Eighteenth Biennial Report

OF THE

Iowa State College of Agriculture

AND THE

Mechanic Arts

INCLUDING

Report of Experiment Station

MADE TO

The Governor of the State

For the years 1898–99

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONAWAY, STATE PRINTER,
1899.

IOWA STATE COLLEGE OF AGRICULTURE
AND THE MECHANIC ARTS.
AMES, Iowa, December 1, 1899.

To His Excellency, Leslie M. Shaw:

In accordance with the statute defining the duties of the secretary of the board of trustees of the Iowa State College of Agriculture and the Mechanic Arts, I have the honor to transmit herewith the eighteenth biennial report of the board.

E. W. STANTON,
Secretary.

PRESIDENT'S REPORT.

To the Board of Trustees of the Iowa State College of Agriculture and the Mechanic Arts:

GENTLEMEN—I am empowered to present to you for his excellency, Leslie M. Shaw, governor of Iowa, and for the citizens of Iowa, the biennial report for the incoming general assembly.

OUR BIENNIAL PROGRESS.

It is gratifying to be able to report the most thrifty biennial period of any within the past ten years. The students in attendance, the deepened interest taken in the work by faculty and students, the investigations of the experiment station, and the enlarged heartiness of co-operation at home and abroad, make this a memorable period. We have been limited in funds but not wanting in enthusiasm, and have endeavored to make the most of what we had. The faculty have had heavy work, but have carried it on resolutely and successfully. The erection of a new carpenter shop met a most urgent need and did away with an old wooden structure that proved a menace to valuable property and a poor excuse for its purpose.

Long needed improvements were made in fitting laboratories for pathology and histology in agricultural hall; in fitting up additional portions of the main barn for stock and grain, and the erection of sheep houses; and in the painting of the main building, engineering hall, the dormitory cottages, and other buildings of the college. A farm dairy room has been provided in which are taught the most advantageous methods of practical dairy farming. The sewerage system has been extended to the dormitories, cottages, and other buildings. The sewage disposal plant is a success, and the sanitary condition of the entire college community is now placed in most commendable condition. Twenty-five shower baths for the young men of the college have been put in the main building.

But the most marked improvement has been in the teaching and the work of all the departments. The student organizations of the college have worked together most effectively and

improvingly. The college classes have co-operated in most pleasing harmony. There has been no college scrap nor unruliness of sudents during the entire period. The courses of study have been greatly strengthened by the addition of an entire year to the courses of engineering, science for young women, and important additions to the courses in agriculture and veterinary science. As a consequence the students have increased in numbers, scholarship, and regularity of classification. Many persons wished their children to go to school more in the winter and less in the summer, so that the school year has been changed to begin about the first of September each year and close in June. This brings the college into line with the colleges of the country, both in arrangement of commencement and the reports of statistics and finance.

ADDITIONAL SUPPORT FUND.

Two causes have combined to make imperative demands for additional support fund. The rate of interest on the endowment-fund has decreased in the last several years from 8 per cent to 5 per cent. We had slight difficulty several years ago in loaning all of our endowment on farm mortgages at 8 per cent, but this year our money has accumulated on our hands beyond $100,000 because the law did not permit us to loan under 6 per cent. It will be necessary for the legislature to pass an enactment empowering the college to loan its endowment fund at 5 per cent. The decrease in interest has greatly curtailed the income of the endowment.

On the other hand the increased attendance in students has made extra demand for teachers. Ten years ago the faculty and instructors numbered twenty-five. This year they number sixty-seven. A number of our faculty and instructors have five and six classes a day, hour periods. This is entirely too much. A number of our classes have fifty to eighty students. This is too much for the most effective work. New classes will have to be formed and additional instructors employed. Our faculty as a whole are underpaid. In the last few years we have lost some very efficient teachers because of low salaries. We have on hand at present a most efficient faculty. They are devoted to the institution and enthused with the possibilities of the development and strength of the college. Frequent efforts are made upon the part of other institutions to secure a number of them. It is very poor economy to secure a strong faculty and

allow it to be broken in upon by other states offering better inducements. The decrease in the income from endowment fund amounts to over $10,000, and in the end will reach $20,000. The increase of extra present demands for instruction and equipment amounts to $5,000. A very moderate estimate of the immediate enlargement of faculty is $15,000. This aggregates $50,000. For the present the board of trustees have unanimously agreed to ask for additional support fund of $31,500 per annum.

NEW ENGINEERING BUILDING.

By thoughtful educators and friends of education in Iowa it is acknowledged that this institution is the technological institution of Iowa. The original law of congress placed the engineering courses on the same basis with agriculture. The purpose of the law is to embrace all industrial education, not excluding liberal and classical studies. There is no disposition upon the part of our college authorities to make use of the privilege of embodying the so-called liberal studies in the curricula of the institution. It is the purpose and ambition of the college to build up a great technological institution, such as will be a credit to the state, an inspiration to the industries, and an honor to the nation.

The civil, mechanical, electrical, and mining engineering departments are all cramped and limited for lack of room. The civil engineering is in the mansard story of the old engineering building, and has very limited quarters for recitation, drawing, and laboratory room. Its laboratories are placed in the basement and in whatever location the generosity of some other department would allow.

The mechanical engineering department is lacking in recitation and drawing-rooms, is much wanting in rooms for machine shops and quarters for practical demonstration and experiment station in various lines of mechanical arts.

Electrical engineering and physics have been dependent upon another building for housing. They are much in need of recitation, labpratory, dynamo, and experimental rooms. The department has accommodated itself from cellar to garret in such rooms as could be secured, as a matter of necessity rather than from the standpoint of convenience and utility.

Mining engineering is in a similar condition, only more necessitous. This is the youngest department in the engineering division. The department has no quarters that it could

call exclusively its own. It has been accommodated in Morrill hall, the physical and chemical building, and the engineering hall. It will need to be provided for throughout. For a number of months the college engineer, Professor Marston, under the direction of the board of trustees, and assisted by the counsel of the professors in the various departments, has, by visitation and observation, made a careful study of the leading engineering departments and buildings of colleges and universities in the United States and Canada. From experience at home and this observation abroad, it seems the most economical plan to have these four engineering departments in one general engineering hall. This hall will contain recitation, lecture, laboratory, office and museum rooms. In addition to this will be such minor rooms as would provide the building with first-class modern conveniencies and facilities. Before the advance in material this building could have been erected for about $100,000, but since the advance in building material, and the conclusion of the board of control and our college authorities that structures of this character should be fireproof, the estimated cost is increased to about $150,000.

PRESIDENT'S HOUSE.

The house which has been rented for the use of the president of the college has been sold during the biennial period. The college now has no suitable dwelling for the residence of the president. At present the college president must shift as best he can. The duties of the president require him to live near the college. The college is located a mile and a half from town, so it would be impracticable to have him reside in the town. A residence somewhat comporting with the dignity of the college and the office should be provided for the president. At a most reasonable estimate $10,000 would be a minimum sum. Illinois has recently put up a president's house at Champaign for $17,000. Other states have made provisions with a similar thoughtfulness.

HORSE BARN AND STOCK PAVILION.

The college has a long time been without suitable quarters for its horses. The only horse barn is a small brick stable of meager dimensions and poor provisions. We need a barn not only for the ordinary utilities of the farm, but also for educational purposes. This was the first college in Iowa to have a live

stock room into which the living animal could be brought before the class, and the success of our young men in judging live stock is most eloquent evidence regarding the wisdom of that provision. But we have outgrown our present room and must have an annex room of larger dimensions This can be erected in connection with the horse barn. It should be an amphitheater of sufficient proportions to admit animals in group or single, as occasion may demand. A low estimate for this, including the stock annex, is $10,000.

PURCHASE OF PURE BRED STOCK.

The laboratories in practical agriculture and animal husbandry are the fields and the domestic animals of the field. To teach young farmers the fundamental principles and chief qualities of farm animals, you must have the living illustration before you. The father of John Ruskin used to take him over the country by carriage to visit the productions of the leading masters of art. When they would come to a gallery or a castle containing these masterpieces, the father always went ahead and selected out the best works of art and arranged so that the son could not see the poor productions. The father kept the boy looking at the choicest perfections of art, and that boy has been keeping the world ever since in search and admiration of the perfect and the beautiful in his chosen profession.

The animal interests of Iowa amount to millions of dollars annually. It is a small thing for the state to do to provide the best specimens of all breeds as models with which the youth can familiarize themselves for the direction of the best thought and production in the animals of our great commonwealth. Such an investment is neither a speculation nor an experiment. A large part of the success attending the work of animal husbandry in this college the past five years is owing to the weeding out of grades and poor stock, and the introduction of first-class animals in the various divisions of this department. Ten thousand dollars are asked for the purchase of pure-bred animals. These would represent cattle, horses, sheep, and swine.

SPECIAL TAX LEVY.

In asking for a tax levy of one-tenth of a mill for five years there is no disposition to pile up imaginary needs for the college. A candid view of the measures, buildings and equipment necessary for a healthy growth and development of the college in the next five years brings strong evidence of the necessity

for such a provision. The sobering effect in this consideration is that after the amount of this levy should have been secured there would be quite a number of essential needs still lacking. I have carefully gone over with the heads of the various departments the present and prospective requirements in a reasonable fitting of the college in the next five years.

In the agricultural division there are needs for scientific experiments on road making, refrigerator plant for creamery, suitable quarters for animal husbandry, laboratory rooms for working, breeding, selecting and improving farm crops, laboratories and glass house for student research work in horticulture, additional facilities in dairying, animal husbandry, agricultural chemistry, practical agriculture, and the work of the experiment station, and permanent improvements of fencing, tiling, road making on the farm, in machinery and equipment and the different sections of farm work, and in improved lines of advanced thought in practical agriculture, the particulars of which it is wise to keep to ourselves until they can be embodied in completed outfits. From all these sources alone a cool estimate would aggregate $198,500.

In the engineering division the next five years disclose needs of urgent import. An enlarged equipment of all these departments is necessitous. Washington university at St. Louis, Mo., is putting in physics and electricity alone about $100,000 of additional apparatus. and the technological institutions of the country are increasing their equipment rapidly. Progress in the thought of physics and electricity is well demonstrated by the frequent and far reaching inventions of Edison, the wizard. In all lines of mechanical contrivances man's thought in the past decade has been unusually active and fruitful. To educate a young man for service in the mechanic arts he must be kept abreast of the thought in his calling. This necessitates extensive laboratories and a wide scope of illustrated materials.

