation expended.	Amount of appropriation.
Salaries	$ 27,218.75	$	$ 27,218.75	$ 27,218.75
Farm department—				
Foreman	524.04	.....	524.04	600.00
Permanent improvements	342.97	.....	342.97	350.00
Current expenses	4,777.12	4,229.67	547.45	700.00
Mechanical department—				
Foreman	1,000.00	.....	1,000.00	1,000.00
Expenses and apparatus	2,044.55	551.70	1,492.85	1,500.00
Horticultural department	2,430.53	1,969.62	460.91	1,075.00
Veterinary department—				
House surgeon	200.00	.....	200.00	200.00
Lectures for 1889	11.58	.....	11.58	25.00
Expenses and apparatus	1,031.09	596.30	434.79	435.10
Chemical department—				
Assistant	300.00	.....	300.00	300.00
Expenses and apparatus	1,027.72	692.01	385.71	400.00
Civil engineering	192.11	.....	192.11	250.00
Domestic economy	342.00	2.00	340.00	350.00
Military department	196.42	.....	196.42	200.00
Physics	344.41	1.00	343.41	350.00
Botany	368.63	68.63	300.00	300.00
Entomology and Zoology	489.97	40.30	449.67	450.00
Library—				
Assistant	75.00	.....	75.00	75.00
Books, periodicals and expenses	761.33	.....	761.33	800.00
Catalogue	246.98	.....	246.98	300.00
Public grounds	666.60	75.83	590.77	600.00
Public rooms	1,515.36	.....	1,515.36	1,951.40
Contingent expenses	2,604.66	3.00	2,601.66	2,704.40
Pianos	1,016.90	4.00	1,012.90	1,025.00
Sabbath services and public lectures	195.08	.....	195.08	200.00
Total	$ 49,033.80	$ 8,194.06	$ 41,739.74	$ 43,009.65

REPORT OF THE TREASURER.

The following is a complete statement of the transactions under all the accounts for the fiscal year ending November 14, 1888.

	BALANCES, NOVEMBER 10, 1887.		FISCAL YEAR.		TOTALS.		INTEREST FUND.		BALANCES, NOVEMBER 14, 1888.	
			Expenditures.	Receipts.						
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Interest on lands belonging to Congressional grant	$	$ 4,483.80	$	$ 23,840.77	$	$ 28,324.57	$	$ 28,324.57	$	$ .....
Interest on accumulated interest	.....	.....	.....	4,290.21	.....	4,290.21	.....	4,290.21	.....	.....
Interest on investment of endowment fund	.....	.....	.....	18,102.08	.....	18,102.08	.....	18,102.08	.....	.....
Contingent principal fund	.....	39,840.00	.....	4,200.00	.....	35,040.00	.....	.....	.....	35,040.00
Mortgages receivable	25,515.00	.....	9,750.00	2,000.00	35,265.00	2,000.00	.....	.....	33,265.00	.....
Donation fund	.....	.....	.....	3.20	.....	3.20	.....	.....	.....	3.20
Diploma fund	.....	177.00	250.47	90.00	250.47	267.00	.....	.....	.....	7.53
Room rent	.....	866.06	1,364.85	1,312.00	1,364.85	2,178.06	.....	.....	.....	813.21
College hospital fund	.....	57.39	320.31	336.00	320.31	393.39	.....	.....	.....	73.08
Railroad damages	.....	593.50	.....	.....	.....	593.50	.....	.....	.....	593.50
Bills receivable	742.25	.....	.....	35.00	742.25	35.00	.....	.....	707.25	.....
Interest on notes	.....	.....	.....	5.95	.....	5.95	.....	5.95	.....	.....
Personal accounts	476.95	.....	.....	.....	476.95	.....	.....	.....	476.95	.....
Interest on State warrants	.....	2.08	.....	.....	.....	2.08	.....	.....	.....	2.08
*Farm department	.....	.....	6,782.58	5,237.66	6,782.58	5,237.66	1,544.92	.....	.....	.....
*Horticultural department	.....	.....	2,484.82	1,506.80	2,484.82	1,506.80	978.02	.....	.....	.....
Chemical department	.....	.....	1,647.74	766.11	1,647.74	766.11	881.63	.....	.....	.....
Civil engineering department	.....	.....	330.37	2.30	330.37	2.30	327.07	.....	.....	.....
Zoology and entomology	.....	.....	902.39	16.55	902.39	16.55	885.84	.....	.....	.....
Domestic economy	.....	.....	200.00	.....	200.00	.....	200.00	.....	.....	.....
Military department	.....	.....	351.42	47.20	351.42	47.20	304.22	.....	.....	.....
Mechanical department	.....	.....	3,104.90	489.27	3,104.90	489.27	2,615.63	.....	.....	.....
Physical department	.....	.....	1,151.00	1.00	1,151.00	1.00	1,150.00	.....	.....	.....
Veterinary department	.....	.....	1,146.37	474.55	1,146.37	474.55	671.82	.....	.....	.....
Botanical department	.....	.....	408.00	33.25	408.00	33.25	374.75	.....	.....	.....
Salaries	.....	.....	28,786.57	.....	28,786.57	.....	28,786.57	.....	.....	.....
Public rooms	.....	.....	1,593.73	19.70	1,593.73	19.70	1,574.03	.....	.....	.....
Public grounds	.....	.....	869.56	34.56	869.56	34.56	775.00	.....	.....	.....
Department bulletins	.....	.....	318.74	.....	318.74	.....	318.74	.....	.....	.....
Chapel services	.....	.....	135.50	.....	135.50	.....	135.50	.....	.....	.....

Contingent expense	.....	.....	3,179.98	.....	3,179.98	.....	3,179.98	.....	.....	.....
Library	.....	.....	1,344.88	.....	1,344.88	.....	1,344.88	.....	.....	2,631.34
†State appropriations	.....	1,991.18	5,350.84	6,000.00	5,350.84	7,991.18	.....	.....	.....	.....
†Experiment station	.....	.....	18,906.74	18,906.74	18,906.74	18,906.74	.....	.....	.....	.....
	$ 26,734.20	$ 30,011.01	$ 90,648.76	$ 87,750.90	$ 117,382.96	$ 120,761.91	$ 46,058.60	$ 50,722.81	.....	4,664.21
Balance, interest fund	.....	.....	.....	.....	.....	.....	4,664.21	.....	.....	.....
Cash balance—										
State appropriations	1,991.18	.....	640.16	.....	2,631.34	.....	.....	.....	2,631.34	.....
Other sources	10,285.63	.....	.....	3,538.02	10,285.63	3,538.02	.....	.....	6,747.61	.....
	$ 30,011.01	$ 30,011.01	$ 91,288.92	$ 91,288.92	$ 130,299.93	$ 130,299.93	$ 50,722.81	$ 50,722.81	$ 43,828.15	$ 43,828.15

* For more complete statements see pages 88, 90.

† For statement covering biennial period for State appropriations see page —. Experiment station see page —.

FARM DEPARTMENT

Statement of the several farm accounts for the fiscal year ending November 14, 1888.

	Expenditures.	Receipts.	Net expenditures.	Net receipts.
Farm stock	$ 4,497.67	$ 4,718.80	$	$ 221.13
Farm experiments	12.60	....	12.60	....
Farm produce	1,030.24	486.06	544.18	....
Farm permanent improvement	181.98	....	181.98	....
Farm current improvement	175.63	12.60	163.03	....
Farm tools	235.89	20.20	215.69	....
Farm foreman	635.66	....	635.66	....
Farm lectures	12.91	....	12.91	....
	$ 6,782.58	$ 5,237.66	$ 1,766.05	$ 221.13
Balance used from interest fund	....	1,544.92	....	1,544.92
	$ 6,782.58	$ 6,782.58	$ 1,766.05	$ 1,766.05

HORTICULTURAL DEPARTMENT.

Statement of the several accounts of the horticultural department for the fiscal year ending November 14, 1888.

	Expenditures.	Receipts.	Net expenditures.	Net receipts.
Horticulture and forestry	$ 340.37	$ 136.63	$ 203.74	$ ....
Experimental horticulture	1,902.93	1,109.07	812.86	....
Propagating house	109.72	14.75	94.97	....
Small fruits	131.80	265.35	....	133.55
	$ 2,484.82	$ 1,506.80	$ 1,111.57	$ 133.55
Balance used from interest fund	....	978.02	....	978.02
	$ 2,484.82	$ 2,484.82	$ 1,111.57	$ 1,111.57

Respectfully submitted,

HERMAN KNAPP, *Treasurer.*

REPORT OF THE TREASURER.

The following is a complete statement of the transactions in all the accounts for the fiscal year ending November 13, 1889.

	BALANCES, NOVEMBER 14, 1888.		FISCAL YEAR.		TOTALS.		INTEREST FUND.		BALANCES, NOVEMBER 13, 1889.	
			Expenditures.	Receipts.						
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Interest on lands belonging to Congressional grant	$	$ 4,664.21	$	$ 21,637.06	$	$ 26,301.27	$	$ 26,301.27	$	$ ....
Interest on accumulated interest	....	....	....	4,367.84	....	4,367.84	....	4,367.84	....	....
Interest on investment of endowment fund	....	....	....	21,846.97	....	21,846.97	....	21,846.97	....	....
Contingent principal fund	....	35,040.00	....	4,200.00	....	39,240.00	....	....	....	39,240.00
Mortgages receivable	33,265.00	....	16,050.00	10,150.00	49,315.00	10,150.00	....	....	39,165.00	....
Donation fund	....	3.20	....	3.20	....	6.40	....	....	....	6.40
Diploma fund	....	7.53	59.73	330.00	59.73	337.53	....	....	....	277.80
Room rent	....	813.21	1,031.91	1,315.00	1,031.91	2,128.21	....	....	....	1,096.30
College hospital	....	73.08	296.29	335.25	296.29	408.33	....	....	....	112.04
Railroad damages	....	593.50	....	....	....	593.50	....	....	....	593.50
Interest on State warrants	....	2.08	....	....	....	2.08	....	....	....	2.08
Personal accounts	476.95	....	....	....	476.95	....	....	....	476.95	....
Bills receivable	707.25	....	....	30.00	707.25	30.00	....	....	677.25	....
Interest on notes	....	....	....	40.00	....	40.00	....	40.00	....	....
*Farm department	....	....	5,644.13	4,229.67	5,644.13	4,229.67	1,414.46	....	....	....
*Horticultural department	....	....	2,430.53	1,969.62	2,430.53	1,969.62	460.91	....	....	....
Chemical department	....	....	1,337.72	652.01	1,337.72	652.01	685.71	....	....	....
Civil engineering department	....	....	192.11	....	192.11	....	192.11	....	....	....
Zoology and entomology	....	....	489.97	40.30	489.97	40.30	449.67	....	....	....
Domestic economy	....	....	342.00	2.00	342.00	2.00	340.00	....	....	....
Military department	....	....	196.42	....	196.42	....	196.42	....	....	....
Mechanical department	....	....	3,044.55	551.70	3,044.55	551.70	2,492.85	....	....	....
Physical department	....	....	344.41	1.00	344.41	1.00	343.41	....	....	....
Veterinary department	....	....	1,242.67	596.30	1,242.67	596.30	646.37	....	....	....
Botanical department	....	....	368.63	68.63	368.63	68.63	300.00	....	....	....
Salaries	....	....	27,218.75	....	27,218.75	....	27,218.75	....	....	....
Pianos	....	....	1,016.90	4.00	1,016.90	4.00	1,012.90	....	....	....
Public rooms	....	....	1,515.36	....	1,515.36	....	1,515.36	....	....	....
Public grounds	....	....	666.60	75.83	666.60	75.83	590.77	....	....	....
Contingent expense	....	....	2,604.66	3.00	2,604.66	3.00	2,601.66	....	....	....

REPORT OF THE TREASURER—CONTINUED.

	BALANCES, NOVEMBER 14, 1888.		FISCAL YEAR.		TOTALS.		INTEREST FUND.		BALANCES, NOVEMBER 13, 1889.	
			Expenditures.	Receipts.						
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Chapel services			195.08		195.08		195.08			
Library			1,083.31		1,083.31		1,083.31			
*State appropriations		2,631.54	5,850.06	6,403.35	5,850.06	6,034.89				3,175.83
*Experiment station			15,584.39	15,582.07	15,584.39	15,582.07				147.68
	$ 34,440.29	$ 43,858.15	$ 88,615.18	$ 94,385.10	$ 123,066.38	$ 138,243.25	$ 41,730.74	$ 32,556.08		10,816.34
Balance interest fund on hand							10,816.34		10,816.34	
Cash to balance	2,631.54		544.29		3,175.83				3,175.83	
†State appropriations			147.98		147.98				147.98	
Experiment station	6,747.61		5,077.65		11,825.26				11,825.26	
Other sources										
	$ 43,858.15	$ 43,858.15	$ 94,385.10	$ 94,385.10	$ 138,213.25	$ 138,213.25	$ 52,556.08	$ 32,556.08	$ 55,468.07	$ 55,468.07

*For more complete statements see pages 88, 90.

†For statement covering biennial period for State appropriations, page ... Experiment station, page ...

FARM DEPARTMENT.

Statement of the several farm accounts for the fiscal year ending November 13, 1889.

	Expenditures.	Receipts.	Net expenditures.	Net receipts.
Farm stock	$ 2,678.90	$ 3,624.71	$	$ 945.81
Farm produce	1,978.63	538.03	840.60	.....
Farm current improvement	204.06	.....	204.06	.....
Farm tools	515.53	66.93	448.60	.....
Farm permanent improvement	342.97	.....	342.97	.....
Farm foreman	524.04	.....	524.04	.....
	$ 5,644.13	$ 4,229.67	$ 2,360.27	$ 945.81
Balance used from interest fund	.....	1,414.46	.....	1,414.46
	$ 5,644.13	$ 5,644.13	$ 2,360.27	$ 2,360.27

HORTICULTURAL DEPARTMENT.