We have asked several legislatures for machine shops, and this demand is still with us. With the general engineering hall secured much specific furnishing and equipping will be necessary. With the increase of 60 per cent in attendance of students in these departments the past year it will be necessary to provide additional facilities in materials as well as in teaching.

In civil and mining engineering special demand is made for clay working and experimentation in clays and building materials. And fitting for work of this character must be provided.

In geology there is a necessity for an early outlay in providing the departments with suitable working instruments and apparatus.

In mechanical, civil, electrical and mining engineering a moderate estimate, aside from the general engineering hall, would aggregate $200,000.

In the division of veterinary medicine the college has reached a period when a substantial enlargement is imperative. Veterinary science with the learning of the times has rapidly advanced in the past decade. Instead of a few veterinary colleges in the United States and Canada, quite a number of strong veterinary colleges have been established in recent years. In the next five years we must make provisions and suitable quarters for general hospital purposes, for a hospital of infectious diseases, for laboratories and histology, physiology, pharmacy and bacteriology, for dissecting room and crematory, and for shoeing shop. In addition to all this, it will be necessary to have the corresponding equipment of men and apparatus. An estimate of $75,000 is in moderation.

In the division of science and philosophy there are wants equally pressing. As soon as electricity and physics can be taken out of the chemical and physical building, the entire building must be remodeled and outfitted for general chemistry. This will cost not less than $15,000.

The department of botany has collections amounting to over $10,000, including the well known Parry collection, many things which, in case of fire, could not be replaced by any amount of money. The quarters of this department are limited and are practically without protection from fire. To place this department in commodious and safe environments is wisdom and economy.

In the department of zoology we have not adequate laboratory rooms, and must enlarge in some manner.

In domestic economy, of the rooms now occupied by that department is a question of present moment.

In English we are not able to meet reasonable demand for rooms and outfitting.

The library, which is considered under a separate head, is a vital factor in making up the wholesome wants of the entire college. It must have more space. All the departments of science and philosophy are in need of more room. Classes are multiplied already beyond a suitable capacity.

We are accommodating ourselves something like our forefathers, in the one and two-roomed houses of their primitive abodes. It is a good atmosphere for cordiality, but not so suitable for a plain reality, calling for more elbow-room and thought-room.

In military science there is a standing and eloquent argument for an armory.

Our college chapel has a seating capacity of 625. Our students more than fill the room. Our work is hindered in public gatherings and the general meetings of prime importance to the unfolding and enthusing of the college and friends with the larger thought and vision of lectures, assemblies, and general college occasions. These urgencies for a working outfit of building and equipment can be accommodated and fitted into each other so as to greatly diminish the aggregate cost, yet in five years $150,000 expended would be in the bounds of a considerate modesty.

In addition to this all there are general needs, such as the improving of the heating plants, the establishment of a poultry department, the enlarging of the college hospital, the providing for physical culture, and the promoting of the sanitary conditions of the buildings and campus. The levying of a special tax would enable us to select out of these respective divisions the things that could least brook delay, and plan more intelligently for the development of the material side of the college in the next five years.

SUMMARY.

Increase of support fund	$ 31,500
General engineering hall for mechanical civil, electrical and mining engineering	150,000
President's residence	10,000
Horse barn and stock pavilion	10,000
Purchase of pure-bred stock	10,000
Total	$211,500

One-tenth of a mill tax for five years for buildings, improvements, and equipment.

NATIONAL RECOGNITION OF THE IOWA STATE COLLEGE.

The last year book of the department of agriculture at Washington, D. C., gives some types of American agricultural colleges, and classifies them into three divisions, first, agricultural colleges; second, agricultural and mechanical colleges; third,

universities having agricultural departments. The purpose of this treatment, as stated by Dr. A. C. True, the national director of the office of experiment stations, is "to describe briefly a few institutions, which may thus serve as types of the rest, and for this purpose institutions are selected which are relatively well equipped for agricultural instruction."

In the class of colleges of agriculture and mechanic arts this college is selected as one of the national types. Cuts of buildings and interior are given, also a brief statement of the plant, equipment, attendance and courses of study. It concludes with the following encouraging statement for all the departments of the college:

> The Iowa college represents those institutions whose development has been along broad lines, and in which the agricultural course, maintained side by side with a number of courses in the arts and sciences, is being more thoroughly organized and specialized in accordance with the general advance movement in education along industrial lines.

THE LIBRARY.

The time has come when some radical aid should be given to the enlargement of the college library. The number of the volumes in the library is now 12,460. This includes the collection through the entire history of the college. The additions to the library of Cornell university, Ithaca, N. Y., for the past year were 13,744, more than we have in our entire library. In the choice of the library we have considered the experience of Emerson when he says: "I visit occasionally the Cambridge library, and I can seldom go there without renewing the conviction that the best of it all is already within the four walls of my study at home." But with the limited amount of funds at our command we are not able to add more than about 500 a year. At this rate it would take us 200 years to secure 100,000 volumes. The library is classified according to the Dewey system, and the catalogue is in two parts, the dictionary (author and title) and classed. Ten thousand dollars annually for the next five years would be a small expenditure for the enlargement of the library.

NATURE STUDY AND ELEMENTARY INSTRUCTION IN AGRICULTURE.

A number of the states, through the agricultural departments of the state colleges, have inaugurated a plan for the teaching of nature studies and elementary agriculture in the country

schools. Most prominent among these is the state of New York. The New York legislature has appropriated $35,000 annually to the agricultural department of Cornell university for these purposes. With this money they have organized two bureaus, one including the work of nature study and a farmers' reading course, and the other investigations along such lines in different parts of the state. They publish leaflets treating of such subjects as "The soil—what is it?" "Tillage and under-drainage—reason why?" "The fertility of the soil—what is it?" "How the plant gets its food from the soil," and "How the plant gets its food from the air." They have about 10,000 farmers enrolled in the farmers' reading course. They have sent out about 600,000 pages of printed matter. Seven thousand names are on the mailing list for the teachers' leaflets. The aggregate of all these will reach about 25,000. Both cities and the country are taking the deepest interest in this movement. There is the tonic of nature in it to the teachers of the state, and the freshness of original truth for all the pupils. A summer school has also been established by the money thus given, divided in three parts—insect life, plant life, and the farm. The State College of Pennsylvania has a home reading course for farmers and conducts examinations in the subjects studied. This has been conducted successfully for seven or eight years. The year book of the United States department of agriculture says:

> Promoters of this movement believe that the most efficient means of elevating the ideals and practice of the rural communities are as follows, in approximately the order of fundamental importance: (1) The establishment of nature study or object-lesson study, combined with field walks and incidental instruction in the principles of farm practice, in the rural schools; (2) the establishment of correspondence instruction in connection with reading courses, binding together the university, the rural schools, and all rural literary or social societies; (3) itinerant or local experiment and investigation, made chiefly as object lessons to farmers, and not for the purpose, primarily, of discovering scientific facts; (4) the publication of reading bulletins, which shall inspire a quickened appreciation of rural life, and which may be used as texts in rural societies and in the reading courses, and which shall prepare the way for the reading of the more extended literature in books; (5) the sending out of special agents as lecturers or teachers or as investigators of special local difficulties, or as itinerant instructors in the normal schools and before the training classes of the teachers' institutes; (6) the itinerant agricultural school, which shall be equipped with the very best teachers and which shall be given as rewards to the most intelligent and energetic communities.

Iowa should not be behind in a movement of such practical moment and worth. God Almighty has predestined these Iowa prairies as an agricultural region. We occupy an unusual spot of the world. The legislature should enable the state college to inaugurate movements of this kind at once. The horticultural society of the state has made a beginning by the publication of leaflets bearing upon these questions.

It contains leaflets on "The Nature and Origin of the Soil;" "How a Plant Gets Out of the Seed;" "Plant Growth;" "How to Observe Insects;" and "A Nature Study Lesson on the Grasshopper" and "School Gardens." These leaflets were prepared by Professors John Craig, Pammel, Atkinson, and Summers of the college, Prof. James of Canada, and Miss Rogers of the East Des Moines high school.

BOARD OF TRUSTEES.

The statute of the last Iowa general assembly, making provisions for the governor of the state and the superintendent of public instruction as members ex-officio of the college board of trustees, has proved a wise and helpful measure. The experiences of these gentlemen in the public affairs of Iowa, and their relations to other state institutions, have made their services to the state college effective and desirable. By reason of serious and protracted illness, Mr. Addis Schermerhorn, of the Fourth district, has not been able to qualify nor meet with the board at any of its sessions this biennial period.

THE SALE AND PURCHASE OF PUBLIC LANDS.

According to the authority given by the last legislature the board of trustees sold off a portion of the northwest corner of the north farm and purchased the Kinsley tract of forty acres, that was mostly surrounded by the college farm on the north. This makes the location of the college farm lands more desirable and serviceable. A thorough system of drainage is now placed in the low lands of the remaining parts of the north farm so that this will be among the most productive portions of the farm. All these measures have contributed to the betterment of the land conditions for practical agriculture.

HON. JUSTIN S. MORRILL.

On December 26, 1898, the father of land grant colleges, Hon. Justin S. Morrill, passed to his eternal reward. In his distinguished services as a representative in congress for twelve years, and for thirty-one years a senator from Vermont, he bestowed himself the farthest and will be remembered the

longest, as the author of the measure that established state colleges through the grant of public lands to the respective states and territories. The 14th of April, his birthday, at that time when all things are blossoming and everything that loves the sun is aptly out of doors will likely be a memorial day in the state colleges of America. A short time before his death he was asked for counsel by a board of regents, in regard to the scope of the land grant colleges, and said: "In reply, I have to say, that the act of 1862 was intended to give those whose lives were to be devoted to agriculture or the mechanic arts, or other industries, embracing much the largest part of our population, some chance to obtain a liberal and practical education. I enclose a quotation from the first act, the law upon the subject, which, you will see, did not proceed upon any exclusive idea, but indicated the leading purpose without excluding other classical and scientific education. You will see that it is very broad and liberal. I should hope that no farmer or mechanic would be so illiberal as to wish to have the monopoly of education in any of these land grant colleges. It will do the professional students good to be educated side by side with those who expect to obtain a living by labor."

MILITARY SCIENCE AND TACTICS.

The department of military science and tactics has for years been one of the most efficient in the country. The excellency of its work never stood out better than during the past biennial period. Many of the men trained in the college performed sturdy service in the Spanish-American war and in the Philippines. To hundreds who have not gone to war it has given a carriage of person, self-respecting discipline, and power of order vital to thorough education. A number of these have also identified themselves with the National Guard, and proved themselves worthy representatives of this thorough training. More than ever the department is in need of an armory for drill hall and the physical culture of our students during inclement weather. We have no suitable place for the storing of the arms. This request is not included in the askings of this year, but such a need makes itself felt more forcefully every year of our work.

THE DOCTOR PARRY BOTANICAL COLLECTION.

A working collection of botanical specimens is indispensable for carrying on botanical work. The Iowa state college is

fortunate in containing an extremely valuable collection of plants made by the late Dr. C. C. Parry. This collection contains the types of many plants first found in the Rocky mountains as well as the Mexican boundary survey by the late Dr. C. C. Parry. In but a few cases are these types generally accessible, and in many cases these types can not be had except upon consultation with the collection at the college, so that these specimens should be properly preserved and kept out of the reach of fire. They are now maintained in a building which is not fire-proof, and in case of fire they would be entirely consumed. Several disastrous fires of this kind destroyed collections of great value in this country, and every effort should be made to preserve this collection. Although this collection was purchased at a cost of $5,000 five times $5,000 could not replace it. In fact money could not replace it. In addition the college has a valuable collection of plants made in the Rocky mountains, this state, and elsewhere in the Mississippi valley that should be preserved in a similar way. The whole collection should be stored in a fire-proof building. The capital invested in botanical collections alone amounts to $10,000. Outside of the collection of the Missouri botanical garden no other college west of the Alleghanies has so valuable a collection of early types as this institution.

NEW ARRANGEMENT OF COLLEGE STUDIES AND WORK.

The progress of the college work within recent years made necessary a more thorough system and division. The work of the college is now divided into four general divisions: the division of agriculture, the division of veterinary science, the division of engineering and the division of science and philosophy.

The division of agriculture is subdivided into five departments, practical agriculture, dairy, animal husbandry, horticulture, and agriculture chemistry. In connection with all of these departments the work of the experiment station is carried on, especially from the side of original investigation and observation.

The division of veterinary science includes twenty-eight courses bearing directly upon the science of veterinary medicine.

The division of engineering is divided into four departments, mechanical, civil, electrical and mining engineering.

The division of science and philosophy includes the courses of the sciences as related to industries, and letters and philosophy for young women. This embraces seventeen departments: mathematics, physics, chemistry, botany, zoology, geology, economic science, domestic economy, psychology and ethics, literature and rhetoric, elocution, Latin, modern languages, history, military science, music and library.

DIVISION OF AGRICULTURE.

The college has been fortunate in the arrangement of its course in agriculture so as to bring its students to the front of the most advanced standard of agricultural education, and at the same time meet the general demands of the public. In the department of practical agriculture there is afforded a field of educational culture and growth not surpassed by any other college on this continent. The connection of the experiment station with the college work gives a spirit of investigation and originality to the students in all departments of agriculture. The national government affords about $35,000 annually for this original work. The college shares its faculty and equipment with students who are preparing themselves in these departments of thought. The fields and barns and entire farm equipment become a great system of laboratories in which the young farmer is thoroughly initiated in the most advanced learning of this character. A room for live stock in connection with recitation is provided in agricultural hall, where various animals are studied from life and judged as to their perfections and imperfections.

DEPARTMENT OF DAIRYING.

In the department of dairying the long and short courses are patronized with a constantly growing attendance of students. Summer and winter courses of sixteen weeks each give facilities for those who wish to equip themselves fully for butter and cheese-making. A short winter course is given in January and February of each year as a review school for dairymen of this state who have already had experience. A laboratory in dairy bacteriology is established in the creamery building, in which questions arising from this side are carefully matured, by investigation and research, the results embodied in the operations of the creamery, and the scientific facts published free of charge. The graduates of the creamery

have been very successful in securing positions. Representatives of this department in recent years have taken six first-class state prizes and gold medals, one second-place state prize, one first prize and gold medal of the National Dairymen's association, a first-class gold medal prize of the Chicago Butter association, and six first-class prizes and gold medals of state fairs, besides a number of first-class prizes in minor conventions and associations.

THE DEPARTMENT OF ANIMAL HUSBANDRY

Has made rapid strides during the past biennial period. The department now has good representatives of five breeds of horses, six breeds of cattle, seven breeds of sheep and six breeds of swine. These animals are used in class illustration and for experiment for breeding and feeding for milk and meat, as well as growth and maintenance. As the crops of the farm are in constant use for educational purposes, so all the animals are fed by rule and system, and the result of their management reported upon and used in class work. During the biennial period students of this department took first, second, and third prizes in the Interstate Live-stock Judging contest of college students at the Omaha Exposition in 1898.

THE DEPARTMENT OF HORTICULTURE

Is also taking on new thrift and enlargement. The raising and distribution of fruit trees and shrubs carried on so eminently by Professor Budd for a number of years, by his own suggestion, has largely given way to more exclusive questions of scientific horticulture. Prof. John Craig, the new head of this department, grew up in nurseries and horticultural work, as well as shared in a large measure in the development and advancement of scientific horticulture in the United States and Canada, being for six years in the Dominion Government station at Ottawa. A special horticultural library is now established in agricultural hall, composed largely of books presented to the department by the late Charles Downing, author of "Fruits and Fruit Trees of America," and the standard authority on pomology of to-day. The new greenhouse has made it possible to take up new questions along the several arts of gardening, and a special gardener is now employed for these purposes. In the lands devoted to the horticultural interests over 1,000 varieties of fruits, including the hardiest types of foreign

and native lands are under constant experimentation, with a view to selecting the most serviceable types. Ample grounds afford operations on a large scale for the drilling of the students in grafting, budding and pruning.

OLERICULTURE

Is receiving more attention than formerly in this department. Leading types of vegetables are experimented with in the manner of culture and as to the excellency of product in order to acquaint the student thoroughly with this growing branch of industry in the west.

FORESTRY

Is receiving additional attention, part of the wooded land of the college farm having been set apart for park and forestry purposes. In this connection the planting of new trees, native and foreign, and observations upon those already in place for a number of years, are afforded, inviting facilities for this branch of knowledge so vital to the future of the public and private domains of America.

THE DEPARTMENT OF AGRICULTURAL CHEMISTRY

Is more thoroughly provided for than ever in the past of our college history, and yet was never so overcrowded as now. The chemistry of soils, the chemistry of field crops, and the chemistry of food products are receiving additional attention each year. Experimentation is also given in the chemical examination of milk, butter, cheese, processes of digestion, the various phases of food adulterations, and the questions of the formation and action of ptomains on the animal body. Additional laboratory room for the department of agricultural chemistry is imperative. The entire first floor of agricultural hall, or a space equivalent, will need to be given this department. In case the stock pavilion is voted by the legislature this very urgent extension can be secured the coming year.

DIVISION OF VETERINARY SCIENCE.

The young men who have availed themselves of the advantages of this course have contributed in no small degree to the advancement of the scientific knowledge and educational work of this specialty. Since the organization of the department as a school of veterinary medicine with authority to confer degrees, ninety-five young men have graduated from the course. Out of

this number ten states have selected veterinary professors for their agricultural colleges, or state veterinarians, or have filled both offices from the same source of supply. Twenty-six have passed the civil service examination and received commissions for work in the United States Bureau of Animal Industry. The government experiment stations have drawn largely on our graduates for workers in their various veterinary sections, and they have made important contributions to investigation along other lines. Add to this the work done by the private practitioner, and it is but fair to say that this department has borne a conspicuous part in meeting the expectations of the lawmakers who planned and endowed the agricultural colleges of the country, and the demands of the live stock interest of our commonwealth.

The recent impetus given to the live stock interest by a notable increase in prices, especially of horse values, has created new interest in the minds of young men for this branch of science. Fifty special veterinary students received instruction during the present year, besides an equal or larger number from other courses of study in the college who came in for certain parts of the work.

While our equipments have enabled us to give to our students such training as I believe has unquestionably given them the front rank among veterinary graduates of this country, the fact still remains that we are sadly in need of additional facilities. In some branches the number of students is quite beyond the accommodations, and the work is seriously interfered with for want of additional room. This is especially true of the facilities for carrying on the work of dissecting, and conducting clinics, under such circumstances as will give to the student the best opportunity for seeing operations and profiting by practical demonstration. The department feels very sadly the want of a suitable building in which to conduct its practical operations along these lines, and I believe the need is so great, and the benefit to the most important industry of the state would be so important, that the very least the state could afford to do would be to provide the means of erecting such a structure.

DIVISION OF ENGINEERING.

In 1889 the division of engineering had sixty-six students, In 1899 it has 275. The attendance in this division increased 60 per cent the past year. In 1898 there were 176, in 1899, 275.

In addition to this, students of other departments are taking work in the division.

The headquarters of this department are in engineering hall, of which the first and second floors are given up to its use. The first floor is occupied by the office of the assistant professor of mechanical engineering and by the machine shops. The latter are in two rooms, having a floor space of about 3,000 square feet, one of the larger rooms having a portion creened off for a tool-room.

The second floor is occupied by the office of the professor of mechanical engineering, computing room, blue-print and dark room, recitation room and a large drawing room. The recitation room will seat about thirty students, and the drawing room has tables for fifty. Two hundred drawing boards and a considerable number of drawings, photographs and blueprints constitute the equipment of the drawing room. The recitation and drawing rooms have ample blackboard space.

The basement is given to engineering laboratory purposes, especially to experiment in hydraulics.

Besides the above space in Engineering Hall, the department occupies the power house, the pattern shop and the forge shop and foundry.