Statement of the several accounts of the horticultural department for the fiscal year ending November 13, 1889.

	Expenditures.	Receipts.	Net expenditures.	Net receipts.
Horticulture and forestry	$ 321.32	.....	$ 321.32	.....
Experimental horticulture	1,970.58	1,865.08	104.40	.....
Propagating house	70.92	.....	35.92	.....
Orchard	33.41	.....	33.41	.....
Small fruits	68.50	103.64	.....	35.14
	$ 2,430.53	$ 1,969.62	$ 496.05	$ 35.14
Balance used from interest fund	.....	460.91	.....	460.91
	$ 2,430.53	$ 2,430.53	$ 496.05	$ 496.05

STATE APPROPRIATIONS.

The following is a statement of the transactions on account of the different appropriations for the biennial period.

	Balance on hand November 15, 1887.	Amount drawn from State treasurer.	Amount paid as per vouchers.	Balance on hand November 15, 1889.
APPROPRIATIONS MADE BY THE TWENTY-SECOND GENERAL ASSEMBLY.				
State repair and improvement fund of 1888	$	$ 1,000.00	$ 1,000.00	$ .....
State repair and improvement fund of 1889	.....	1,000.00	926.14	73.86
Water supply	.....	1,000.00	999.61	.39
Lavatories	.....	5,500.00	5,343.77	156.23
Electric light and mechanical department repairs	.....	500.00	499.02	.98
Totals	$	$ 7,000.00	$ 6,768.54	$ 231.46
ANNUAL APPROPRIATIONS.				
State contingent fund of 1887	293.28	.....	293.28	.....
State contingent fund of 1888	.....	1,000.00	1,000.00	.....
State contingent fund of 1889	.....	1,000.00	472.74	527.26
State experimental fund of 1886	691.19	.....	691.19	.....
State experimental fund of 1887	1,096.71	.....	1,062.83	33.88
State experimental fund of 1888	.....	*1,903.35	1,020.32	883.03
State experimental fund of 1889	.....	1,500.00	.....	1,500.00
Totals	$ 1,991.18	$ 12,403.35	$ 11,218.90	$ 3,175.63

*Of this amount, $403.35 was received from the sale of stock that had been bought with this fund for the purpose of conducting experiments in feeding. When the experiment was finished the stock was sold and the money so received was credited to this fund.

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, 1887, to October 31, 1889, inclusive, is hereby submitted for your consideration.

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

1887. DR.		
To amount collected November	$ 1,791.73	
To amount collected December	2,150.82	
1888.		
To amount collected January	1,847.64	
To amount collected February	1,189.42	
To amount collected March	973.78	
To amount collected April	1,649.81	
To amount collected May	1,796.44	
To amount collected June	2,338.56	
To amount collected July	2,713.64	
To amount collected August	2,371.11	
To amount collected September	2,136.77	
To amount collected October	2,881.05	

1887. CR.		
By amount remitted November 30, voucher No. 18.		$ 1,791.73
By amount remitted December 31, voucher No. 19.		2,150.82
1888.		
By amount remitted January 31, voucher No. 20.		1,847.64
By amount remitted February 29, voucher No. 21.		1,189.42
By amount remitted March 31, voucher No. 22		973.78
By amount remitted April 30, voucher No. 23		1,649.81
By amount remitted May 31, voucher No. 24		1,796.44
By amount remitted June 30, voucher No. 25		2,338.56
By amount remitted July 31, voucher No. 26		2,713.64
By amount remitted August 31, voucher No. 27		2,371.11
By amount remitted October 1, voucher No. 28		2,136.77
By amount remitted October 31, voucher No. 29		2,881.05
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1888	$ 23,840.77	$ 23,840.77

1888. DR.		
To amount collected November	$ 1,839.37	
To amount collected December	2,226.85	
1889.		
To amount collected January	1,252.50	
To amount collected February	1,153.49	
To amount collected March	1,094.13	
To amount collected April	1,336.61	
To amount collected May	1,776.41	
To amount collected June	2,277.98	
To amount collected July	2,353.15	
To amount collected August	1,639.85	
To amount collected September	2,406.40	
To amount collected October	2,280.32	
1888. CR.		
By amount remitted November 30, voucher No. 30		$ 1,839.37
By amount remitted December 31, voucher No. 31		2,226.85
1889.		
By amount remitted January 31, voucher No. 32		1,252.50
By amount remitted March 1, voucher No. 33		1,153.49
By amount remitted April 1, voucher No. 34		1,094.13
By amount remitted May 1, voucher No. 35		1,336.61
By amount remitted May 31, voucher No. 36		1,776.41
By amount remitted July 2, voucher No. 37		2,277.98
By amount remitted July 31, voucher No. 38		2,353.15
By amount remitted August 31, voucher No. 39		1,639.85
By amount remitted September 30, voucher No. 40.		2,406.40
By amount remitted October 31, voucher No. 41		2,280.32
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1889	$ 21,637.06	$ 21,637.06

CONTINGENT FUND.

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

1887. DR.		
To amount collected November	$ 163.20	
To amount collected December	121.60	
1888.		
To amount collected January	60.80	
To amount collected February	160.00	
To amount collected March	115.20	
To amount collected April	233.60	
To amount collected May	307.15	
To amount collected June	376.00	
To amount collected July	80.00	
To amount collected August	76.80	
To amount collected September	246.40	
To amount collected October	320.00	
1887. CR.		
By amount remitted November 30, voucher No. 18		$ 163.20
By amount remitted December 31, voucher No. 19		121.60
1888.		
By amount remitted January 31, voucher No. 20.		60.80
By amount remitted February 29, voucher No. 21.		160.00
By amount remitted March 31, voucher No. 22		115.20
By amount remitted April 30, voucher No. 23		233.60
By amount remitted May 31, voucher No. 24		307.15
By amount remitted June 30, voucher No. 25		376.00
By amount remitted July 31, voucher No. 26		80.00
By amount remitted August 31, voucher No. 27		76.80
By amount remitted October 1, voucher No. 28		246.40
By amount remitted October 31, voucher No. 29		320.00
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1888	$ 2,260.75	$ 2,260.75

1888. DR.		
To amount collected November	$ 128.00	
To amount collected December	76.80	
1889.		
To amount collected January	28.80	
To amount collected February	236.80	
To amount collected March	184.32	
To amount collected April	272.00	
To amount collected May	254.35	
To amount collected June	283.40	
To amount collected July	73.60	
To amount collected September	345.60	
To amount collected October	364.80	
1888. CR.		
By amount remitted November 30, voucher No. 30		128.00
By amount remitted December 31, voucher No. 31.		76.80
1889.		
By amount remitted January 31, voucher No. 32.		28.80
By amount remitted March 1, voucher No 33		236.80
By amount remitted April 1, voucher No. 34		184.32
By amount remitted May 1, voucher No. 35		272.00
By amount remitted June 1, voucher No. 36		254.35
By amount remitted July 2, voucher No. 37		283.40
By amount remitted July 31, voucher No. 38		73.60
By amount remitted September 30, voucher No. 39		345.60
By amount remitted October 31, voucher No. 40		364.80
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1889	$ 2,248.47	$ 2,248.47

INTEREST ON LOANS OF CONTINGENT FUND.

1887. DR.		
To interest collected November	$ 147.80	
To interest collected December	318.50	
1888.		
To interest collected January	673.50	
To interest collected February	271.56	
To interest collected March	35.35	
To interest collected June	140.00	
To interest collected July	241.75	
To interest collected August	201.00	
1887. CR.		
By amount paid November 30, voucher No. 12		$ 147.80
By amount paid December 31, voucher No. 13		318.50
1888.		
By amount paid January 31, voucher No. 14		673.50
By amount paid February 29, voucher No. 15		271.56
By amount paid March 31, voucher No. 16		35.35
By amount paid June 30, voucher No. 17		140.00
By amount paid July 31, voucher No. 18		241.75
By amount paid August 31, voucher No. 19		201.00
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1888	$ 2,029.46	$ 2,029.46

1888. DR.		
To interest collected December	$ 253.17	
1889.		
To interest collected January	659.71	
To interest collected February	130.50	
To interest collected March	171.83	
To interest collected June	425.68	
To interest collected July	141.15	
To interest collected September	42.00	
To interest collected October	295.33	
1888. CR.		
By amount paid December 31, voucher No. 20		$ 253.17
1889.		
By amount paid January 31, voucher No. 21		659.71
By amount paid March 1, voucher No. 22		130.50
By amount paid April 1, voucher No. 23		171.83
By amount paid July 2, voucher No. 24		425.68
By amount paid July 31, voucher No. 25		141.15
By amount paid September 30, voucher No. 26		42.00
By amount paid October 31, voucher No. 27		295.33
Total amount collected and paid to College Treasurer during the fiscal year ending October 31, 1889	$ 2,119.37	$ 2,119.37

ENDOWMENT FUND.

1887.	DR.		
To amount collected November		$ 6,105.65	
1888.			
To amount collected February		240.00	
To amount collected March		3,760.00	
To amount collected April		3,480.00	
To amount collected May		1,794.06	
To amount collected June		2,410.45	
To amount collected July		1,000.00	
To amount collected August		360.00	
To amount collected September		1,560.00	
To amount collected October		1,240.00	
1887.	CR.		
By amount remitted November 30, voucher No. 16			$ 6,101.65
1888.			
By amount remitted February 10, voucher No. 17.			4.00
By amount remitted February 29, voucher No. 18.			240.00
By amount remitted March 31, voucher No. 19			3,760.00
By amount remitted April 30, voucher No. 20			3,480.00
By amount remitted May 31, voucher No. 21			1,794.06
By amount remitted June 30, voucher No. 22			2,410.45
By amount remitted July 31, voucher No. 23			1,000.00
By amount remitted August 31, voucher No. 24			360.00
By amount remitted October 1, voucher No. 25			1,560.00
By amount remitted November 1, voucher No. 26.			1,240.00
Total amount collected and remitted to State Treasurer during the fiscal year ending October 31, 1888		$ 21,950.16	$ 21,950.16

1888.	DR.		
To amount collected November		$ 1,560.00	
To amount collected December		1,040.00	
1889.			
To amount collected January		2,580.00	
To amount collected January		360.00	
To amount collected February		1,440.00	
To amount collected March		3,249.28	
To amount collected April		1,380.40	
To amount collected May		675.14	
To amount collected June		4,857.49	
To amount collected July		3,778.93	
To amount collected August		4,267.94	
To amount collected September		2,660.00	
To amount collected October		2,644.27	
1888.	CR.		
By amount remitted November 30, voucher No. 27			$ 1,560.00
By amount remitted December 31, voucher No. 28			1,040.00
1889.			
By amount remitted January 31, voucher No. 29.			2,580.00
By amount remitted January 31, voucher No. 30.			360.00
By amount remitted February 27, voucher No. 31.			1,440.00
By amount remitted April 1, voucher No. 32			347.85
By amount remitted April 1, voucher No. 33			2,901.43
By amount remitted May 1, voucher No. 34			1,380.02
By amount remitted May 1, voucher No. 35			.38
By amount remitted June 1, voucher No. 36			675.14
By amount remitted July 2, voucher No. 37			4,857.49
By amount remitted July 31, voucher No. 38			3,778.93
By amount remitted August 31, voucher No. 39			4,267.94
By amount remitted September 18, voucher No. 40.			360.00
By amount remitted September 30, voucher No. 41.			2,300.00
By amount remitted October 31, voucher No. 42			2,644.27
Total amount collected and remitted to State Treasurer during the fiscal year ending October 31, 1889		$ 30,493.45	$ 30,493.45

CONTINGENT FUND PRINCIPAL.

SALE OF LANDS PURCHASED WITH ACCUMULATED INTEREST.

1887.	DR.		
To amount collected December		$ 2,520.00	
1888.			
To amount collected March		280.00	
To amount collected May		560.00	
To amount collected June		400.00	
To amount collected September		440.00	
1887.	CR.		
By amount remitted December 31, voucher No. 5.			$ 2,252.00
1888.			
By amount remitted March 31, voucher No. 6.			280.00
By amount remitted May 31, voucher No. 7			560.00
By amount remitted June 30, voucher No. 8			400.00
By amount remitted October 1, voucher No. 9			440.00
Total amount collected and remitted to State Treasurer during the fiscal year ending October 31, 1888		$ 4,200.00	$ 4,200.00
1889.	DR.		
To amount collected March		$ 800.00	
To amount collected May		2,240.00	
To amount collected August		960.00	
To amount collected September		200.00	
1889.	CR.		
By amount remitted April 1, voucher No. 10			$ 800.00
By amount remitted June 1, voucher No. 11			2,240.00
By amount remitted August 31, voucher No. 12			960.00
By amount remitted September 30, voucher No. 13.			200.00
Total amount collected and remitted to State Treasurer during the fiscal year ending October 31, 1889		$ 4,200.00	$ 4,200.00

PRINCIPAL ON LOANS MADE FROM ACCUMULATED INTEREST.

1888.	DR.		
To amount collected February		$ 1,000.00	
To amount collected July		1,000.00	
1888.	CR.		
By amount paid February 29, voucher No. 2			$ 1,000.00
By amount paid July 31, voucher No. 3			1,000.00
Total amount collected and paid College Treasurer during the fiscal year ending October 31, 1888		$ 2,000.00	$ 2,000.00

1889.	DR.		
To amount collected January		$ 7,050.00	
To amount collected February		2,600.00	
To amount collected June		500.00	
1889.	CR.		
By amount paid January 31, voucher No. 4			$ 7,050.00
By amount paid March 1, voucher No. 5			2,600.00
By amount paid July 2, voucher No. 6			500.00
Total amount collected and paid College Treasurer during the fiscal year ending October 31, 1889		$ 10,150.00	$ 10,150.00

RECAPITULATION.