The machine shops are equipped with a 24x25 inch planer, a milling machine, a universal grinding machine, a shaper, a drill press, two emery grinders, a polishing wheel, a power hack saw, a cutting-off machine, eight engine lathes of capacities from ten to twenty swing and three to ten feet between centers, and three speed and drilling lathes, together with the usual assortment of small tools in the tool-room. Power is furnished to this shop by an electric motor of five-horse power.

The pattern shop is a new brick building one story high, with spacious attic for storage of lumber. The building is 128 feet long by 38 feet wide. A tool room 12 by 20 feet is screened off in the center. A fire proof room is provided for patterns. The equipment of the pattern shop consists of a universal buzz-saw, a mortising machine, planer, buzz-planer, hand-saw, jig-saw, grindstone, fifteen turning lathes, benches for twenty students, twenty-four complete sets of small tools and a number of special tools. Power for this building is furnished by a twenty-horse power electric motor. By means of roller-bearings the line-shaft is made to consume only a small fraction of the available power.

The forge and foundry equipments are housed under one roof in a brick building 78 by 38 feet. A steel truss roof structure of substantial construction provides support for an overhead traveling crane, which serves the whole floor for handling heavy ladles, castings and forgings. Eight forges, with blower and exhaust fan, drill-press, vises, anvils, grindstone and small tools, such as sledges, fullers and swages, constitute the equipment for forge work.

A cupola and blower for melting cast-iron, a brass furnace, a core oven, core benches, eight sets of molders' tools, crucibles, and a large assortment of flasks are used for foundry work. A twelve-horse power gasoline engine supplies power for the forge and foundry.

The power-house contains the complete electric light and pumping plants of the college, all of which is available for experimental work, and constitutes a part of the engineering laboratory equipment of the engineering departments of the college. In addition to the above the engineering laboratory equipment of the department consists of a twelve-horse power Otto gasoline engine, a Wheeler condenser, three Worthington water-meters, a Holly duplex pump, injectors, weir and weighing tanks, gas-meters, a Crosby steam-gauge tester, fan-blowers for experimental work, Westinghouse air pump, a 100,000 pound Riehle testing machine, with Gray autographic device; a 50 000 pound Olsen testing machine, an Olsen torsion testing machine, a Thurston oil tester, a complete De La Vergne refrigerating machine, gas analysis apparatus, two Thompson, two Crosby and one Richards indicators, dynamometers, a Prony brake, platform scales, and some other apparatus essential and accessory to experimental engineering.

Students in mechanical engineering pursue the full course in shop-work, which consists of eight hours per week for four years. Partial courses are given to the students in the agricultural, mining and electrical engineering courses.

The system of instruction in the several shops begins with graded exercises calculated to familiarize the student with tools and with the materials used. The exercises are supplanted as soon as possible by work on machines or parts thereof which are to be put into actual use. By this arrangement greater interest is maintained in the work than would be possible with a strict adherence to the exercise system. The object of the shop work is not to teach trades, but to acquaint the student

with the tools, materials, and difficulties of shop-practice, and to establish in his mind principles which will aid him in designing and construction work in the other studies of his course and in his professional career.

The drawing-room work begins with free-hand drawing and object drawing, and is followed successfully by machine sketching, mechanical and kinematic drawing, and designing. The latter division occupies the last two years of the course.

The object sought by the drawing-room course is to enable the student to make, as quickly as possible, neat and accurate working drawings, to design, in general and in detail, machines and parts thereof, and to apply throughout his knowledge of shop methods and his theoretical information acquired in the laboratory and class-room.

Experimental work begins with the junior year, and extends to the end of the course. The instruction in this subject is thorough, its scope being indicated by the following list of experiments. Tensile, transverse and compression tests of materials, properties of lubricants, measurements of power by absorption and transmission dynamometers, steam gauge and indicator spring calibration, flue-glass analysis, indicator practice, variation of engine speed, fan-blower tests, calorimetery, including throttling and separating calorimeters, weir and water meter calibration, efficiency tests of steam engines, boilers, injectors, and steam heating, electric lighting, refrigerating, power and pumping plants, and Hirn's analysis of steam engine, besides a number of special experiments in the line of investigation. The engineering laboratory work usually culminates in the thesis, which is an exhaustive investigation of a limited subject. From 400 to 500 hours of actual time are spent in thesis by students in the engineering courses.

In the current year the thesis subjects are:

The Effect of Clearance on the Economy of a Steam Engine.

Effect of Speed and Back Pressure on Economy of College Pump.

Economy Tests of Boiler Feed Pumps.

Investigation to Determine the Proper Division of Expenses of the College Power Plant.

THE DEPARTMENT OF CIVIL ENGINEERING

Furnishes thirty-three courses of study. It occupies the third story of engineering hall. The department also occupies considerable laboratory space in the rooms of the mechanical

engineering department. Its hydraulic and cement testing laboratories are located in the basement of engineering hall.

The instrumental equipment of the department includes six transites, four levels, a plane table, two compasses, and numerous chains, tapes, rods, etc. The department is also well supplied with minor instruments, such as drawing instruments, field-glasses, computing machines, planimeter, etc. Additional instruments are to be purchased for use in the summer school of surveying.

Laboratory equipment includes stone sawing and grinding machinery, a drying oven, an abrasion testing machine, and a standard rattler for paving brick tests. In connection with the mechanical engineering department the civil engineering department owns an automatic and autographic Riehle testing machine of 100,000 pounds capacity for crushing tensile and transverse tests of steel, iron, wood, stone and paving brick. Students also have access to other testing machines.

The department possesses a complete cement testing outfit, consisting of a Fairbank's testing machine, a mixing slab, many briquette molds, cement and sand sieves, baths, etc.

A new hydraulic laboratory is just being fitted up. Water is supplied by about 700 feet of 8-inch and 10-inch cast iron pipe from the college elevated tank of 163,000 gallons capacity. The available head will be about 150 feet. Arrangements are made for measuring the loss of head from friction in the supply pipe and in its special castings. In the laboratory a tank is provided 50 feet long by 6 feet wide and 4 feet deep, which will be used as a measuring and discharging tank for the various pieces of apparatus, and which can also be used for experiments on the resistance of models to propulsion. The water will be removed from this tank by two sewers, one 6 inches and the other 15 inches in diameter. These are arranged to be used for experiments on the laws of flow in sewer pipes. The laboratory will also be provided with weir tanks, hydraulic motors, pumps of various types, apparatus for experiments with orifices, friction in small pipes, etc.

WATERWORKS AND SEWAGE DISPOSAL PLANT.

The department designed and supervised the construction of the college waterworks. The college water tower is the largest in this state and one of the largest in the west. The pumping machinery, which is of an unusual and very efficient type, is so

arranged that college students in waterworks engineering can make tests of the efficiency of the apparatus as part of the class work.

The department has also designed and supervised the construction of the college sewage disposal system. This is the first sewage plant installed in the state. Investigations in the line of the most recent advance in sewage purification are now being conducted with the college plant, and it is hoped that the results will be of much value to Iowa cities in the future.

The waterworks system and the sewage disposal system are utilized so far as possible to furnish practical object lessons to the students in hydraulic engineering.

EXPERIMENTAL INVESTIGATIONS HELPFUL TO STATE INTERESTS.

The modern university or school of technology must serve the public in many ways other than by giving class instruction to students. Experimental and other investigations on important subjects must be carried on, and the results of these, as well as other important or recent truths of advanced thought or theoretical or applied science, must be made known to the general public, as well as to the institution's own students.

Realizing this the department of civil engineering is doing what it can to advance the interests of the state of Iowa by carrying on investigations helpful to state interests. One of the most important lines of work already begun is the testing of the properties of the building materials and paving brick of the state. Some results of this work have already been published, and the work is being systematically continued. It is hoped that this investigation will make the properties of Iowa building materials and paving brick better known, and so increase their use.

In future work in testing brick the department of mining engineering will co-operate, and the two departments hope soon to establish a joint laboratory, containing apparatus for making clay into brick and pottery, so that the clay deposits of the state can be studied and their use by manufacturers encouraged.

The experiments now in progress with the college sewage disposal system already mentioned constitute another line of work which will be very helpful to state interests, for many of our cities will in the near future find themselves compelled to cease polluting the streams of the state with their unpurified sewage.

Some of the experimental thesis work by students of the department has been of value in furnishing information useful to engineers. In one of these thesis investigations, made in 1898, nearly 200 photographs were taken, from which the exact paths of fire-streams from hose-nozzles under different conditions have been mapped out, giving information of value to hydraulic engineers. A few years ago two students made gaugings of the flow of sewage from the sewers of Des Moines, giving information which has since been made use of by sanitary engineers.

The department hopes to be able to make investigations along the line of Iowa good roads in the near future.

THE DEPARTMENT OF ELECTRICAL ENGINEERING

Furnishes thirty-one courses of study. This department aims to meet the needs of young men who have in mind the practice of electrical engineering in any of its applications in the business world.

The sciences of mathematics, physics and chemistry, and mechanical engineering are strongly emphasized, as it is believed they are of first importance in such a course. The attention of the student is directed to the value of these subjects and he is urged to give them his most careful consideration.

Mechanical engineering constitutes the practical basis for commercial electrical engineering, and in recognition of this the course in electrical engineering is largely identical with that in mechanical engineering. The mechanical engineering work required of students in electrical engineering includes mechanical drawing, shop-work, kinematics, machine design, analytical mechanics, hydraulics, materials of construction, engineering laboratory and the study of the steam engine.

Physics is the basis of the study of electricity and magnetism, the phenomena of which underlie electrical engineering, theory and design, and is manifestly of sufficient importance to demand considerable time and attention in the training of the electrical engineer. In addition to the work in physics prescribed for all engineering students, the electrical engineering student spends six to twelve hours per week in the junior and senior years in the physical laboratory and class-room. Laboratory work in electricity and magnetism, including work in the dynamo-room and testing laboratory, extends throughout the last two years of the course.

The first work in the physical laboratory embodies the accurate measurements of lengths, mass, and time, the adjustment and use of physical instruments, and the determinations of physical constants. In the laboratory course in electricity and magnetism the student makes a study of primary and secondary batteries and the electrical instruments of the laboratory, the determination of the constants of measuring instruments, and the methods of measuring the several electrical quantities.

The laboratory work in light and sound consist largely in photometric measurements of various forms of commercial lamps.

In the laboratory work of the senior year the more practical applications of the principles of electro-magnetism are studied, together with the principles of the magnetic circuit of current flow, etc.

The topics of electric wiring, power transmission, electro-chemistry, telegraphy, telephony, and electric signaling receive special attention in the latter part of the course. The laboratory work in these various topics is made to conform to the text-book and lecture work.

The study of alternating currents and alternating current machinery is taken up in the senior year. In the class-room work much stress is placed upon the theory of alternating currents, and in the laboratory the student is afforded opportunity to study and familiarize himself with the phenomena peculiar to such currents.

The department possesses thirteen experimental dynamos, including two arc machines, one 250 light Diamond alternator and one two light Pony alternator; also one twenty-five-horse power M. P. Ahlms-Edwards direct-current motor and other series; and shut wound continuous current machines. There are also transformers of various types, and a secondary battery of fifty cells.

In addition to this equipment the student has access, for experimental and test purposes, to the electric machinery of the college power-house and lighting plant. Among other machines in this plant are two fifteen K. W. Edison dynamos, one four-pole eighteen K. W. compound-wound generator by the American Engine company, and one 500 light alternator. There is also a series of motors for driving the machinery of the mechanical engineering department, which range in size

from five to twelve-horse power, and which are also available for test purposes.

In addition to the general physical laboratory rooms, the department occupies seven basement rooms in the west cottage.

An extended system of wiring connects all rooms of the department with the switchboards of the dynamo laboratory and the apparatus room. At these switchboards are the terminals of a line connecting with a 110 volt, 150 ampere directing current machine, which is available as a current source during the day. During the evening hours there are available 110 volt direct or alternating current circuits.

THE DEPARTMENT OF MINING ENGINEERING

Affords seven different courses. Some one has said that utility is the bane of science, but a greater man has written that philosophy is never more exalted than when she stoops to minister to humauity. Engineering is eminently practical in its varied phases, and thus commends itself to those interested in the material welfare of the community and the development of the natural resources of the state. This is no less true of mining engineering than of the other branches of engineering. The mineral output for Iowa has been steadily on the increase, and in 1898 the total product exceeded $7,475,000, firmly establishing mining as one of the most important industries of the commonwealth. While this comfortable sum was won from nature's rock-bound stores, no one would pretend to say that the natural resources of the state were developed to their full capacity. The coal output is on a low up-grade, and yet nearly half of the state draws its supply from the coal fields of Illinois and Indiana. The lead and zinc interests have remained practically at a standstill for a score of years, chiefly for want of intelligent direction. The quarry products of the state have been displaced largely by importations, from other states, of stone, no better in quality, but produced on a more economical scale; while her clay interests are but in their infancy. All of these great industries require, for their best development, educated, intelligent direction. Old ways and wasteful methods must give way to new processes and improved machinery. The skillful hand must be supplemented by the educated, resourceful brain in order that products of the mine, the quarry and the pit may meet in successful competition similar products from other states.

In 1894 the Twenty-fifth General Assembly, realizing the necessity of supplementing practice with science in order that Iowa might assume her proper place among the mineral producers of the nation, legislated as follows:

CHAPTER 107.

AN ACT to establish a school of mines for the state of Iowa.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF IOWA:

SECTION 1. There is hereby created and established a school of mines for the state of Iowa, which shall be a department of, and under the control of, the State Agricultural college.

SEC. 2. It shall be the duty of the board of trustees to provide for a thorough course in theoretical and practical mining, so as to fit the students to undertake the full management of mining in its different branches.

SEC. 3. Students shall be allowed to enter upon the same conditions, and shall be accorded the same privileges, as other pupils of the State Agricultural college.

Approved March 30, 1894.

To carry out the will of the legislature as expressed in the above act, two courses in mining engineering are offered. The first is intended for those students who desire a "thorough course in theoretical and practical mining" and underlying sciences, and requires four years for its completion, leading to the degree of bachelor of science in mining engineering. The requirements for admission are the same as those for admission in other engineering courses. Students who pursue this course to completion are expected to be able to undertake the "full management of mining in its various branches," at least as practiced in Iowa, and to become familiar with the principles involved and the methods employed in good mining engineering practice in general.

The second is specially adapted to men actively employed in the mining industry, but who have neither the time nor the opportunity to prepare themselves to meet the entrance requirements for the regular four years' course. It is intended more particularly for mine superintendents, mine foremen, and the more intelligent miners who wish to gain some insight into the laws of mineral origin, accumulation, and distribution; the most economical and approved methods of winning the ores, the fuels, and the structural materials from nature; the mechanics of the steam engine and of the dynamo and their manifold applications to mining and the principles involved in mine surveying, mine drainage, and mine ventilation; in short, to acquaint themselves with the science of mining.

EQUIPMENT.

The department of mining engineering is located in Morrill hall, dividing quarters with the department of geology. The description of rooms, collections, and apparatus which may be found under the latter department will apply almost equally well to mining engineering. In addition to the apparatus previously listed and described, the department is supplied with a Sullivan core-drill, with a complete set of tools and accessories for actual field operations; a sensitive six-dial, anemometer read to 10,000,000 of feet and adapted for the measurement of currents of air through mines and tunnels — an instrument absolutely necessary in order to deal intelligently with the problems of mine ventilation; a miner's level with rods and measuring tape; a plane table with accessories; a set of miner's tools; a barometer, clinometer, and various instruments used in ascertaining distances.

The proximity of Ames to the Iowa coal fields affords easy access to the coal mines at Boone and Des Moines. The great centers of the clay industries — Des Moines, Boone, and Ft. Dodge — are equally accessible; while the quarries of Marshall county are scarcely more than an hour's ride from the college. These and numerous allied industries are, after all, the most important and indispensable laboratories for the practical mining engineer. The department undertakes to present the accepted theories concerning mineral aggregation, origin, and occurrence, but these theories can only be put to the test by an intelligent use of the drill, the level, and the plane table. The accredited methods of winning the ores and minerals receive full discussion of the class-room, but only render obvious the necessity of becoming familiar with the practical workings of the sluice-box, the tipple, and the stamp-mill. The chemical and physical properties of a clay may be ascertained in the laboratory, but a complete knowledge of its properties and its proper mode of treatment can only be gained by following it from the pit to the street. In short, the department aims to give as complete an exposition of the theories and laws which underlie the science of mining, as the time will permit, but the verification and application of these theories and laws must be made, in large measure, in the field and in the industries.

DIVISION OF SCIENCE AND PHILOSOPHY.

The national law establishing land grant colleges makes special mention of teaching science in relation to the industries. The college holds closely to this original intent of the law. Fourteen courses are given in the department of mathematics, twenty-eight courses in the department of physics, seventeen courses in department of general chemistry, sixteen courses in department of botany, eleven courses in department of zoology, nine courses in department of geology and mining, three courses in department of economic science, nine courses in department of domestic economy, two courses in department of psychology and ethics, sixteen courses in department of literature and rhetoric, eight courses in department of elocution and oratory, nine courses in department of French and German, four courses in department of history, and eight courses in department of military science and tactics. The department of music is chiefly self sustaining. It meets a large demand upon the part of many persons who wish to take some studies in instrumental or vocal music in addition to the other college courses of instruction.

The course in letters and philosophy is given only to the young women of the college. This is done to avoid conflict of interest with any other state institution. Young women are privileged to take studies in any department of the college. Quite a number of them now pursue studies in science and a few studies in agriculture and engineering.

DOMESTIC ECONOMY.

The department of domestic economy has made very encouraging growth the past two years. The courses of study have been enlarged to include plain sewing for young women in the freshman year, including lectures upon fabrics, tools, and manufactures employed. This work also provides sewing for advanced classes. Dressmaking is taught, in which the young woman is taught the designing and making of her own garments. The courses in cooking and hygiene have been increased. In all, this department now affords nine different courses of study and instruction for young women. The first two graduates in this department secured desirable positions in Boston, Mass., before their work had been fully completed. An additional instructor has been added for this work and the equipment of the department increased.

THE WORK OF THE IOWA EXPERIMENT STATION.

The establishment of experiment stations by our national government is something unique in the history of education. There are now sixty-four colleges receiving the benefits of the land grant and Morrill acts of the United States government. In these are fifty-four agricultural experiment stations, having a total income of over $1,000,000, per annum. These institutions employ a working force of about 650 persons, whose time is given to administration and research work upon all the modern phases of scientific agriculture. They publish over 400 bulletins annually, and these are sent free to over half a million of American farmers. These bulletins comprise more than 16,000 pages of scientific and practical matter bearing upon live questions of soil, crops and animals. In addition to these publications of the states, the department of agriculture issues special farmers' bulletins, of marked scientific value, at the rate of over 2,000,000 copies a year, and the year book, of the national department, of 500,000 copies, and containing the ripest thought at home and abroad, and distributed among the farmers of the United States. The demand for this literature is so great that the department has not been able to keep fully up to it. The total number of all publications of the national agricultural department has increased in the five-year basis at a rate of 160 per cent. There are 5,500,000 farms in the United States, and the national government bids fair to reach all these farms in the early future with the most helpful literature in the every-day problem of the furrows. Of this money the Iowa experiment station now shares about $35,000 a year. It has taken up as rapidly as possible the investigations of problems in soils, field crops, fruits, foods, animals, dairying, insects, plants and the multifold economic and practical questions of modern agriculture.

In the biennial period the station has issued bulletins 37 to 43 inclusive. No. 37 contains sugar-beet investigations and especially sugar-beet growing in Iowa. One thousand five hundred pounds of seed were distributed in one year to various counties of the state, and about 1,200 samples of the beets analyzed. The results are tabulated by counties and the conclusion reached that the greater part of Iowa is favorably situated for profitable sugar-beet production. The sugar beets grown in the experiment grounds at the college have always ranked

higher in richness and purity than those grown in other sections of the state. The superiority has doubtless been largely due to the exercise of more care in preparing the ground and cultivating and growing the crop. Aside from this the conditions prevailing on the college farm are not more favorable than those common to other localities. A wide variety of soils respond favorably to the growing of sugar beets, and any fairly good soil that will grow corn or potatoes will produce beets successfully. The expense of growing the crop will not exceed $2 a ton. A large part of the success of the work depends upon the preparation of the ground and the cultivation of the crop. The raising of beets contributes to better farming of other crops and helps greatly as a food to live stock.