Amount of interest fund collected from November 1, 1887, to October 31, 1888	$ 23,840.77	
Amount of interest fund collected from November 1, 1888, to October 31, 1889	21,637.06	
Amount of contingent fund collected from November 1, 1887, to October 31, 1888	2,260.75	
Amount of contingent fund collected from November 1, 1888, to October 31, 1889	2,248.47	
Amount of interest on loans collected from November 1, 1887, to October 31, 1888	2,029.46	
Amount of interest on loans collected from November 1, 1888, to October 31, 1889	2,119.37	
Total income from department since last report		$ 54,135.88
Amount of endowment fund collected from November 1, 1887, to October 31, 1888	$ 21,950.16	
Amount of endowment fund collected from November 1, 1888, to October 31, 1889	30,493.45	
Amount of contingent fund principal collected from November 1, 1887, to October 31, 1888	4,200.00	
Amount of contingent fund principal collected from November 1, 1888, to October 31, 1889	4,200.00	
Amount of principal on loans contingent fund collected from November 1, 1887, to October 31, 1888	2,000.00	
Amount of principal on loans contingent fund collected from November 1, 1888, to October 31, 1888	10,150.00	
		$ 72,993.61
Total collections since last report		$ 127,129.49

There have been loaned of the contingent fund principal since date of last report, $25,800.00, at seven per cent, secured on improved farming land, as follows:

Loan No. 40, John M. Seemann	$ 1,600.00	
Loan No. 41, C. C. Stevens	1,200.00	
Loan No. 42, W. J. Freed	1,500.00	
Loan No. 43, V. G. Coe	1,200.00	
Loan No. 44, L. A. Firkins	600.00	
Loan No. 45, Mrs. M. M. Adamson	650.00	
Loan No. 46, John Linderback	1,000.00	
Loan No. 47, Fredrick R. Price	2,000.00	
Loan No. 48, S. A. and L. May Garrett	1,000.00	
Loan No. 49, William Rabe	600.00	
Loan No. 50, F. Bartels	1,600.00	
Loan No. 51, A. E. Howland	550.00	
Loan No. 52, S. O. Holland	800.00	
Loan No. 53, Erick Helin	600.00	
Loan No. 54, Jens L. Stages	600.00	
Loan No. 55, Nicholas Klein	500.00	
Loan No. 56, J. F. Gage	500.00	
Loan No. 57, James L. Manel	1,000.00	
Loan No. 58, John P. Hilstrom	1,200.00	
Loan No. 59, Benson Searle	1,200.00	
Loan No. 60, John McBreen	900.00	
Loan No. 61, Swan Swanson	700.00	
Loan No. 62, L. F. Morehouse	1,000.00	
Loan No. 63, Betsey Brokke	1,000.00	
Loan No. 64, Hans F. Peterson	1,000.00	
Loan No. 65, C. J. Hamlin	700.00	
Loan No. 66, Syver Enderson	600.00	
Total loaned from November 2, 1887, to October 31, 1889	$ 25,800.00	$ 25,800.00
Amount of loans outstanding at last report		25,515.00
Total		$ 51,315.00
Amount of principal paid since last report		12,150.00
Amount of loans outstanding		$ 39,165.00

ENDOWMENT FUND LANDS.

Endowment fund lands leased from November 1st, 1887, to October 31st, 1889.

No. of lease.	PARTS OF SECTION.	Section.	Township.	Range.	Acres.	Price per acre.	Valuation.	NAME OF LESSEE.	DATE OF LEASE.	Time, years.	Rate.	First year's interest.
2978	e hf of se qr	31	94	37	80	$ 5.00	$ 400.00	James Kennedy	January 15, 1888	10	10 per cent.	$ 32.00
2979	no qr of se qr and s hf of se qr	31	90	48	120	5.00	600.00	David E. Fox	February 10, 1888	10	10 per cent.	36.00
2980	se qr	36	90	48	160	5.00	800.00	S. R. Cole	April 25, 1888	10	10 per cent.	80.00
2981	sw qr	36	95	37	160	7.00	1,120.00	William McGoorty	August 28, 1888	10	10 per cent.	80.00
					320		$ 2,960.00					

LANDS BELONGING TO THE SIOUX CITY PURCHASE LEASED FROM NOVEMBER 1, 1887, TO OCTOBER 31, 1889.

171	ne qr	36	93	36	160	$ 5.00	$ 800.00	John R. Williams and Oscar Casey	April 20, 1888	10	10 per cent.	$ 64.00

Number of acres of Congressional grant forfeited since last report	1,690.27	
Valuation of same when forfeited		$ 6,026.24
Number of acres of Congressional grant patented since last report	17,537.08	
*Valuation of same		52,533.61
Number of acres of "Sioux City Purchase" patented since last report	2,360.00	
Valuation of same		8,400.00

LANDS BELONGING TO CONGRESSIONAL GRANT.

Number of acres in the market for leasing	1,850.27
Number of acres under lease	78,287.67
Total number of acres patented	123,854.70
N. W ¼, 30, 97, 28, in conflict with swamp land entry.	149.67
S ½ of N. E. ¼, 29, 95, 30, decided to be swamp lands.	80.00
Total number of acres	204,222.31

LANDS BELONGING TO SIOUX CITY PURCHASE.

Number of acres in market for leasing	320.00
Number of acres under lease	7,453.17
Total number of acres patented	7,240.00
Total number of acres	15,013.17

The following is a description of the lands which are now on the market to be leased:

BELONGING TO SIOUX CITY PURCHASE.

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

*The total valuation of lands patented belonging to the Congressional grant exceeds the amount of endowment fund collected and remitted to the State Treasurer by $90.00. This is to be explained by the fact that the $90.00 was already in the hands of the State Treasurer, having been paid to him during the fiscal year of 1882. It was collected by Agent Bassett for "Right of Way," Lease No. 1,951, Endowment Fund Receipt No. 109.

LAND BELONGING TO THE ENDOWMENT FUND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.
Ne qr	12	99	28	160
Ne qr	34	98	29	160
Nw qr	34	98	29	160
Sw qr	3	96	36	160
Ne qr	13	95	27	160
Ne qr	33	95	27	160
Sw qr	31	95	27	166.84
Sw qr	30	95	27	163.43
Se qr	25	95	28	160
Nw qr	36	95	28	160
N hf of sw qr	15	93	27	80
Ne qr	30	96	33	160

These endowment fund lands will be on the market as soon as they have been appraised.

Respectfully submitted,

HERMAN KNAPP,

Land Agent Iowa Agricultural College.

REPORT OF THE FINANCIAL AGENT.

CORNING, IOWA, November 7, 1889.

To the Honorable Board of Trustees:

I herewith submit for your consideration my report, as your financial agent, for the term beginning November 1, 1887, and ending November 1, 1889. The amount of your endowment fund in my hands November 1, 1887, for investment, was $8,655.25. I have drawn from the Treasurer of the State of the endowment fund, $85,444.75, making a total of the funds coming into my hands for investment in first mortgages on real estate in Iowa, $94,100.00. Of this sum I have invested according to law, as per your instructions and by the mode provided, the sum of $87,600.00, leaving a balance on hand of $6,500.00.

I have followed your instructions as to the care of the taxes in the different counties in which mortgage investments have been made from your endowment fund, by sending (at the close of the year) to each of the county treasurers a list of the lands embraced in the mortgages taken for your endowment fund, and asking them to state the condition of the tax and to certify to the same. With the exception of a very few instances, I have found the taxes paid. These cases, by constant watch and persuasion, have paid the tax. This includes the tax up to and including 1887. I shall soon give the same attention for the year 1888.

It has become necessary to give especial attention to a very few loans in default as to interest. I refer to—

Loan No. 208.	W. H. Wellemeyer, Hancock county	$2,500
Loan No. 202.	G. L. Mills, Butler county	5,000
Loan No. 186.	Helen Wildfang, Emmet county	1,000
Loan No. 81.	Sewell Worthly, Cherokee county	1,200
Loan No. 148.	Sarah Drain, O'Brien county	750

Of these five loans the following disposition has been made: Worthly loan, No. 21, has been paid; Drain, No. 148, the money was in the bank, and paid; the Wildfang loan is in the Emmet county court on foreclosure; the Wellemeyer loan is in the Hancock county court on foreclosure, and the Mills loan has been settled and reinstated, and the interest money has been paid into the State Treasurer's office; leaving three paid and two in foreclosure suits. In the Wildfang suit the parties have removed from the State. I was offered a surplus over the amount of the loan and interest for the land, but the conditions about the control did not seem to allow any handling of land in my department, nor in my office.

As to the question of interest on the investment by your agent, it will be sufficient to say the law seems to place this with the State Treasurer.

I might add a word on the present status of your investments since the beginning of the year. Your board have deemed it best, as well as feasible, to reduce the rate of interest from eight per cent to seven per cent, as well as to change the option on the loans; also to allow your agent to pay local agents a small commission for their services. It will, perhaps, be enough to say the success that has followed such changes has proved the wisdom of your judgment.

The small balance on hand will be invested within thirty days, at most, and leave the demand yet unsupplied. I also vouch that there will be no accumulations, applications now being sufficient to absorb all funds now in sight. I have followed your instructions and paid to agents in the different counties the commission allowed of one per cent on the loans made. The commissions amount to $392. I have forwarded receipts to your Secretary, only to learn the funds come direct from the State Auditor, as does my salary. Possibly there may be some condition you care to consider in this matter.

A few times the demand for the payment on loans, between the arrival of funds from the State Treasurer on approved drafts, has caused me to pay over the endowment fund in my hands some fifty-four hundred dollars, also at another time near one thousand dollars; but by a later arrangement with the Secretary, funds have arrived all right. These matters have caused some complaint about funds, a condition I did not feel like avoiding, on the small salary paid. The mails have, no doubt, contributed some to this condition, as the changes to Ames and Des Moines have been unfavorable as to time.

I have on hand unfinished loans to the amount of $10,850. I also have on hand $6,500 for investment at this date.

Respectfully submitted,

D. S. SIGLER, *Agent.*

PROCEEDINGS
OF
BOARD OF TRUSTEES.

ABSTRACT OF THE PROCEEDINGS OF THE BOARD OF TRUSTEES, 1888-9.

MEMBERS OF THE BOARD OF TRUSTEES.

First District—Hon. J. W. Garner, Columbus City.....1892
Second District—Hon. C. M. Dunbar, Maquoketa.....1892
Third District—Hon. G. W. Dunham, Manchester.....1890
Fourth District—Hon. S. P. Yeomans, Charles City.....1892
Fifth District—Hon. Joseph Dysart, Dysart.....1894
Sixth District—Hon. John Morrison, Hedrick.....1890
Seventh District—Hon. J. S. Clarkson, Des Moines.....1894
Eighth District—Hon. Geo. Van Houten, Lenox.....1892
Ninth District—Hon. Platt Wicks, Harlan.....1890
Tenth District—Hon. Eugene Secor, Forest City.....1894
Eleventh District—Hon. C. D. Boardman, Odebolt.....1894

OFFICERS OF THE BOARD.

Hon. Joseph Dysart, Dysart.....*Chairman.*
E. W. Stanton, Ames.....*Secretary.*
Herman Knapp, Ames.....*Treasurer.*
J. R. Lincoln, Ames.....*Steward.*

STANDING COMMITTEES.

Executive and Finance Committee—Trustees Wicks, Yeomans, Dunham, Secor, and Van Houten.
Committee on Faculty and Courses of Study—Trustees Clarkson, Morrison, Dunbar, Boardman, and Dysart.
Committee on Farm and Farm Buildings—Trustees Secor, Boardman, and Dunbar.
Committee on Horticulture, Experiments and Hybridizing—Trustees Van Houten, Yeomans, and Boardman.

Committee on Workshop—Trustees Dunbar, Clarkson, Dunham, and Morrison.
Committee on College Lands—Trustees Morrison, Boardman and Secor.
Building Committee—Trustees Garner, Dunham, and Van Houten.
Committee on Investments—Trustees Yeomans, Dunham, and Secor.
Committee on Library—Trustees Clarkson, Van Houten, and Dysart.
Committee on Rules—Trustees Dunbar, Morrison, and Secor.
Committee on Bonds—Trustees Dunham and Wicks.
Committee on Domestic Economy—Trustees Boardman, Yeomans, and Morrison.
Committee on Experiment Station—Trustees Garner, Dunbar, and Dysart.
Committee on Scientific Departments—Trustees Clarkson, Yeomans, and Boardman.

STATE APPROPRIATIONS.

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

For removing privies and water-closets from main building and placing the same in outside towers	$3,500
For water supply for College hospital and professors' houses on College grounds	1,000
For repairing boiler and machinery in electric light and mechanical departments	500
For the repair and improvement of College buildings, the sum of $1,000, in addition to the annual appropriation of $1,000 already granted, the said sum to be paid each year on the first day of May.	

In accordance with the instructions of the Board of Trustees, the committee on buildings and the secretary of the Board submitted, at the meeting in May, 1888, plans for the lavatories contemplated by the legislative appropriation, which plans were approved, subject to such modifications as the building committee might make. This committee was directed to take charge of the construction of the buildings. The appropriation by the State proving insufficient to complete them, the deficiency was provided for by using a part of the fund paid in by students for rent of rooms. The committee having advertised for separate proposals for erecting the buildings and doing the necessary plumbing, the following were found to be the lowest bidders:

Building lavatories, B. Bisbee, Ames	$3,248
Plumbing for same, Burnside & Kehoe, Des Moines	965

The contracts were let to these parties upon the basis of their bids. Mr. Bisbee did not complete his contract to the satisfaction of the architect and the committee, and in making settlement with

him the sum of $300 was deducted from the contract price. The contractor accepted the reduction and final settlement was made upon this basis. Burnside & Kehoe completed their work in a satisfactory manner. The sum of $83.00 was paid them from the lavatory appropriation and the balance of the amount due them, from the room-rent fund. The following are the sums charged to the State appropriation:

Paid for advertising for proposals	$ 27.14
Paid B. Bisbee for construction of buildings	2,948.00
Paid Burnside & Kehoe on plumbing	83.00
Paid Foster & Leibbe, architects, five per cent on $4,241	212.05
Paid for extending steam heating and electric light systems to lavatories	72.58
Paid telephone bills	1.00
Total	$3,343.77

The unexpended balance of $156.23 is needed to complete the buildings in good shape.

With the appropriation of $1,000 for water supply, five cisterns were built at the residences of the different professors, and the same connected with the College water system; a new three-inch pipe was laid from the spring to the main College building, and the engine and boiler used in pumping were put in repair. The entire expenditures amount to $999.61, leaving an unexpended balance of 39 cents.

The appropriation of $500 for repairing boiler and machinery in electric light and mechanical departments is accounted for as follows:

Paid for repairing boiler and electric light plant	$ 183.50
Paid for repairs in mechanical engineering department	315.52
Balance unexpended	.98
Total	$ 500.00

The annual appropriation of $1,000 for the repair and *improvement* of College buildings is intended to supplement the annual appropriation of a like amount made by the legislature of 1880. The earlier appropriation, except as it provides for the payment of expenses incurred in the management of the land department, is limited to the repair of buildings; this later appropriation can be used both for their repair and *improvement*. The Board is thus enabled to now make those minor changes and additions which are found almost absolutely necessary in repairing buildings, but which

the earlier appropriation did not permit. During the last two years this appropriation has been used in the repair and improvement of the following buildings:

Main College building and boarding cottages	$ 399.72
Engineering hall	234.51
South hall	196.89
North hall	69.83
Chemical laboratory building	152.64
Veterinary hospital	26.34
Sanitary building	37.00
Farm buildings	34.42
Horticultural buildings	9.50
Office building	16.90
Houses occupied by professors (seven residences)	748.39
Total	$1,926.14

The other annual appropriation for 1888 and 1889 has been expended in part and for the following purposes:

Repairing main building and cottages	$ 383.93
Repairing engineering hall	43.52
Repairing chemical laboratory building	28.84
Repairing office building	3.25
Repairing farm buildings	132.95
Repairing horticultural buildings	159.21
Repairing veterinary hospital	66.66
Repairing north hall	10.05
Repairing south hall	181.24
Repairing electric light and water supply plants	98.87
Repairing houses occupied by professors	308.14
Expenses connected with land department	40.42
Expenses connected with financial agency	15.66
Total	$1,472.74

At the beginning of the biennial period there was on hand of the annual appropriation of 1887, a balance of $203.28. This amount has been expended as follows:

Repairing main building	$ 21.50
Repairing houses occupied by professors	68.37
Repairing chemical laboratory	11.30
Repairing farm buildings	17.74
Repairing engineering hall	40.55
Repairing horticultural buildings	5.25
Repairing veterinary hospital	16.60
Expenses of land department	21.87
Total	$203.28

It will be noticed that the following balances remain to the credit of the repair funds:

Repair fund of 1889	$ 73.86
Repair and improvement fund of 1889	527.26
Total	$601.12

About $200 of unpaid bills are on file, leaving $400 available for any repairs which may become necessary before May next. By a standing order of the Board, the repair funds are disbursed under the direction of the chairman of the building committee, Mr. J. W. Garner. The committee, Trustees Garner, Van Houten and Dunham, have general supervision over the expenditure of all State appropriations relating to buildings.

The annual State fund of $1,500 for experimentation was divided between the agricultural and horticultural departments as follows:

1888.

Experimentation in agriculture	$ 750
Experimentation in horticulture	750
Total	$1,500

1889.

Experimentation in agriculture	$1,200
Experimentation in horticulture	300
Total	$1,500

For statement of the purposes for which this fund is used, see reports of the professors in charge of the agricultural and horticultural departments.

The total disbursements on account of appropriations by the State during the last two biennial periods are as follows:

Biennial period 1886–7	$ 9,287.29
Biennial period 1888–9	11,218.90
Total for the four years	$20,506.19

The Board ask the Twenty-third General Assembly to deal more liberally with the College. They consider the following to represent its most pressing needs:

For repairs on main College building and boarding halls	$ 5,000
For boiler and boiler-house for mechanical engineering dep't.	5,000
For two professors' houses	5,000
For the purchase of the Dr. Welch property as a home for the President	6,000
For improvement of the physical laboratory building	2,000
For repair and improvement of farm buildings	2,200
For addition to office building for accommodation of post-office and to furnish committee rooms and College guest rooms	800
For building for chapel, library and museum, and for remodeling main building	35,000
Total	$61,000

Trustees Wicks, Yeomans, Garner, Van Houten, Dunbar and Morrison were appointed a committee to see that the needs of the College were duly presented to the legislature and its committees.

ENDOWMENT FUND.

The report of the secretary of the Board and the exhibits accompanying it, show in detail the amount and present condition of the College endowment fund. The amounts invested and uninvested are as follows:

Invested in land, bonds and farm mortgages yielding income	$ 623,952.05
Invested in land not under lease	10,395.25
Cash in hands of State and College treasurers and financial agent awaiting investment	15,048.86
Total endowment	$ 649,396.16

The Board of Trustees is "charged and intrusted" with the management of this fund. A small portion of the endowment is invested in bonds which, under the law, are deposited with the treasurer of State. The remainder of the fund is handled under the statutes establishing and governing the "financial agency" and the "land and loan department" of the College. These will be treated in their order.

ENDOWMENT FUND BONDS.

At the beginning of the biennial period the following bonds were owned by the College:

Des Moines Security Loan and Trust Company bonds, bearing 6 per cent interest	$ 5,500
Independent school district bonds of Maquoketa, bearing 6 per cent interest	500
Total	$ 6,000

The bonds of the independent school district of Maquoketa have been redeemed, leaving the Security Loan and Trust Company bonds as the only ones now owned by the endowment fund.

FINANCIAL AGENCY.

The law establishing and governing the financial agency was enacted by the Twentieth General Assembly (see Chap. 193). A detailed statement of the work of the agency for the biennial period can be found in the report of the agent in charge, Mr. D. S. Sigler.

A summary of the financial transactions during the past two years, as taken from the accounts kept by the secretary of the Board with the agent and the treasurer of State, shows the following:

Cash awaiting investment at the beginning of biennial period:		
In the hands of the agent	$8,655.25	
In the hands of the State treasurer	3,500.00	
		$12,155.25
Cash received from redemption of bonds of Maquoketa school district		500.00
Cash received from sale of land		52,443.61
Cash received from payment of principal of loans		37,475.00
Total to be invested		$102,573.86
Amount invested by the agent		87,600.00
Balance uninvested		14,973.86
In hands of financial agent	$ 6,500.00	
In hands of State treasurer	8,473.86	
	$ 14,973.86	

All papers connected with the loans negotiated are recorded by the secretary of the Board in a "register of loans" kept in his office, and are then forwarded to the treasurer of State.

The contract with Agent Sigler, in force at the beginning of the biennial period, contained the following provision:

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

In March, 1888, Attorney General Baker, upon questions propounded by the State treasurer, rendered an opinion, of which the following is the substance:

First: That the above clause in the contract with the agent was *ultra vires* the powers of the board and the agent, and that any condition in his bond looking to the security of the State for such collections was consequently inoperative and void.

Second: That it was the duty of the State treasurer to make such collections of the principal and interest of endowment fund loans.

Third: That it was the duty of the State treasurer to direct the foreclosure of the mortgages when default was made in the conditions thereof.

It being deemed best, both by the treasurer of State and the authorities of the College, that the financial agent should have charge of the foreclosure of mortgages, the legislature then in session enacted the following law:

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That section 3 of chapter 193, laws of the Twentieth General Assembly, be and the same is hereby amended by inserting after the word "contained" in the fourth line of said section, as the same is printed in the session acts of said Twentieth General Assembly, the following: "And to take charge of the foreclosure of the mortgages and collection of bonds from delinquent debtors to said fund when so directed by the said trustees."

SEC. 2. It shall be the duty of said trustees upon the passage of this act to require the said financial agent to execute an additional bond, in such sum as shall be fixed by the trustees, conditioned for the faithful performance of the additional duties herein required, and for the payment into the State treasury of all sums of money which shall come into his hands belonging to such endowment fund. And when any agent shall hereafter be appointed by said trustees, his bond as required by said section three shall cover all the duties provided in said original section and in this act.

SEC. 3. [Publication clause.]

Approved April 12, 1888.

At the meeting of the board in May, 1888, the chairman and the secretary of the board were directed to make an accounting with Agent Sigler under his existing contract, and to enter into a new contract, omitting therefrom any provision for the collection of the principal and interest of loans, and inserting a clause providing for

the foreclosure of mortgages as directed by the act of the legislature. The bond of the agent was fixed at $50,000. The new contract was duly executed, and the bond given was approved by the committee on bonds and by the executive council. The following is the report on the accounting made with the agent under his old contract:

To the Honorable Board of Trustees:

Your committee, appointed to make an accounting with the financial agent, D. S. Sigler, beg leave to report as follows: At the date of the last accounting, February 1, 1887, there was charged against the agent a cash balance of $21,223.33. Since that date, and prior to June 15, 1888, the date of the new contract with Mr. Sigler, he drew from the State treasury, upon orders approved by the Secretary of the Board, the sum of $34,733.57. Under the instructions of your honorable body, loan No. 168, amounting to $1,200, previously credited to Mr. Sigler, was charged back to him, making a total charge against him of $57,156.90. Your committee credited Mr. Sigler with the sum of $1,600, the amount of loan No. 60, which had been collected by him and included in the balance charged against him at the date of the last accounting, but which sum he has since remitted to the State treasurer. We also credited him with completed loans, for which receipts have been issued by the secretary of the Board, to the amount of $47,750.00, the same being loans 199 to 235 inclusive, and 237 and 238. This leaves a balance of $7,806.90 with which the agent should be charged at the beginning of his new contract, and for which he has satisfactorily accounted to this committee.

During the time covered by this accounting the agent has collected principal upon the following loans:

Loan No. 19	$1,200
Loan No. 7	500
Loan No. 23	1,000
Loan No. 124	2,000
Loan No. 8—part payment	500
Total	$5,200

This amount he has duly remitted to the State treasurer.

During the same time the agent has collected and forwarded to the State treasurer interest to the amount of $18,512.83.

Respectfully submitted,

JOSEPH DYSART,
E. W. STANTON.

AMES, June 15, 1888.

Report adopted.

Except in cases where foreclosure of mortgage is ordered, the treasurer of State, in accordance with the opinion of the Attorney-General, collects the principal and interest of all loans. All releases of mortgages are, under the orders of the Board, signed by

their chairman and secretary, and forwarded to the treasurer of State for delivery to the party paying the loan.

The financial agent and the chairman and secretary of the Board were appointed a committee to decide upon foreclosures and order the same. The following form of order for obtaining from the treasurer of State the papers necessary to conduct such foreclosure was approved:

HON. ....., *Treasurer of State:*

By authority given in chapter 193, Laws of the Twentieth General Assembly, as amended by chapter 58, Laws of the Twenty-second General Assembly, you are directed to deliver to ... .., financial agent, for the purpose of foreclosure, endowment fund mortgage bond No. . . . . , executed by ....., for the sum of $....., together with all papers and unpaid coupons belonging thereto.

....., *Ch'n.*,
....., *Secy.*,
Of the Board of Trustees of the Iowa Agricultural College and Farm.

Nine mortgages in all have been ordered foreclosed. Six of these cases were afterward settled, leaving only three in which foreclosures have actually been made. In only one case, as yet, has a sheriff's deed been issued.

A question having arisen in regard to the payment of the expenses of foreclosure, the matter was submitted to the Attorney-General. The following is his opinion:

OFFICE OF ATTORNEY-GENERAL, }
DES MOINES, April 30, 1888. }

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

SIR:—Yours of this date, enclosing letter of Prof. E. W. Stanton, Secretary of Agricultural College, etc., is at hand. The act of Congress making the grant of lands to various States to endow Agricultural Colleges therein, contains the following provision:

All expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they belong out of the treasury of said States.

The State of Iowa accepted the grant on the terms proposed in this act of Congress, and, in my opinion, none of the expenses of suits to foreclose the mortgages and collect the bonds can be paid out of the endowment fund, and that the State treasurer would not be warranted in paying out any of said funds for that purpose. Nor would the legislature now have power to authorize such payment. To do so would impair the obligation of the contract between the Federal Government and the State.

Yours truly,

A. J. BAKER,
Attorney-General.

The expenses of foreclosures have thus far been included in the expense account of the agent, and have been paid from the State treasury.

At the meeting of the Board in May, 1889, Agent Sigler reported that he could not continue to loan the endowment fund at 8 per cent. Upon the recommendation of the Investment Committee it was ordered:

1. That the rate of interest on future loans from the endowment fund be reduced from 8 per cent to 7 per cent.

2. That the salary of the financial agent be fixed at $1,000, and a commission of 1 per cent upon all loans made; this commission of 1 per cent to be used only as necessary in the payment of commissions to sub-agents, and allowed only on vouchers duly verified and filed with the secretary of the Board, showing such commissions paid to sub-agents on such loans; provided, also, that the salary of $1,000 and 1 per cent commission shall in no case exceed $2,000 in any one year.