The people of Iowa pay out $16,000 a day and $6,000,000 a year for sugar. Here is a possibility for the developing of new and profitable resources for our people.

Bulletin No. 38 treats of the Russian thistle, giving an account of its origin, introduction to the United States, its present general distribution and Iowa distribution, character of the plant, and the methods of its extermination.

Bulletin No. 39 treats of the weeds of cornfields. A weed, in the ordinary acceptance of the term, is a plant growing where it is not wanted. All plants except corn and the accompanying crop, pumpkins, must be considered as weeds. A number of weeds are largely troublesome because they rob the soil of a number of necessary food elements, and by shutting out the light prevent the crop from making the greatest amount of food. The ragweed and mustard belong to such a class. Other weeds, like the germander, prevent the growing crops by a networking of roots that interfere with the full development of the roots of the grain crop. Corn being a cultivated crop is more largely interfered with than most other products of the field. These weeds are classified as European, like the prickly lettuce, pig grass, foxtail, bindweed and bull thistle. Others are southern weeds, like the cocklebur, Indian mallow and horse nettle. These flourish mostly in the southern borders of Iowa. Another crop comprises the western weeds, like the buffalo bur, and the cream weed, more common in eastern Iowa. Still another class is that of northern weeds, like the marsh elder. This is spread along the Missouri and northeastward across Iowa. Smartweed belongs to this class The duration of weeds as annual, biennial, and perennial is noted.

A study is given to the most troublesome weeds of the cornfield. They are classified as worst, bad and indifferent. The most conspicuous weeds are described, for the practical study and knowledge of the farmer. Methods for the destruction of obnoxious weeds are given.

Bulletin No. 40 bears upon the relation of acid fermentation to butter flavor and aroma. The market value of butter is largely determined by its flavor. This counts against it quicker than mechanical conditions. The score cards of dairy associations generally assign 45 to 50 out of 100 points to the flavor. It is very difficult to secure a uniformly high flavor. There is no agreement as to the chemical nature of the substances which give the delicate flavor and aroma to butter. It is accepted, however, that the flavor substances, whatever they may be, are products resulting from a breaking down of the milk and solids, and that they are the results of the growth of bacteria. While the feed of animals yielding milk has some influence on the color and hardness of butter, yet this influence is less than the effect of the fermentations which have taken place in the milk and cream. While undesirable feeds, such as turnips, carrots, and certain wild plants and weeds may affect the flavor of the milk and the butter, yet undesirable fermentations may produce a flavor worse than any of these. The difference between the flavor of winter and summer butter is somewhat due to influence of feed, but much more to the difference in kinds of fermentations which are in the milk. Experimentations were made with bacillus subtilis, a growth arising in connection with hay. The ripening of cream came in for careful observation and experimentation. A comparison is made between the relative number of bacteria in unripened and ripened cream and milk. A study was made of the difference between winter and summer flavor and an examination of natural starters. Butter flavor, from pasteurized cream ripened with acid producing bacteria, is included in the investigation. Conclusions were reached as follows:

Butter flavor is produced mostly by the bacterial fermentations which have taken place in the milk and cream. The kind of flavor produced depends upon the class of bacteria causing the fermentation. Cream ripened with common bacteria found in hay dust (Bacillus subtilis) gives a very undesirable flavor to butter.

The general superiority of butter flavor in the summer season is mainly due to the difference in the fermentations that are in milk.

This difference is due to the greater number of bacteria of the acid class found in the milk during the summer season.

The ripening of a good quality of natural cream is mostly a development of acid bacteria. When good-flavored cream is ready for churning, the number of bacteria per cubic centimeter varies from 280 million to 3 billion. Of this number the acid-producing bacteria constitute from 91 to 98 per cent. As the process of ripening advances, the relative per cent of acid bacteria greatly increases. As this proceeds, some species disappear; others are prevented from increasing in numbers.

A good natural skim milk starter is practically a pure culture of acid producing bacteria.

The flavor-producing power of four species of acid-producing bacteria was tried by using to ripen pasteurized cream. Any one of these give the butter the typical flavor and aroma produced in natural ripening.

The most common milk souring organism (Bacterium lactarii), all things considered, gives the most satisfactory results of any of the species tried as a culture for ripening cream.

Practical experience and experimental evidences both indicate that the most important factors in cream ripening are the development of the typical acid fermentations and the elimination or suppression of other and injurious types of fermentations.

Bulletin No. 41 gives reports from trial stations on new orchard fruits and shrubs. This embraces the testing of orchard fruits, ornamental trees, and shrubs of a period beginning with 1878 and extending to the time of the report by Prof. J. L. Budd. It includes various varieties of apples, cherries, and peaches, ranging in testing grounds over portions of Canada and the United States. The report also contains data regarding ornamental shrubs and trees introduced from eastern Europe in 1883.

Bulletin No. 42 deals with the horse nettle as a troublesome weed in Iowa, with the European bindweed or the morning-glory, the ground burnut, and with the potato scab. Many complaints have come to the station in regard to the horse nettle. A description is given of the plant, an account of its distribution in America, and the manner of its extermination. The smothering or cutting off of leaves of the plant is the most effective method for its destruction. A crop of rape is helpful in smothering it out, while the hoe and plow can be used effectively in its extermination. Similar methods can be employed in the eradication of the horse nettle. The ground burnut is a comparatively newcomer among the weeds of Iowa. It appears chiefly on the island of Muscatine. Its spiny burs would prove very troublesome to stock, and its spread should be prevented.

Chemicals and the rotation of crops over a period of six or seven years are the most preventive measures of potato scab. Particulars are given in the bulletin.

No. 43 is entitled, "Some Injurious Scale Insects." This bulletin is prepared in response to inquiries regarding insect pests. Scale insects are bark lice, and are found in varying degrees in the orchards of the state. Fortunately Iowa nurseries and orchards have thus far been kept free from the San Jose scale. The manner of treating and preventing the ordinary scales that inflict the trees of our regions is given. Description and instruction regarding the dread San Jose scale are embodied in this bulletin. It concludes with directions in the use of insecticides effective in exterminating scale insects.

STATE AID FOR THE SUPPORT OF THE EXPERIMENT STATION.

In addition to the $15,000 annual appropriation by the national government for the support of an experiment station in each state, a number of the states have made additional appropriations for the enlargement of the work of the stations. Some states have gone so far as to enlarge the work of original investigation in addition to that of the national experiment station, but that is generally where the geographical extent of the state would require experimentation to be carried on in different localities. There is no such a demand as this in Iowa, but the time has come when Iowa ought to add to the income of the experiment station in order to meet a growing interest and demand for original investigation on a still more extensive scale. Much more printed matter of chief importance to the whole commonwealth would be distributed more fully through such aid. Careful attention to this eloquent need is asked.

CRITICAL PERIOD.

This is a critical period in the history of the Iowa State College of Agriculture and the Mechanic Arts. The balancings of this crisis rest with the incoming legislature and the people of Iowa. We never can expect to present any better spirit of study, faculty, and friends with more united front upon the part of all our workers. We hope to go on in this spirit. But that progress rests in a large measure with this legislature. We are in a period of unusual thrift in buildings, equipment and material appliances in American education. In 1898 $13,000,000 were donated by private benevolences to schools of

learning in America. In 1899 $20,000,000 were granted from similar sources. In eight years the University of Chicago, in equipment and endowment, has secured about $9,000,000. The legislatures of the leading states east and west in recent sittings have made largely increased appropriations for their educational institutions. Where Iowa is spending $1 for educational purposes, they are spending from $3 to $10. In Illinois the last legislature appropriated $150,000 for an agricultural hall. To the south of us Kansas appropriated $35,000 for a dairy building; and so on around, states are advancing the material equipment of their educational forces in a threefold more rapid pace than hitherto.

As a college we have suffered by waiting four years without adequate appropriations for buildings and equipment. We have wrought our best to present to the people of Iowa this college in its present condition. With utmost goodwill to all the institutions of the state, we ask for the largest appropriations in our history in truest sincerity and according to our best judgment. These material improvements and resources for education in America will give way in the immediate future to a general upheaval in methods of teaching, in strengthening of faculties and in promotion of the educational welfare of the states and the country. In order for Iowa to do her share and to be true to her own youth, prompt action and liberal provision must be made for the Iowa State college. There is a proverb, whose origin I do not know, It is "God's pity;" but it would be a pity fit for gods to check this work in its upward and onward growth by meager appropriations. A few hundred thousand dollars now and the enactment of a tax levy will amount to but half pennies for our people as a whole, but when centered in the development of this college will bring untold magnitudes within the next ten years into the youth and all the commonwealth of this beloved Iowa.

WELL-MEANT OBJECTION

Is sometimes made to the making of comparisons with the institutions of other states. Anything human that grows must compare. Comparison is at the foundation of ideas and progress. A lone idea in a brain or a college would encyst. The educational progress of the United States owes much of its rapidity and maturity to a comparison with the leading schools of the world. Iowa owes much of its excellent educational system to

the comparisons of Horace Mann and the standard of Massachusetts. The elaborate report of the board of control regarding the future needs and present excellencies of the state institutions under their management, owes much to their statesmanlike observation of similar institutions in other states. A man never knows what he has at home until he knows what there is abroad. For these reasons, as managers of state institutions, we are compelled to make comparisons. The recognition of the national government as to the scope of the courses of study and the successful interfitting in this college of the branches embraced in the land grant act of congress in 1862 is encouraging. It now remains for the good people of Iowa to make possible the unfolding of the work herein wisely outlined.