3. That the limit of loans be raised from $5,000 to $10,000.

A resolution was adopted declaring that upon the qualification of his successor, and the filing by him of an approved bond, the present agency of Mr. Sigler be terminated. The Board then proceeded to ballot for a financial agent. Mr. Sigler receiving upon the third ballot a majority of all the votes cast, was declared elected. His bond was fixed at $50,000. The chairman and the secretary of the Board were directed to make an accounting with him under his old contract, and complete, and on behalf of the Board sign a new contract with him as financial agent. The following is their report on the accounting made with him under his old contract:

To the Board of Trustees:

Your committee find that at the date of the last accounting, June 15, 1888, the agent was charged with a cash balance of $7,806.90. There has been paid him since that date by the State Treasurer the sum of $7,443, making a total to be accounted for of $15,249.90. He has filed with the secretary of the Board completed papers of loans amounting to $9,450, the same being loans 168, 236 and 239 to 247 inclusive. The balance, $5,799.90, is the amount with which the agent should stand charged at the beginning of his new contract, which bears date of June 14, 1889. This sum has been accounted for to the satisfaction of the committee.

Respectfully submitted,

JOSEPH DYSART,
E. W. STANTON.

The following is the contract with Agent Sigler now in force:

CONTRACT WITH AGENT SIGLER.

This contract, by and between the Iowa State Agricultural College and Farm and D. S. Sigler, witnesseth: That the said Sigler, having been appointed financial agent of said College and Farm by the trustees thereof, by virtue of chapter 193, Laws of the Twentieth General Assembly, State of Iowa, he (the said Sigler) agrees to conduct said agency according to the terms of said statute and this agreement.

1. All loans negotiated shall be upon the following terms: The rate of interest shall be seven (7) per cent per annum, payable annually, principal and interest payable to the order of the 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, 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 purposes of and pursuant to the fourth paragraph of section 2 of said statute aforesaid.

3. He, the said agent, shall not loan less than $500 nor more than $10,000 to any one person.

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

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

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

7. Once each year, just prior to the time the penalty attaches for non-payment of taxes on real estate, he shall examine and ascertain whether all taxes are paid on the real estate covered by mortgage to secure any of such loans. If the taxes are not paid, he shall pay the same and the penalties thereon, and the receipt therefor shall be his voucher for said amount of money, which amount the board of trustees do hereby agree shall be promptly repaid him.

8. He shall receive a salary of $1,000 per annum 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.

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. The said Sigler 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.

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

12. The said Sigler 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 the secretary of the board of trustees, duly authorized so to act, and by the said D. S. Sigler, in his own proper person, this 14th day of June, A. D. 1889.

JOSEPH DYSART,
Chairman Board of Trustees.

E. W. STANTON,
Secretary Board of Trustees.

D. S. SIGLER,
Agent.

The agent's bond for $50,000 for the faithful execution of the above contract was approved by the committee on bonds and by the State executive council.

The secretary of the board estimates the funds to be loaned through the financial agency during the next biennial period as follows:

During 1890	$115,000
During 1891	75,000

At its meeting in May, 1889, the board directed that the land in Ringgold county, viz.: the s hf of the se qr and the se qr of the sw qr of section 22, township 69, range 31, containing 120 acres, obtained under the foreclosure of mortgage of loan No. 168, J. W. Fuller, be placed upon the list of "College lands" for either sale or lease, and that Trustee Van Houten be directed to obtain security for the current year's rent, failing in which, he was ordered to take for the College a landlord's lien on the crop for rent due. Mr. Van Houten reported at the November meeting that the rent for the present year had not been paid. He was continued as committee to secure payment of rent on said land for the present year, and to appraise it for sale or lease during the coming year.

The following resolutions were adopted:

1. That, in the opinion of this board, it is unnecessary for the financial agent, in the loaning of the College endowment fund, to employ any subagent in Corning.
2. That this board declines to make allowance to the agent for the payment of exchange or for examination of abstracts in connection with the financial agency.

LAND DEPARTMENT.

The present law governing the management of the land owned by the College was enacted by the Twentieth General Assembly (see chapter 72). The department is under the charge of Herman Knapp, who was appointed agent in February, 1887. His contract with the Board can be found on page 159 of the last biennial report. A detailed statement of the financial transactions of the office for the biennial period, are given by Mr. Knapp in his report on page 92. Trustees Secor and Dunbar, who were appointed a committee to examine the report of the agent, reported at the meeting in November, 1889, that they had made such examination, compared the report with the agent's books and vouchers, and found the same correct. The following endowment fund land has been re-appraised during the biennial period:

PART OF SECTION.	Section.	Township.	Range.	No. of acres.	Old price.	New price.
sw qr	36	95	27	160	$ 4.00	$ 7.00

The following tracts have been forfeited by the agent for non-payment of rental, and reported to the Board for re-appraisal:

ENDOWMENT FUND LAND.

PART OF SECTION.	Section.	Township.	Range.	No. of acres.
ne qr	12	99	28	160.00
ne qr	34	98	29	160.00
nw qr	34	98	29	160.00
sw qr	3	96	36	160.00
ne qr	13	95	27	160.00
ne qr	33	95	27	160.00
sw qr	31	95	27	166.84
sw qr	30	95	27	163.43
se qr	25	95	28	160.00
nw qr	36	95	28	160.00
n hf sw qr	15	93	27	80.00
ne qr	30	96	33	160.00

The Board at its meeting in November, 1889, authorized Trustee Secor to re-appraise the above land. It is then to be put upon the market for lease.

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

Land belonging to the Congressional grant—	
Leases covering 520 acres, appraised at	$ 2,360.00
Land purchased with interest fund—	
Leases covering 160 acres, appraised at	800.00

The following have been renewed:

Land belonging to the Congressional grant—	
Leases covering 8,487.81 acres, appraised at	28,078.17
Land purchased with interest fund—	
Leases covering 1,280 acres, appraised at	3,200.00

The following lands have been patented:

Land belonging to the Congressional grant, 17,537.08 acres.....	52,533.61
Land purchased with interest fund, 2,360 acres.....	8,400.00

The following is the present condition of the lands remaining unsold:

Land belonging to the Congressional grant—			
Under lease, acres.....	78,271.72	$ 253,887.54	
Not under lease, acres.....	1,999.94	7,355.25	
			$ 261,242.79
Land purchased with interest fund—			
Under lease, acres.....	7,453.17	$ 24,399.51	
Not under lease, acres.....	320.00	3,040.00	
			$ 27,439.51
			$ 288,682.30

The following is the condition of the accumulated interest fund which the land agent contracts to loan:

Invested in farm mortgages	$ 39,165.00	
Awaiting investment	75.00	
		$ 39,240.00
Total lands and funds included in the department.....		$ 327,922.30

The new leases run ten years; renewed leases, five or ten. Both bear interest at eight per cent, payable in advance. The investments in farm mortgages made by the department are for five years, and bear seven per cent interest.

The question of making payments upon these loans before the expiration of the term having arisen, the privilege of making such payment was granted in the case of Mr. Freed, provided interest be paid for the current year. Permission to subdivide leases was refused.

Complaints have been presented to the Board by several lessees, who state that other parties claim to own the lands covered by their leases, having derived title thereto under the swamp land grant. The following is one of the cases:

Mr. R. W. Atwood leased the ne qr of section 24, township 85, range 31, on June 4, 1867, at an annual rental of $16.00. On August 23, 1873, the lease was renewed at an annual rental of $20.00, commencing June 4, 1874. On June 4, 1880, the lease was again renewed at an annual rental of $16.00. The lessee made the last payment of rental on June 4, 1883, paying to June 4, 1884, the total rental paid being $296.00. Learning of the rival claimant

under the swamp land grant, Mr. Atwood, after investigation, ceased payment of rental and presented to the Board a claim for the rental paid, with interest on the same.

Trustee Peck, having been appointed a committee upon the case, reported in substance as follows:

1. Letters from the General Land Office and Secretary of State say that those departments consider the title to vest in the College.
2. The State Land Office reports that no other disposition has ever been made of the land, so far as the records show, than that to the College, and the description does not appear among any of the lists of swamp lands in that office.
3. The General Land Office reports that the land was selected and reported to that office as swamp land May 11, 1859, but that it has not been approved or patented as such; that having been certified to the State under the Agricultural College grant of July 2, 1862, it is beyond the control of that office.
4. The land itself is, 75 per cent of it, unfit for cultivation without drainage.

Trustee Morrison and the secretary of the Board having been appointed a committee to make further investigation of the case and commence suit to establish title if they deemed the same expedient, reported in May, 1888:

1. That the committee had employed Judge Sampson, of Sigourney, as counsel.
2. That he had rendered to them an opinion adverse to the title of the State, the following being the basis of such opinion:
(*a*) The land falls within the description of the land called swamp, as specified in section 3 of the act making the grant.
(*b*) The courts have decided that the act of Congress of Sept. 30, 1850, granting swamp and overflowed lands to the State, operated to convey a present title without a patent or formal conveyance.
(*c*) That a grant by the State is as sufficient to pass title as a formal conveyance, and that therefore title to the land in question passed from the State to Greene county by virtue of the grant of Feb. 2, 1853.

The report was accepted and the secretary of the Board directed to secure the opinion of the Attorney-General, both upon the question of title and the obligation of the College to the lessee. The Secretary reported at the meeting in November, 1889.

1. That in the matter of title the Attorney-General fully concurred in the opinion of Judge Sampson.
2. That since the lessee had made payment of rental, but not of principal, it was difficult to decide how much damage, if any, had been sustained by him because of failure of title.

The claimant to the land under the swamp-land grant appeared before the Board at this meeting and desired to also obtain title under the grant to the College. The following orders were passed:

1. That Agent Knapp be directed to declare lease 776, known as the Atwood lease, forfeited for non-payment of interest, and that the Board reappraise the same.

2. That the land covered by the aforementioned lease be appraised at $480 and placed on the market for sale or lease.

The lease was thereupon forfeited by Agent Knapp and the land leased to Mr. J. F. Gallup, the claimant under the swamp-land grant, at the price fixed by the Board. No action was taken on the claim of Mr. Atwood for damages.

In the above case a portion of the land in question is clearly swamp; in other cases on file it is not swamp, or its character is in doubt. Only a few cases of conflict have thus far come to the notice of the Board, but it is probable that others will be presented for action. The question is one which affects not only the College, but all other owners of land. It is so forcibly presented in the report of the Secretary of State on the land department as to warrant the following quotation:

Some of the swamp-land claimants, who claim to have purchased the entire swamp-land interests of several of the counties, are of the opinion that, under the decisions of the courts, they have the right, in the counties whose interests they have purchased, to select every forty acre tract of land, or other smallest legal subdivision, which they may deem to be swamp land within the meaning of the act making the grant, that was not disposed of prior to the date of the granting act, or which the general government has not already accounted for under the grant, and to exercise control and ownership of the same. Under this impression said parties, as it appears, have made a large number of selections and continue to make others. They have issued circular letters, as I learn, to the adverse claimants of these lands, who in many cases have owned them unmolested for many years under government entries or under other congressional grants, notifying them that *they* own the lands under the swamp-land grant, and offering to settle and give them a quitclaim for a stipulated price per acre.

Now, if this thing is permitted, the consequence will be that no matter what may be the character of the land, whether swamp in fact or not, the purchaser from the government, or other adverse claimant, is subject to the hardship of either paying for his land the second time or of being obliged to defend his title in court against the claim of the swamp-land claimant. And often, to avoid the expense and trouble of a suit in court, he will yield, likely, to a demand that may be extremely unjust, and pay the swamp claimant in accordance with the terms he has dictated.

The College cannot get rid of the swamp-land claimant by paying "the swamp claimant in accordance with the terms he has dictated." The Board has no fund at its disposal which it can use in making such compromises; nor does it consider that it can legally employ either the endowment fund, or the income derived therefrom, in making settlement of claims by lessees on account of these conflicts of title. The State alone can adjust the matter. The title to all lands derived under the Congressional grant rests in the State. The State holds these lands in trust; they were selected by a commissioner appointed by the State, and for whose acts the State is responsible; if, in selecting these lands, errors were made by this agent, the State is liable therefor. It is under contract with the national government to keep the endowment fund of the College forever undiminished, and to apply the income derived therefrom, without any diminution whatever, to the support and maintenance of the institution. It should provide adequate means for defending its title to these lands. There would seem to be no better way than that the legal questions involved should be placed under the charge of the Attorney-General, acting, perhaps, under the direction of the State executive council, and that said council should be furnished with funds necessary to conduct such defense and make payment to lessees of damages arising from such conflicts. It is proposed to present to the legislature a bill looking to this end.

INCOME OF THE COLLEGE AND ITS EXPENDITURE.

The income from the College endowment fund, available for the maintenance of the institution during the biennial period, has been as follows:

Cash on hand at beginning of biennial term	$3,264.60	
Sale notes belonging to interest fund paid	65.00	
		$ 3,329.60
Income from endowment during fiscal year 1888		46,239.01
Income from endowment during fiscal year 1889		47,891.87
Total available funds		$ 97,460.48
This amount is accounted for as follows:		
Expenditures during fiscal year 1888, as per exhibit "B."		$ 46,058.60
Expenditures during fiscal year 1889, as per exhibit "C."		41,739.74
Cash balance on hand		9,662.14
Total		$ 97,460.48

The Board directed that $3,000 of the balance to the credit of interest fund be loaned by Agent Knapp, the same to be replaced

when needed from any moneys in the treasurer's hands belonging to that portion of the endowment fund arising from the transfer of accumulated interest.

The income during the next biennial period will be considerably reduced because of a lowering of the rate of interest and the payment of a large amount of the principal of outstanding leases upon which interest has been paid in advance. The Secretary estimates that, taking into account the cash balance on hand, the expenditures for the years 1890 and 1891 can average $43,000 per year without danger of bringing financial embarrassment upon the College. The appropriations of the Board to meet the expenses of the different departments for the fiscal year 1890 are as follows:

FROM INTEREST FUND.

For salaries		$ 27,250.00
For farm department—		
For general farm expenses	$ 700.00	
For permanent improvements	300.00	
For foreman	600.00	
		$ 1,600.00
For horticultural department—		
For current expenses and apparatus		1,000.00
For mechanical department—		
For current expenses and apparatus	$ 1,200.00	
For salary of foreman	1,000.00	
For salary of assistant	600.00	
		$ 2,800.00
For veterinary department—		
For current expenses and apparatus	$ 375.00	
For salary of house surgeon	200.00	
		$ 575.00
For department of chemistry—		
For current expenses and apparatus	$ 400.00	
For salary of assistant	300.00	
		$ 700.00
For department of civil engineering		200.00
For department of botany		250.00
For department of zoology and entomology		400.00
For department of physics		350.00
For department of military tactics		200.00
For department of domestic economy		350.00
For library—		
For current expenses and purchases	$ 1,000.00	
For assistant	75.00	
For salary of cataloguer	500.00	
Special appropriation for department of history and English literature	50.00	
Special appropriation for department of political economy	50.00	
		$ 1,675.00

For public grounds		$ 400.00
For public rooms—		
For heating, lighting and cleaning public rooms in main building	$ 900.00	
For heating, lighting and cleaning office building	175.00	
For heating, lighting and cleaning north hall	150.00	
For heating chemical and physical laboratory	160.00	
For carpet and curtains for college rostrum	65.00	
		$ 1,450.00
For Sabbath services		150.00
For contingent expenses—		
For catalogue printing and engraving	$ 350.00	
For stationery, printing and advertising	400.00	
For telephone service	60.00	
For President's clerk	100.00	
For Secretary's clerk	25.00	
For ringing bell for recitations	75.00	
For 'bus to Ames during the year, to be expended under the direction of the President of the college and Secretary of the board	225.00	
For proctors and chapel roll	325.00	
For music at public services and instruction in vocal music to freshman class	400.00	
For assistant to preceptress	75.00	
For pumping organ	15.00	
For tuning organ	20.00	
For address before Trustees	50.00	
For emergency fund, subject to President's order	100.00	
For current expenses of department of history and English literature	10.00	
For traveling expenses of the President and members of the faculty attending farmers' institutes	100.00	
For piano covers and music for musical department	30.00	
For balance due President's clerk for past fiscal year	5.00	
For refund of over payment of interest by Kate Wood	8.62	
For expenses of President Chamberlain reading proof of catalogue	2.24	
		$ 2,375.86
Total		$ 41,725.86

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.

Captain Lincoln was authorized by the Board to purchase, from the appropriation to the military department, prizes to be awarded students for excellence in military drill.

OFFICERS OF INSTRUCTION.

The following is a standing order of the Board of Trustees:

The President of the College and the Secretary of the Board of Trustees are authorized to temporarily fill all vacancies which may occur in the list of teachers when the Board is not in session, provided that the expense shall not exceed the sum appropriated for that purpose.

Under the authority thus given the two vacancies in the teaching force of the College, existing at the time of the publication of the last biennial report, were filled by the appointment of Miss Lillie M. Gunn, formerly a teacher in the celebrated school called the "Gunnery," at Washington, Conn., to the position of preceptress and professor of French and German, and the employment of Mr. E. A. Kirkpatrick, a graduate of the College, as instructor in English and sub-freshman studies. The salary of the former was fixed at $1,200, and the latter at $300 per annum, the services of both commencing March 1, 1888.

In May of that year the resignation of Professor Bassett, in charge of the department of mechanical engineering, was presented and accepted. The committee on vacancies was authorized by the Board to make temporary arrangements for the conduct of the department, while the chairman and the secretary of the Board, the President of the College, and the chairman of the committee on Faculty, were appointed a special committee, with full power, to permanently fill the vacancy. The committee on vacancies reported to the Board in July that they had made an agreement with Mr. A. J. Weichardt, the foreman of the workshops, to do the work of the professor of mechanical engineering during the remainder of the spring term, and that they had employed Mr. E. C. Kimball, a practical machinist and former student in the mechanical department, to act as foreman during that time. The work was performed to the reasonable satisfaction of the committee and with a net saving to the College of $150. The special committee to secure a professor of mechanical engineering reported that they had made patient and faithful search for the best available man, writing to what seemed to them the best sources of information, and that after a most careful examination of the testimonials submitted, they had unanimously agreed upon the appointment of Mr.

Chas. W. Scribner, a graduate in the classical course of Princeton College, and in the mechanical engineering course of the Stephens Polytechnic Institute. The action of the committee was approved by the Board. The salary of Professor Scribner was fixed at $1,800 per annum, his services and salary to commence with the beginning of the Fall term.

At the annual meeting of the Board in November, 1888, no changes were made in the list of officers of instruction. The salaries of Professors Mount and Osborn were each increased $100, making the salary of the former $1,500 per annum, and of the latter $1,300 and the use of a house. The salaries of the other teachers were not changed.

In December, following the adjournment of the Board, the resignations of Dr. Halsted, professor of botany, and of Mrs. Riley, librarian and instructor in elocution, were presented to the President.

After consultation with the chairman of the Board and extensive correspondence with colleges and scientific men, and after laying the correspondence before the scientific professors then present at the College and securing their unanimous opinion, the committee on vacancies engaged Mr. L. H. Pammel, of St. Louis, to fill the chair of botany at an annual salary of $1,300 and the use of a house. Mr. Pammel is a graduate and post-graduate of the agricultural department of the University of Wisconsin, and was for years a special student in botany under Prof. Trelease, of the St. Louis Shaw School of Botany, and Prof. Farlow, of Harvard University.

To fill the vacancy caused by the resignation of Mrs. Riley, the committee engaged Miss Cora Marsland, of Sing Sing, N. Y., a graduate of the State Normal School at Albany, N. Y., and of the Monroe School of Oratory at Boston. The salary allowed her was $800 for the year.

The action of the committee in filling these vacancies was afterwards reported to the Board, and by them approved.

On March 14, 1889, occurred the death of Dr. Welch. He was elected president of the College in 1868. He organized its departments and courses of study, and guided the institution safely through the difficulties of its early years. He resigned the presidency in 1883, and in the following year was elected professor of psychology and history of civilization, which position he held at the time of his death. At a special meeting of the Board, called to attend his funeral, the following resolutions were adopted and ordered spread upon the minutes:

Resolved, That in the death of ex-President A. S. Welch the College has lost one of its oldest, ablest and most efficient supporters, friends and instructors.

Resolved, That his long and ardent devotion to the cause of education, his peculiar fitness for the work of a successful teacher, and his deportment as a Christian gentleman, have given him such standing in the esteem of Western educators that his loss will be felt as a general calamity.

Resolved, That we extend our sympathy to the afflicted family, and commend to them the promises of a reunion so clearly revealed to us in the Sacred Word.

Resolved, That these resolutions be entered upon our records, and a copy of the same forwarded to Mrs. Welch and to the press for publication.

The committee on vacancies was authorized to arrange for carrying on his work during the remainder of the spring term. The work was provided for as follows: The president took charge of the class in Psychology, and Dr. Welch's assistant, Mr. Kirkpatrick, was engaged, for an additional compensation of $100, to conduct both divisions of the class in rhetoric. At the meeting in May, the recommendation of the President that the history of civilization be transferred permanently to Prof. Barrows, and sophomore Latin to the president for the fall term, was approved by the Board.

An additional sum of $100 was appropriated from the interest fund to Sabbath services, in order that Prof. Barrows might, through the employment of outside talent, be in great part relieved of preaching during the fall term.

Mr. Kirkpatrick was continued in charge of the class in rhetoric for that term, being allowed $100 for the extra service rendered. At the annual meeting in November last the Board directed that a lady graduate of a classical college course be employed at a salary of not over $800 per year, to teach Latin, English literature, composition and rhetoric, and such other studies as the President of the College might assign her under the general authority for the assignment of work conferred upon him by the Board. The committee on vacancies was directed to employ such teacher for the coming year. Under this authority the committee has made temporary appointment of Miss Margaret Doolittle, a graduate of the college at Pella, and a teacher in the academy at Washington, Iowa. Her salary is fixed at $800, to begin March 1, 1890.

Other action was taken by the Board at this meeting as follows: Prof. Pammel, who had been appointed professor of botany by the committee on vacancies, was elected by the Board to that position for the ensuing year at a salary of $1,300 and the use of a house; the salary of Miss Cora Marsland, as professor of elocution and

librarian, was fixed at $1,000 per annum; the salary of Prof. Osborn was increased to $1,600 per annum and the use of a house, and that of Prof. Hainer to $1,600 per annum, and $200 per year in lieu of a house until one should be provided. The sum of $300 was appropriated from the interest fund for the employment of an assistant in mathematics and instructor in the preparatory department. Mr. William R. Shoemaker, a graduate of high standing in the class of 1889, has since been appointed to this position. He will also serve as chief proctor in the main college building.

The following is the list of the officers of instruction for 1890, as fixed by the Board of Trustees and the committee on vacancies. It does not include the assistants in the different departments whose salaries are paid from the appropriations to those departments:

W. I. Chamberlain, A. M., LL. D., President,
Professor of Psychology, Ethics and Civics.
Salary $3,000, and $350 in lieu of a house.

M. Stalker, M. Sc., V. S.,
Professor of Veterinary Science.
Salary $1,600.

J. L. Budd, M. H.,
Professor of Horticulture.
Salary $1,800 and use of a house.

E. W. Stanton, M. Sc.,
Professor of Mathematics and Political Economy.
Salary $1,600 and use of a house.

D. S. Fairchild, M. D.,
Professor of Pathology, Histology, Therapeutics and Comparative Anatomy.
Salary $1,000.

C. F. Mount, C. E.,
Professor of Civil Engineering.
Salary $1,300, and $200 in lieu of a house.

Capt. James Rush Lincoln,
Professor of Military Science and Tactics.
Salary $500 and use of a house.

Alfred A. Bennett, M. Sc.,
Professor of Chemistry.
Salary $1,600 and use of a house.

Herbert Osborn, M. Sc.,
Professor of Zoology and Entomology.
Salary $1,600 and use of a house.

J. C. Haiser, M. Sc., M. D.,
Professor of Physics.
Salary $1,600, and $200 in lieu of a house.

A. C. Barrows, A. M., D. D.,
Professor of English Literature and History.
Salary $1,600 and use of a house.

Loren P. Smith, M. Sc.,
Professor of Agriculture and Farm Superintendent.
Salary $1,600 and use of house.

Miss Lillie M. Gunn,
Preceptress and Professor of French and German.
Salary $1,200.

C. W. Scribner, A. B., M. E.,
Professor of Mechanical Engineering.
Salary $1,600 and $200 in lieu of a house.

L. H. Pammel, B. Agr.,
Professor of Botany.
Salary $1,300 and use of a house.

Mrs. Elisa Owens,
Professor of Domestic Economy.
Salary $800 and use of a house.

Miss Cora Marsland, O. B.,
Librarian and Professor of Elocution.
Salary $1,000.

Miss Margaret Doolittle,
Instructor in Latin, English Language, Composition, Rhetoric, and such other work, if any, as the President may assign her.
Salary $800.

Wm. R. Shoemaker, B. Sc.,
Assistant in Mathematics and Instructor in Preparatory Department.
Salary $300.

Miss Eva F. Pike,
Organist and Instructor in Vocal and Instrumental Music.
Salary for conducting music at public exercises and giving instruction in vocal music to freshman class, $400.

Professors occupying houses belonging to the College are required, as a condition of such occupancy, to keep the inside of said house in first class repair. Rooms in the main College building have been permanently assigned to the preceptress, the professor of elocution and the instructors in music, and Latin and rhetoric. These rooms are fitted up and furnished by the steward's department, and for their use the occupants are charged an annual rental of $12.00.

Under an order of the Board no furniture is purchased or furnished by the College funds for any room occupied by a professor, teacher or other employe of the College.

A letter having been received from the office of the United States Adjutant-General asking whether it was the intention of the College to apply for the detail of an officer from the army, the question of applying for such officer was decided by the Board in the negative.

A resolution was adopted declaring it to be the opinion of the Board that it is unwise to make exchange of pulpits where expense is incurred.

OFFICERS OF THE BOARD.

The following are the officers of the Board receiving salaries:

E. W. Stanton, Secretary, salary $400.

Herman Knapp, Treasurer and Recorder, salary $700.

James Rush Lincoln, Steward, salary $1,000 and board during the school year.

The salary of the Steward is paid from the receipts of the boarding department; the other salaries are paid from interest fund.

COLLEGE TREASURER.

Herman Knapp has held the position of treasurer during the biennial period, receiving as treasurer and recorder a salary of $700 per annum, as heretofore mentioned. His report will be found on pages 88–91. Monthly settlements have been made with him by the secretary. At the close of the fiscal year of 1888 the committee appointed by the Board of Trustees to examine his accounts submitted the following report:

To the Board of Trustees:

The special committee appointed to examine the books and vouchers of the treasurer report that we have carefully examined the accounts and compared all the debits and credits with the vouchers on file, and find them correct in every respect. We have also counted the cash on hand and find it to be $9,378.95.

Respectfully submitted,

C. M. Dunbar,
Eugene Secor,
Committee.

Report adopted.

The same committee was appointed to make the annual settlement with the treasurer at the close of the fiscal year of 1889. They reported as follows:

To the Board of Trustees:

Your committee appointed to examine and report upon the treasurer's accounts respectfully state that we have carefully examined his report and compared it with his books and vouchers, and that we find it correct. We find the cash balance to be $15,148.87, and that said balance is now on deposit in the Union National Bank of Ames.