THE NAME OF THE COLLEGE

Is in full The Iowa State College of Agriculture and the Mechanic Arts. In the brevity of general usage Iowa State College is employed. These terms are just to all the departments of our college work. There is no disposition to sell agriculture for mechanic arts nor mechanic arts for agriculture. The college is as much mechanical as it is agricultural, and as much agricultural as it is mechanical. The statement by parties now and then that "agricultural" would catch the farmers is beneath honest consideration, and such a spirit would betray weakness in every particular. The farmers of Iowa, as well as we, have more sense than this. The national law governing colleges is now more fully understood by the American people, so that the chief purpose is what can be gotten out of these colleges for the good of all the people rather than what we put on them or in them merely in name. There is only one purely agricultural college in the United States, that at Amherst, Mass. All other colleges of this character are either colleges of agriculture and mechanic arts or departments in state universities. In the southern states the "A. and M. A. college" is a favorite term, referring to agriculture and the mechanic arts colleges. The year book of the national agricultural department at Washington, on the naming of these colleges, says:

> To do this in any satisfactory way is by no means a simple matter. The colleges of agriculture in the several states and territories have been so fashioned by the conditions of their local environment that each of them has developed individual peculiarities of form and life to such an extent that classification of them is more or less open to objections. It will not do at all, for example, to classify these institutions according to the names

which they bear. Some which are denominated simply agricultural colleges are really institutions of complex structure, while others, in whose title the term "agricultural" does not appear, have thoroughly organized and well attended courses in that branch of learning.

The problem of ends and departments is easily solved upon the college campus at Ames. The students of the departments of agriculture and mechanic arts mingle with mutual respect in literary societies and all the social interchange of college life. The young engineer or scientist is the better for his contact with the young agriculturist, and the young agriculturist is the stronger for his growing up with the other two. In fact, the larger per cent of all these departments are young people from the farms and rural villages of Iowa, and those from the cities find that the sterling worth of the furrow is a wholesome equivalent to the urbanity of the paved street. So that the term Iowa State college is but an honest conviction and expression of fairness to all the departments of the institution. That means Iowa, both country and town, is back and for the young educated farmer, mechanic, or student of any course in the Iowa State College of Agriculture and the Mechanic Arts.

Acknowledgment is hereby made to all the authorities, associates and friends who have made possible and real the wholesome growths and attainments of this eighteenth biennial period. With the deepest good will to all other institutions, state and denominational, this report is submitted in earnest hope of our Iowa people becoming still more intimately acquainted with the needs of agricultural, technological and industrial education in their state college at Ames, and the full-faced, whole-handed, one-hearted plea for more money, to be free and to grow. Very respectfully submitted,

W. M. BEARDSHEAR,

President Iowa State College of Agriculture and the Mechanic Arts.

FINANCIAL REPORTS.

TREASURER'S REPORT.

The following is a complete statement of the transactions in all the accounts for the fiscal year ending June 30, 1898.

	BALANCES, NOVEMBER 11, 1897.		FISCAL YEAR.		TOTALS.		INTEREST FUND.		MORRILL SUPPORT FUND.		BALANCES, JUNE 30, 1898.	
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Interest on lands belonging to to Congressional grant		$ 4,981.82		$ 2,374 83		$ 7,356 65		$ 7,356.65				
Interest on accumulated interest				6,038.48		6,038 48		6,038.48				
Interest on investment of endowment fund				23,027 81		23,027.81		23,027.81				
Interest on lands obtained by foreclosure				168 50		168.50		168.50				
Endowment land purchase fund			$ 2,000.00	2,000.00	$ 2,000.00	2,000.00						
Contingent principal fund		83,680.00	24,105 00	4,425 00	24,105.00	88,105.00						$ 64,000.00
Mortgages receivable	$ 81,150 00			17,150.00	81,150 00	17,150.00					$ 64,000.00	
Donation fund		9 60	159.57	178 80	159 57	188.40						28.83
Diploma fund		904.33	104.57	25.00	104.57	929.33						824.76
Room rent		370 98	871.86	1,207 05	871.86	1,578 03						706.17
Railroad damages		88 00				88.00						88.00
Personal accounts	476 95				476 95						476 95	
Bills receivable	577.25				577.25						577.25	
Morrill support fund		8,989.88	13,635.53	8,000.00	13,635.53	16,989.88				$ 3,354.05		
Salaries			8,397.94		8,397.94		$ 8,397.94					
Farm department			5,749 69	3,863 93	5,749 69	3,863.93	1,885,76					
Creamery			11,548 53	11,797.31	11,548.53	11,797.31		248.78				
Dairy			1,504 12	723.07	1,504.12	723 07	781.05					
Horticulture			1,469 67	2,435 53	1,469 67	2,435.53		965.86				
Chemical department			1,426 08	424.37	1,426.08	424 37	1,001.71					
Civil engineering			559.64	5 86	559.64	5.86	553.78					
Entomology and zoology			662 85	43.71	662.85	43.71	619.14					
Mechanical department			4 524.13	1,759 49	4,524.13	1,759.49	2,764.64					
Physical department			776 91	160 43	776 91	160.43	616 48					
Veterinary department			323 38	153 70	323.38	153.70	169.68					
Botany department			805.04	177.45	805.04	177.45	627.59					
Music			363 60		363.60		363 60					
Public rooms			1,976.90		1,976.90		1,976.90					
Contingent expense			5,260.29		5,260 29		5,260 29					
Library			1,636.82		1,636.82		1,636.82					
Domestic economy			272 82	64 18	272 82	64.18	208.64					
Political economy			22 00		22.00		22.00					
Mathematical department			1,068.64		1,068.64		1,068 64					

TREASURER'S REPORT—CONTINUED.

	BALANCES, NOVEMBER 11, 1897		FISCAL YEAR.		TOTALS.		INTEREST FUND.		MORRILL SUPPORT FUND.		BALANCES, JUNE 30, 1898.	
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Military	.....	.....	166.73	.....	166.73	.....	166.73	.....	.....	.....	.....	.....
Mining engineering	.....	.....	10.55	.....	10.55	.....	10 55	.....	.....	.....	.....	.....
Agricultural chemistry	.....	.....	569.91	143.91	569.91	143 91	426 00	.....	.....	.....	.....	.....
Public grounds	.....	.....	1,266 86	46 26	1.266.86	46.26	1,220.60	.....	.....	.....	.....	.....
Sabbath services	.....	.....	266.25	.....	266.25	.....	266.25	.....	.....	.....	.....	.....
Pathology	.....	.....	34.54	1 25	34 54	1 25	33.29	.....	.....	.....	.....	.....
Station, experiment	.....	21.81	8,833.32	8,824.36	8,833 32	8,845 17	.....	.....	.....	.....	.....	12 85
State appropriations	.....	16 01	20,046.99	20,039.88	20,046 99	20 055.87	.....	.....	.....	.....	.....	8.88
Totals	$ 82,204 20	$ 99,062.43	$ 120,421.03	$ 115,260 14	$ 202,625.23	$ 214,322.57	$ 30,078.08	$ 37,806.08	.....	$ 3,354 05	.....	.....
Balance interest fund on hand	.....	.....	.....	.....	.....	.....	7,728.00	.....	$ 3,354 05	.....	.....	7,728 00
Balance Morrill support fund on hand	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,354.05
Cash to balance	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$ 65,054.20	$ 76,751.54
Experiment station	21 81	.....	.....	8 96	12 85	.....	.....	.....	.....	.....	12.85	.....
State appropriations	16 01	.....	.....	7.13	8 88	.....	.....	.....	.....	.....	8 88	.....
Morrill support fund	8,989 88	.....	.....	5,635.83	3.354.05	.....	.....	.....	.....	.....	3.354.05	.....
Other sources	7,830 53	.....	491.03	.....	8,321.56	.....	.....	.....	.....	.....	8,321 56	.....
Totals	$ 99,062.43	$ 99,062 43	$ 120,912 06	$ 120,912 06	$ 214,322.57	$ 214,322.57	$ 37,806 08	$ 37,806 08	$ 3,354.05	$ 3.354.05	$ 76,751.54	$ 76,751 54

TREASURER'S REPORT—STEWARD'S DIVISION.

	BALANCES, NOV. 11, 1897.		FISCAL YEAR.		TOTAL.		BALANCES, JUNE 30, 1898.	
	Debit.	Credit.	Debit.	Credit	Debit.	Credit.	Debit.	Credit
Boarding dept.	.....	$ 557.52	$ 11,938.71	$ 11,366.76	$ 11,938.71	$ 11,944.28	.....	$ 5.57
Damages	.....	241.99	6 00	5.80	6.00	247.79	.....	241.79
Hospital	.....	289.85	686.19	435 33	688.19	735.18	.....	48.99
Fire, lights and incidentals	.....	.....	8,216 60	8,216 60	8,216 60	8,216 60	.....	.....
Piano rent	.....	1.50	39.00	48 50	39.00	50 00	.....	11.00
F. J. Resler	.....	14 00	621.50	607.50	621.50	621 50	.....	.....
A. M. Newens	.....	.....	45 50	45 50	45 50	45 50	.....	.....
Cash to balance	$ 1,114 86	.....	807.51	807.51	807.35	.....	$ 307.35	.....
Totals	$ 1,114.86	$ 1,114 86	$ 21,553.50	$ 21,553 50	$ 21,860.85	$ 21,860 85	$ 307 35	$ 307.35

STATE APPROPRIATIONS.

The following is a statement of the different appropriations for the fiscal year ending June 30, 1898:

FUND.	Balance November 11, 1897.	Drawn from state treasurer.	EXPENDED.	BALANCES. DR.	BALANCES. CR.
State contingent fund	.....	$ 392.32	$ 392.32	....	.....
State experimental fund	$ 8.40	13 30	21.70	....	.....
Improvements and current expenses	7.51	11,172.91	11,171.45	....	$8.97
Waterworks	.....	3,211.42	3,211.51	.09	.....
Forge shops	.....	3,163.04	3,163.04	.....	.....
Remodeling farm barns	.10	3.23	3.33	....	.....
Sewage disposal system	.....	2,083.65	2,083.65	.....	.....
Total	$16 01	$20,039.86	$20,046 99		$8.88

MORRILL FUND.

The following is a summary of the report made to the secretary of the interior for the fiscal year ending June 30, 1898:

Receipts.

July 1, 1897.	Balance on hand		$ 3,896.81
September 3.	Received from state treasurer		23,000.00
Total			$26,896.81

Expenditures.