Respectfully submitted,

EUGENE SECOR,
C. M. DUNBAR,
Committee.

The report of the committee was adopted and Herman Knapp re-elected treasurer for the fiscal year ending December 1, 1890, at the same salary as heretofore paid. His bond of $40,000 has been filed with the State executive council as the law provides.

FARM DEPARTMENT.

The operations of the farm during the past two years and its present condition are set forth in the report of the Professor in charge. The following is the action of the Board in relation to the farm:

At the meeting in May, 1888, the President of the College recommended the adoption of a definite plan for the management of the farm. The farm committee to whom the recommendation of the President was referred, reported that they preferred to wait until the experiment station was well started before adopting a rigid rule for the conduct of the department. In May, 1889, this committee submitted the following report in regard to the future policy of the farm:

To the Board of Trustees:

Your committee is of the opinion that in order to make a success of the agricultural part of the College farm, it is necessary to formulate and adopt a definite plan of action. Two different suggestions have been made, not only to the committee, but also to the Board. One is that the farm be made purely educational; the other is to place the farm on a strictly commercial basis. We do not concur in either of these suggestions to the exclusion of the other. We believe that the primary object of the farm should be educational, but that the commercial part should not be lost sight of; that is, the farm should be made to pay expenses as near as consistent with the dominant idea, that it shall be educational.

In order to carry out this idea we recommend the following:

1. That no stallions be kept on the farm.

2. That only recorded mares of individual excellence be kept, and that the following breeds be represented: French Draft, Clydesdale or English Shire and French Coach.

3. In the selection of the cows of the milk breeds none but the best thoroughbreds and recorded animals of individual merit and of the best strains of milkers should be purchased, and of the following breeds: First, Jerseys; second, Holsteins; third, Red Pole. We recommend that the following beef cattle be kept on the farm: First, Short-horns; second, Aberdeen-Angus; third, Herefords.

4. In regard to bulls of the different breeds we recommend keeping representatives of three breeds, viz.: Short-horns, Holsteins and Jerseys.

5. We do not expect to be able to keep a large number of all of the different breeds of cattle. We recommend that for the purpose of creamery and cheese factory, and to furnish the College and professors' families with milk, that the milk breeds shall largely predominate, and that the number of the beef breeds shall be sufficient for the purpose of illustration that is educational only.

6. We do not wish to be understood as making the furnishing of milk to the college and to professors' families the leading idea, to the exclusion of the creamery and cheese factory.

7. The predominant breed of hogs, in our judgment, should be the Poland China.

8. We should keep a small flock of sheep, dispose of all cross-bred sheep, and keep only full bloods of the Shropshire and Merino breeds.

9. To inaugurate and establish the above plan will necessitate the expenditure of considerable money. It is not expected that this can be done at once, but a start can be made. To do this we recommend that the cows now on hand be carefully tested and that all of the poor ones be sold and the money arising from such sales be re-invested in cows of the class above referred to, to-wit: Jerseys, Holsteins and Red Poles for the dairy; and as fast as practicable all other animals, horses, hogs, sheep and cattle now on the farm that are not recorded or eligible to record and of good individual merit, be disposed of to the best advantage and others purchased according to the above recommendations.

10. The barns, hog pens and creamery buildings are in very poor condition and totally unfit for the carrying out of the plan outlined above. The barns and creamery must be repaired, and an appropriation for that purpose must be secured from the legislature.

11. We find that there has never been a thorough or systematic method of keeping the books of the farm department. Prof. Smith has continued the books and accounts on the same plan that his predecessors kept them. As a matter of education, for the purpose of teaching the students how to keep farm accounts, and in order that the Board of Trustees may know what the profit and loss is in this department, we recommend that a practical system of farm accounts be opened by the department and kept by the professor.

EUGENE SECOR,
C. D. BOARDMAN,
C. M. DUNBAR,
Committee.

The report of the committee was adopted, and in futherance of the policy thus established, an item of $2,200 for the repair and improvement of farm buildings was, at the November meeting of the Board, included in the list of appropriations to be asked of the legislature. In regard to the creamery, the Board decided at this meeting that while a good creamery would be valuable for the purposes of illustration, the time had not arrived when the funds of the College would warrant the expenditure, the present stock of the farm not producing sufficient milk to supply the needs of the College and the creamery also.

HORTICULTURAL DEPARTMENT.

At the meeting of the Board of Trustees in May, 1888, the committee on horticulture submitted the following report, which was adopted:

To the Board of Trustees:

In the matter of the recommendation of the President, in regard to commercial nursery work accounts, we believe that the College should not conduct any work specially with a view to raising trees and plants for *profit*. The work should be instructive and experimental, and largely confined to the propagation, collection and dissemination of new varieties; and while a reasonable charge should be made for articles sold, yet we believe that the keeping of strict accounts as to cost of production is impracticable and unnecessary.

Respectfully submitted,

GEO. VAN HOUTEN,
Chairman.

In May, 1888, the Board made arrangements for the construction of a fruit house for the horticultural department, the cost of which was ordered paid from the State appropriation already set aside by the Board for horticultural experimentation. The fruit house when completed, cost about $600.

A contract was made by Professor Budd in 1888, with Mr. Miller, of Ames, to drill a well at the horticultural barn, where there had been no water during 1886 and 1887. The contract price was $1 per foot for the first hundred feet and $1.25 per foot for the second hundred feet. The rock proved exceedingly hard below the hundred-foot level, making the work slow and expensive, and at the depth of one hundred and sixty-five feet the drill was lost. Professor Budd reported that there was about fifty feet of water in the hole, that the hole had been cased, a pump purchased and that the water supplied was sufficient for the department. The bill of

Mr. Miller for digging, casing, etc., amounting to $230.25, was referred by the board of audit to the Board of Trustees, and by them allowed and ordered paid from the State experimental fund.

At the meeting in November, 1889, Professor Budd urged upon the Board the necessity of permitting the horticultural department to publish a bulletin devoted to a presentation of the latest results of its experimental work. The Board authorized the publication of such bulletin and made the necessary appropriation to meet the expense thereof from the State experimental fund.

For a full statement in regard to the work of the department during the biennial period, see the report of Professor Budd.

EXPERIMENT STATION.

The act of Congress establishing experiment stations was approved March 2, 1887. This act can be found in full on page 178 of the last biennial report. By the following act, approved March 1, 1888, the General Assembly of Iowa gave legislative assent to the purposes of the congressional law, and established a station for this State at the Agricultural College:

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That legislative assent be and is hereby given to the purposes of the grant authorized by the (congressional) act of March 2, 1887, and that in accordance with the requirements thereof the State agrees to devote the moneys thus received to the establishment and support of an Agricultural experiment station, as a department of the Iowa Agricultural College, as provided in said act of Congress.

SEC. 2. [Publication clause].

In anticipation of the acceptance of the grant by the State, the Board, at its meeting in November, 1887, had appointed Trustees Speer, Clarkson, Dysart and President Chamberlain a committee to take action in regard to the establishment of the station.

This committee submitted to the Board, at a meeting held in February, 1889, a report which was considered, amended and adopted in the following form:

To the Board of Trustees:

THE STATUS OF THE STATION.—This was the subject of earnest study, investigation and consultation at the meeting of the Association of American Agricultural Colleges and Experiment Stations in Washington, last October. At that meeting the committee to propose to the convention a system for the organization and management of agricultural experiment stations submitted the following, which, after a long discussion was adopted:

1. That all appropriations received under what is known as "The Hatch Bill," should be applied in good faith to agricultural research and experiment, and the dissemination of the results thereof among the people, and that any diversion of the funds to the general uses of the colleges would be a direct violation of the plain spirit and intent of the law, and an inexcusable disappointment of just public expectation.

2. That the experiment stations especially referred to should be so far separate and distinct from the colleges that it shall be possible at any moment to show to any authorized inspector or investigator that all the funds derived from the United States under the Hatch bill have been expended solely for the purpose of agricultural experimentation, according to the intent of the law.

3. That every department to be known and designated as an agricultural experimental station should be distinctly organized, with its duties and control clearly defined, and with a recognized official head, whose time shall be chiefly devoted to this department, who should be on an equal footing with the other heads of departments or professors of the college, and whose compensation should recognize the fact that the duties of the position occupy every month of the year.

4. That the publications of the stations should be entirely separate from those of the college. The quarterly or more frequent bulletins should give their readers the results of experiments as fast as completed, and only as completed, or as distinct chapters are completed. These bulletins should enlarge on practical points, such as the improvement or restoration of soils, the development of plants and the breeding of stock, when suggested by work done, even to the extent of repeating well-known principles and facts when these need to be taught.

The organic national law of March 2, 1887, in section 1 thereof, makes the station a department of the Agricultural College, and the Iowa State Legislature has assented to the appropriation and located the station as a department at Ames.

The director of the station is its head, and it seems to your committee that the State and national laws, and the laws passed by the trustees especially, p. 14–16 of our pamphlet copy of the laws, fix the status of departments and the rights and duties of their heads. It seems to be definitely settled by these laws that the director has the same independence of action that heads of other departments have.

Your committee believe that he should have the same responsibility to the president of the College as the heads of other departments, except in the matter of absence from the station, and that in all matters he should be fully responsible to the Board of Trustees.

Your committee believe that a standing committee of three on experiment station should be appointed, and that the general lines of experiment should be approved by the Board of Trustees, and perhaps more specifically by this standing committee. Yet the final detailed plan of conducting the work should be made and executed by and under the general charge of the director. Also that especial lines of experiment in botany, chemistry, zoology, entomology, veterinary science, agriculture and horticulture may properly be carried on by the director at the expense of the station, but under the *immediate technical supervision* of the heads of these several departments; so far only, however, as it can be made thus better to promote the common aims of experimentation and publication of results by the station on the one hand, and instruction and illustration by these other departments of the College. Also that this must be largely a matter of accommodation and agreement between the director, who is responsible to the trustees and to the public for the success and usefulness of the station, and the individual heads of these departments, who are responsible only for the character and quality of their instruction.

Your committee believe that it will be better for the Board simply to express the wish that there be this mutual co-operation between the director and these several heads of departments, than to endeavor to prescribe any set of hard and fast rules and regulations that should compel the director on the one hand to assign, or other heads of departments to accept and perform any specific kind or amount of experiments. This will require mutual forbearance and concession on the part of the director and the heads of these several other departments, in working for a common end. Plainly, these heads of departments have just the technical knowledge that enables them to conduct certain experiments most successfully. Plainly, it can be made to redound to the success of the station to utilize this talent in some way. Plainly, the trustees have a right to expect that it be utilized. Plainly, however, the details of such arrangements must be left to a mutual arrangement between the director and these heads of departments.

LAND.—We recommend that the standing committee of the Board be authorized to purchase not to exceed 160 acres of land for the experiment station, or to lease from the College farm such land as may be needed for the station, and that for these purposes the sum of $3,000, or so much thereof as may be necessary, be appropriated from the experiment station fund.

BUILDINGS.—We recommend that the building for office and laboratories be erected under charge of the standing committee and the director, and that it be completed before the money lapses to the United States treasury.

STUDENT LABOR.—We recommend that in the work of the station student labor be employed on a commercial basis.

APPROPRIATIONS.—We recommend that the Board appropriate the entire $15,000 to the purposes contemplated by the act of congress.

By resolution it was declared to be the sense of the Board that the director of the experiment station, while the head of his department, is not a member of the faculty of the College, nor a member of its corps of instructors.

The resignation of R. P. Speer as trustee of the College having been accepted, he was elected director of the station, his salary being fixed at $2,000 per annum, with an additional allowance of $200 for house rent until a house shall be furnished him.

Herman Knapp was appointed treasurer of the station at a salary of $250 per annum.

Trustees Garner, Dysart and Dunbar were appointed as standing committee on the experiment station. This committee submitted to the Board, at its meeting in May, 1888, the following report upon the organization of the station:

To the Board of Trustees:

Your committee organized by selecting J. W. Garner as chairman and C. M. Dunbar as secretary. The first meeting of the committee was held on March 14, when three preliminary questions presented themselves for discussion: 1st, How many assistants should be employed to enable the director to carry out the spirit of the law of Congress? 2d, Whether land should be purchased for the station, or whether a part or all of the College farm should be taken for experimental purposes? 3d, What kind and how large a building should be erected?

It seemed very clear to your committee that section 2 of the act of congress establishing experiment stations requires the employment of a chemist versed in agricultural chemistry, and with considerable experience in conducting experiments therein. The capacity of new plants or trees for acclimation, and the adaptation and value of grasses and forage plants for culture, also mentioned therein, require the constant observation and experiments of a botanist skilled in that line of investigation. Destructive insects and the new enemies to all kinds of crops multiplying so rapidly yearly, demand the uninterrupted watchfulness and study of an experienced entomologist, to ascertain how to prevent their ravages and to point out how they may be exterminated.

In providing for keeping the work of the station in the main separate from that of the College, it was not the intention of your committee to interfere with the power delegated to the director by the report of the committee appointed at the November meeting, 1887, and adopted by the Board in February last. He still can employ and compensate the heads of the different departments for pursuing special lines of investigation, and preparing reports for the quarterly bulletins.

After consultation with Director Speer and President Chamberlain, your committee assigned about 120 acres from the west side of the College farm to the station, the station to be at the expense of changing fences and keeping the same in repair, and to pay an annual rental of $200. We have contracted for the erection of a two-story frame building, with propagating house attached, for the use of the station as office and laboratories. We employed Messrs. Foster & Liebbe, architects, of Des Moines, to draw plans and specifications and advertise for proposals for building. Seven different proposals for the erection of the same were received, as follows:

Shields & Cook, Ames, Iowa	$3,645.00
Smith Warren, Maquoketa, Iowa	3,750.00
W. P. Thomas, Maquoketa, Iowa	3,725.00
W. G. McNulty, Des Moines	3,425.00
John Lenan, Des Moines	3,540.00
James Garrity, Des Moines	3,699.00
Smith & Tusant, Des Moines	3,380.00

The contract was let to Smith & Tusant, of Des Moines, for $3,380, they having been the lowest bidders. They have filed a satisfactory bond for the faithful performance of the contract, and to complete the same before June 30th. It has been the aim of the committee to employ the best scientific talent obtainable for the different departments of the station. With that end in view Director Speer was authorized to correspond with well known scientists, asking for recommendations and suggestions of suitable persons. After receiving a large number of recommendations and applications, the committee, by a unanimous vote, selected Mr. G. C. Patrick of Orono, Maine, as chemist at a salary of $2,000, from April 15, 1888. Mr. A. A Crozier, of the department of agriculture, Washington, D. C., as botanist, at a salary of $1,800, from April 1, 1888. Mr. P. C. Gillett, of Lansing, Michigan, as entomologist, at a salary of $1,600, from May 15, 1888.

In making the above selections preference was given to persons who had paid special attention to the particular lines of investigation required by the station.

Teams, implements and seeds have been bought and Director Speer and President Chamberlain have been authorized to purchase the necessary chemical and biological apparatus and supplies, and also the library for the station. The limit placed on the amount to be expended in buildings by the act of congress making the appropriation, caused the committee to build somewhat smaller than it would otherwise have done, and to build of frame instead of brick. However, we think the building will answer the needs of the station and be an ornament to our grounds.

Respectfully submitted,

J. W. GARNER,
JOSEPH DYSART,
C. M. DUNBAR,
Committee.

The report was adopted and the committee given full power to act upon all matters in connection with the station.

A question having arisen in regard to the interpretation of certain sections of the congressional act, an official interpretation of these sections by the comptroller of the treasury was obtained. The following are the principal points in this decision:

1. Under section 237 of the revised statutes of the United States, all appropriations for agricultural experiment stations and all expenditures and accounts of the same, must be for and limited by the fiscal year of the United States government, which ends June 30th.

2. The quarterly payments to stations are held to be, not in advance, but for the calendar and fiscal quarters next preceding the days specified for the payments. The payment of July 1st should, therefore, be regarded as belonging to the quarter ending the day before, and should be included in the account for the year ending the 30th of June.

3. The annual reports of stations, which are due "annually, on or before the first day of February" * * * "including a statement of receipts and expenditures," may very properly include in the "reports," full description of operations for the previous *calendar* year, but financial "statements" should be only for the *fiscal* year last preceding.

4. The portion of funds unexpended, which reverts, as provided by section 6 of the act of congress approved March 2, 1887, will be the balance at the close of the fiscal year, as shown by the statement above described.

The decision of the comptroller leaves the station without any working capital during the first quarter of each U. S. fiscal year, (commencing July 1st,) and causes, of course, great inconvenience in the station work.

The reports of the station committee to the Board of Trustees, made in August and November, 1888, may be summarized as follows:

1. Changes in the station building, costing $92, were authorized by the committee.

2. The completed building was examined by the committee and Architect Foster on June 25th, and found to comply with the contract, plans and specifications. It was thereupon accepted.

3. Director Speer, acting under the authority of the committee, procured tables, book-shelves and other furniture; purchased a gas machine known as the Detroit Combination Gas Machine, for the purpose of lighting the building and furnishing the gas to the chemical laboratory; put in water tanks, pipes and a force pump to supply the entire building with water and bought a heating apparatus for heating both the main building and the propagating house.

The law of congress establishing the experiment stations provides that only $3,000 of the first annual appropriation, and $750 of each subsequent annual appropriation, can be used for the erection or repair of station buildings. The board of audit being in doubt as to whether the heating apparatus purchased by Director Speer could be considered as furniture, a letter was addressed by him to the Attorney-General making the following statement of the case:

I have bought and placed two of Hitching's portable hot water heaters on the cellar floor of the station building. From one of them hot water passes up through the floor through pipes to radiators, which stand on the floor, and returns through other pipes to the base of the heater. No part of the heaters or pipes are fastened to the building by nails, screws or other materials. From the other heater hot water pipes pass through the propagating houses and rest on iron chairs without being in any manner attached to the same. Would it be lawful for me to pay for this heating apparatus out of the part of the appropriation intended to be used for other purposes than station buildings?

Attorney-General Baker, in his reply, says:

Taking your statement as a basis of facts, I would say that the heaters would be no more a part of the realty than an ordinary stove with pipes running through partitions and into flues would be. It is simply furniture, and not fixtures.

The special powers granted the committee on experiment station, placing the full management of the station in their hands, were continued during the College fiscal year of 1889. At the close of that year, the station having been firmly established, these powers were revoked; the committee was made subject to the approval and direction of the Board the same as other standing committees, and both the committee and director were required to report to the Board.

The unexpended balance to the credit of the station, together with all sums which may be received from the national government or from other sources for said station during the College fiscal year of 1890, were appropriated by the Board to the support of the station.

The resignation of Mr. Crozier, botanist of the station, to take effect July 1, 1889, was presented and accepted; otherwise the working force of the station remains as already stated.

The work accomplished by the station during the biennial period, together with an exhibit of the expenditures on account thereof, are fully set forth in the bulletins issued by the department, and in the report of the director, found on page 30.

PUBLIC GROUNDS.

Permission was granted by the Board to the treasurer, Herman Knapp, to erect on the College grounds a residence and out-buildings. For this purpose there was leased to him for ten years, with the privilege of renewal, one acre of ground at an annual rental of one dollar. It was directed that the lease should provide: that the buildings erected should be satisfactory to the building committee; that they should be kept in repair; that a failure so to do should work a forfeiture of the lease; and that said residence should not be rented to any party except with the consent of the Board of Trustees.

It was ordered by the Board that the barn in the rear of south hall be set apart as a tool room and stable, in charge of the faculty committee on public grounds.

Provision was made for the construction of a road sixteen and one-half feet wide running from the cemetery gate due east until intersecting the road running north from the College. The committee on public grounds were directed to take charge of the same.

SCHOOL-BOOK DEPARTMENT.

This department is not supported in any way by College funds. It is managed by the Board of Trustees for the benefit of the students, and all its expenses are met from the income derived from the sales of books and stationery. During the last two years it has been under the charge of the treasurer, who is allowed $100 per annum as compensation for such service, and who gives a bond approved by the Board in the penal sum of $1,000. The following summary shows its financial condition:

Inventory November, 1887:

Stock on hand	$ 1,029.04

CASH ACCOUNT.

DR.

Cash on hand at beginning of biennial period		$ 739.36
Cash received from sales, express and drayage		6,899.86
CR.		
Cash paid for school-books, stationery, express, drayage, salary and clerk hire	$ 6,700.45	
Cash now on hand	938.77	
Total	$ 7,639.22	$ 7,639.22

Inventory November, 1889:

Stock on hand	$ 1,106.62

SUMMARY.

Total assets at beginning of the biennial period	$ 1,768.40
Total assets at close of the biennial period	2,045.39

Treasurer Knapp is continued in charge of the department at the salary hitherto allowed.

BOARDING DEPARTMENT.

The Board of Trustees elect the steward, approve his bond and examine his accounts. The funds of the boarding department are, however, kept separate from those of the College, and do not enter into the accounts of the treasurer. The department is not strictly a College department, but is managed by the Board in trust for the students. During the past two years it has been under the charge of Captain J. R. Lincoln, who receives therefor a salary of $1,000 and board during the school year. He gives a bond of

$5,000 for the faithful performance of his duties, one of the conditions of which is that he shall keep the expenditures within the income.

Trustees Garner and Morrison, who were appointed a committee to make settlement with the steward for the fiscal year 1888, reported that after a careful examination they had found his books and vouchers correct, and that there was in his hands at the close of business for the year, a cash balance of $1,409.44, for which sum he had properly accounted.

The same committee made the annual settlement with the steward at the close of the year 1889. The following is their report:

To the Board of Trustees:

Your committee to examine the books of the steward's department beg leave to report that they have examined his books and accounts and compared his vouchers with the same. We find a cash balance of $1,332.86 on hand, and balances due from various parties amounting to $119.37. We find that the steward has accounted for all balances remaining in his hands.

SUMMARY.

DR.

Cash balance	$ 1,332.86	
Personal balances	119.37	
		$ 1,452.23

CR.

College boarding department	$ 1,102.99	
Cottage boarding department	303.35	
Fires and lights	4.41	
Incidentals	17.87	
Bus account	23.61	
		$ 1,452.23

Respectfully submitted,

J. W. GARNER,
JOHN MORRISON,
Committee.

Captain Lincoln continues in charge of the department, serving at the pleasure of the Board.

The steward was authorized to use the fund received from the rent of rooms for the purchase and repair of bed-room furniture.

The Board directed that students remaining at the College for less than half a term be charged $3 per week for board, except in case of sickness. A memorial prepared by the faculty and representing their unanimous view was presented to the Board at its

meeting in November, 1889, in which it was asked that the charges against students for incidentals, fires and lights be so increased as to enable the steward's funds to meet the expense of heating, lighting and cleaning the college building and cottages, leaving only the heating, lighting and cleaning of the other buildings to be paid from the College funds. It was urged that the income of the College should be used to purchase apparatus and furnish instruction, and that with the portion saved, as suggested, the departments could be more fully equipped, their efficiency largely increased, and the interests of the College and its students thus greatly advanced.

The Board decided not to increase the charges against students, but it was understood that the faculty might present the matter again at the meeting in May, 1890.

FARMERS' INSTITUTES.

During the biennial period the College has paid the expenses of members of the faculty and officers of the experiment station incurred in attending farmers' institutes to the amount of $153.45.

At the meeting in November, 1889, the Board appropriated to the payment of the traveling expenses of officers attending such institutes during the winter of 1889–90, the following sums:

From experiment station fund, expenses of station officers.....	$ 100.00
From College interest fund, expenses of members of faculty.....	100.00

COLLEGE POSTOFFICE.

At its meeting in May, 1889, the Board passed a resolution asking the Postoffice department to establish a postoffice at the College and a mail route between Ames and the College, and directing the secretary of the Board to present the matter to Congressman Conger and the Assistant Postmaster-General, and suggest the name of the College treasurer as postmaster, provided the office should be established. The secretary reported to the Board at the November meeting that the postoffice had been established, the postmaster appointed and his bond forwarded, but that nothing further had been heard from the department in regard to the matter.

MATTERS RELATING TO STUDENTS,

Certain students who had been suspended by the faculty at the close of the spring term of 1888, because of a disturbance growing

out of the bitter feeling of a portion of the school toward secret societies, asked a hearing of their cases before the Board of Trustees. After a thorough investigation the action of the faculty was approved.

A petition was presented signed by many students, asking that the secret societies in the College be abolished. The committee to whom the investigation of these societies was referred, offered the following resolution, which was adopted:

Resolved, That all special privileges, including use of rooms or place of meeting, be withdrawn from all secret societies or secret fraternities of whatever kind or character.

In accordance with this action, settlement was made with the fraternities for expense incurred by them in fitting up society rooms in the College buildings.

The government of students is now conducted under the following resolution, which was adopted by the Board in November, 1888:

Resolved, That the government shall be that which is known as Faculty government, but the President and the sub-judiciary committee of the Faculty, however, shall have authority to suspend temporarily, but immediately, any student found deliberately disobeying the rules of the College, or willfully disturbing its peace and good order; the duration of such suspension to be fixed by the President and the sub-judiciary committee.

A memorial was presented by the faculty, urging the establishment of a half-year's preparatory course of study. It was argued that such preparatory work would more closely unite the College to the country schools from which it draws the great bulk of its students; that it would enable the faculty to be more strict in enforcing the requirements for admission to the freshman class and thus raise the standard of the College work; and that each preparatory course could be conducted without great additional expense to the College. The Board adopted the recommendation of the faculty and made provision for the establishment of a preparatory course of study to extend through the second half of each school year. The studies to be taught in the department are beginning algebra, advanced grammar, physiology and United States history.

The catalogue of the College for 1889, was approved by the Board. This carries with it the adoption of all changes made in the courses of study.

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

	1888.	1889.
In the course in science and agriculture	20	24
In the course in mechanical engineering	3	4
In the course in civil engineering	3	5
In the ladies' course	7	4
In the course in veterinary science	4	7
Totals	37	44

Appropriate degrees were conferred by the Board on these graduates. The post graduate degree of Master of Science (M. Sc.) was conferred on Professor J. C. Hainer, of the class of 1878, and F. W. Malley, of the class of 1887; the degree of Master of Scientific Agriculture (M. S. A.) on E. S. Richman, of the class of 1886; and the degree of Master of Philosophy (M. Ph.) on E. A. Kirkpatrick, of the class of 1887.

E. W. STANTON,
Secretary.

CALENDAR FOR 1890.

First Term opens	Tuesday, February 25.
Entrance Examinations	Tuesday, February 25. Wednesday, February 26.
Recitations begin	Thursday, February 27.
Decoration Day	Friday, May 30.
Term Examinations	June 11 to 18.
Junior Exhibition	Wednesday, June 18.
Field Sports and Competitive Military Drill	Wednesday, June 18.
Second Term begins	Tuesday, July 15.
Entrance Examinations	Tuesday, July 15. Wednesday, July 16.
Recitations begin	Thursday, July 17.
Term Examinations	November 5 to 12.
Baccalaureate Sermon	Sunday, November 9.
Address before Trustees	Tuesday evening, Nov. 11.
Commencement Exercises	Wednesday, November 12.
Winter Vacation from November 12, 1890, to	February 24, 1891.

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