Paid for agricultural instruction	$ 8,220.53	
Paid for mechanic arts instruction	4,143.06	
Paid for English language instruction	716.64	
Paid for mathematical science instruction	1,155.53	
Paid for natural and physical science instruction	8,729.24	
Paid for economic science instruction	577.76	
Total		23,542.76
Balance cash on hand June 30, 1898		3,354.05
Total		$26,896.81

Respectfully submitted,

HERMAN KNAPP,
Treasurer.

TREASURER'S REPORT.

The following is a complete statement of the transactions of all the accounts for the fiscal year ending June 30, 1899.

	BALANCES JULY 1, 1898. Debit.	BALANCES JULY 1, 1898. Credit.	FISCAL YEAR. Debit.	FISCAL YEAR. Credit.	TOTALS. Debit.	TOTALS. Credit.	INTEREST FUND. Debit.	INTEREST FUND. Credit.	MORRILL SUPPORT. Debit.	MORRILL SUPPORT. Credit.	BALANCES JUNE 30, 1899. Debit.	BALANCES JUNE 30, 1899. Credit.
Interest on lands belonging to congressional grant	.....	$ 7,728.00	.....	$ 3,217 47	.....	$ 10,945 47	.....	$ 10,945.47	.....	.....	.....	.....
Interest on accumulated int	.....	.....	.....	5,588 31	.....	5,838.31	.....	5,838.31	.....	.....	.....	.....
Interest on investment of endowment fund	.....	.....	.....	37,869.14	.....	37,869.14	.....	37,869.14	.....	.....	.....	.....
Interest on lands obtained by foreclosure	.....	.....	.....	253.50	.....	253.50	.....	253.50	.....	.....	.....	.....
Contingent principal fund	.....	64,000.00	$ 19,850.00	.....	$ 19,850 00	64,000 00	.....	.....	.....	.....	$ 44,150.00	.....
Mortgages receivable	$ 64,000.00	.....	.....	19,850 00	64,000 00	19,850 00	.....	.....	.....	.....	$ 44,150.00	.....
Donation fund	.....	38.83	.....	82.00	.....	60.83	.....	.....	.....	.....	.....	60.83
Diploma fund	.....	834.76	241.08	455 00	241.08	1,279 76	.....	.....	.....	.....	.....	1,038.68
Room rent	.....	706 17	2,778.81	.....	2,013.76	3,484 98	.....	.....	.....	.....	.....	1,471.22
Railroad damages	.....	88 00	.....	.....	.....	88.00	.....	.....	.....	.....	.....	88.00
Personal accounts	476.95	.....	.....	.....	476.95	.....	.....	.....	.....	.....	476 95	.....
Bills receivable	577.25	.....	.....	.....	577.25	.....	.....	.....	.....	.....	577.25	.....
Morrill support fund	.....	3,354.05	21,603 64	24,000.00	21,603 64	27,354 05	.....	$ 12,770 08	$ 21,603.64	$ 27,354.05	.....	.....
Salaries	.....	.....	12,770.08	.....	12,770 08	6,973.34	.....	2,475 56	.....	600.00	.....	.....
Farm department	.....	.....	10,049 90	.....	10,049.90	2,475 56	.....	1,799 96	.....	.....	.....	.....
Dreamery	.....	.....	20,853.92	19,053.94	20,853.92	19,053.94	.....	942 33	.....	1,299.96	.....	.....
Dairy culture	.....	.....	2,617 17	674 88	2,617.17	974.88	.....	1,600.00	.....	.....	.....	.....
Horticulture	.....	.....	2,965.44	965 46	2,965.44	965.46	.....	389.96	.....	960.00	.....	.....
Chemistry	.....	.....	1,618.96	90 00	1,618.96	90.00	.....	90.00	.....	799.96	.....	.....
Civil engineering	.....	.....	754.19	213 31	754.19	213.31	.....	540.88	.....	.....	.....	.....
Entomology and zoology	.....	.....	7,302.69	3,121.44	7,302.69	3,121.44	.....	4,081.25	.....	.....	.....	.....
Mechanical department	.....	.....	2,400.60	400.05	2,400.60	400.05	.....	2,100.55	.....	.....	.....	.....
Physical department	.....	.....	1,011.79	240.80	1,011.79	240.80	.....	770.99	.....	.....	.....	.....
Veterinary department	.....	.....	1,039.57	393.00	1,039.57	393.00	.....	646.57	.....	.....	.....	.....
Botany	.....	.....	639.47	.....	639.47	.....	.....	639.47	.....	.....	.....	.....
Musical department	.....	.....	432.05	.....	432.05	.....	.....	432.05	.....	.....	.....	.....
Public rooms	.....	.....	6,719.82	.....	6,719.82	.....	.....	6,719.82	.....	.....	.....	.....
Contingent expense	.....	.....	2,692.14	.....	2,692.14	.75	.....	2,691.39	.....	.....	.....	.....
Library	.....	.....	720.00	.....	720.00	.....	.....	720.00	.....	.....	.....	.....
English	.....	.....	1,360.85	226.55	1,360.85	226.55	.....	974.30	.....	.....	.....	.....
Domestic economy	.....	.....	69.80	.....	69.80	.....	.....	69.80	.....	.....	.....	.....
Political economy	.....	.....	1,848.24	.....	1,848.24	.....	.....	948.24	.....	900.00	.....	.....
Mathematical department	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TREASURER'S REPORT—CONTINUED.

	BALANCES JULY 1, 1898.		FISCAL YEAR.		TOTALS.		INTEREST FUND.		MORRILL SUPPORT.		BALANCES JUNE 30, 1899.	
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Military			199.64		199 64		199.64					
Geology			193.35	3.35	193 35	3.35	190.00					
Mining engineering			102.29	2.50	102 29	2.50	99.79					
Agricultural chemistry			979.26	480.60	979 26	480.60	498.66					
Public grounds			1,358 26	31.89	1,358.26	31 89	1,326 37					
Sabbath services			422 03		422 03		422.03					
Pathology			98 58	6 50	98 58	6.50	92.08					
Experiment station		12.85	17,355 81	17,343.34	17,355.81	17,356 19						.38
State appropriations		8 88	30,211 57	30,202.69	30,211.57	30,211 57						
Totals	$ 65,054.20	$ 76,751.54	$ 173,8s9.60	$ 175,561 24	$ 238,943 80	$ 252,312.78	$ 43,942 88	$ 54,906 42	$ 26,553.52	$ 27,354 05		
Balance interest fund on hand							10,963.54					10,963.54
Balance Morrill support fund									800.53			800.53
Cash to balance.												
Experiment station	12.85			12.47	.38						.38	
Morrill support fund	3,354.05			2,553.52	800 53						800.58	
Other sources	8,321 56		4,206 51		12,568.07						12,568 07	
State appropriations	8.88			8.88								
Totals	$ 76,751.54	$ 76,751.54	$ 178,136.11	$ 178,136.11	$ 252,312.78	$ 252,312.78	$ 54,906.42	$ 54,906.42	$ 27,354.05	$ 27,354 05	$ 58,573.18	$ 58,573 18

TREASURER'S REPORT—STEWARD'S DIVISION.

	BALANCES JULY 1, 1898.		FISCAL YEAR.		TOTALS.		BALANCES JUNE 30, 1899.	
	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.	Debit.	Credit.
Boarding dept.		$ 5.57	$ 28,050.61	$ 28,580.67	$ 28,050.61	$ 28,586.24		$ 535.63
Damages		241.79	35.00	86.35	35.00	328.14		293.14
Hospital		48.90	903.85	1,011.80	903.85	1,060.70		156 85
Fires, lights and incidentals		11.00	14,362 95	14,362.95	14,362.95	14,373.95		11.00
Piano rent			37.30	67.50	37.30	67.50		30.20
F. J. Besler			572.85	572.85	572.85	572.85		
A. M. Newens			79.75	155.30	79 75	155.30		75.55
Cash to balance	$ 307.35		794.61		1,101.96		$1,101.96	
Totals	$ 307.35	$ 307.35	$ 44,836 92	$ 44,836.92	$ 45,144.27	$ 45,144.27	$1,101.96	$1,101.96

STATE APPROPRIATIONS.

The following is a statement of the appropriations for the fiscal year ending June 30, 1899:

FUND.	BALANCE JULY 1, 1898. Debit.	BALANCE JULY 1, 1898. Credit.	Drawn from state treasurer.	Expended.
State repair and improvement			$ 1,089.94	$ 1,089.94
State contingent fund			634 43	634.43
State experimental fund			25.90	25.90
Deep well			933 63	933.63
Water works fund	$ .09		109.93	109.84
Forge shops			5.55	5.55
Sewage disposal			1,371.80	1,371 80
Carpenter shop			5,000.00	5,000.00
Improvements and current expenses		$ 8.97	8,519.22	8,528.19
Improvements and current expenses			12,512.29	12,512.29
Total		$8 88	$ 30,202.69	$30,211.57

MORRILL FUND.

The following is a summary of the report made to the secretary of the interior for the fiscal year ending June 30, 1899:

Receipts.

July 1, 1898. Balance on hand		$ 3,354.05
July 21, 1898. Received from state treasurer		24,000.00
Total		$27,354.05

Expenditures.

For agricultural instruction	$ 7 920.58	
For mechanic arts instruction	7,149.80	
For English language instruction	1,566.64	
For mathematical science instruction	1,966.64	
For natural and physical science instruction	7,416.54	
For economic science instruction	533.32	$26,553 52
Balance cash on hand June 30		800.53
Total		$ 27,354.05

Respectfully submitted,

HERMAN KNAPP,
Treasurer.

REPORT OF COLLEGE ENGINEER ON SEWAGE DISPOSAL SYSTEM.

AMES, Iowa, November 29, 1899.

To the Board of Trustees of the Iowa State College, Ames, Iowa:

GENTLEMEN—I respectfully present the following report regarding the college sewage disposal plant, which was constructed in 1898, under the direction and according to the plans of myself as college engineer:

The appropriation for the construction of this plant was made by the legislature in 1896. Previous to the construction of the plant the outlet of the college sewage system was into an open ditch extending across the Squaw creek bottoms. This ditch was dry, except for the sewage, during part of the year, and constituted an open cesspool more than a quarter of a mile long. In order to abate this nuisance an appropriation of $3,500 was asked from the state and granted by the legislature, on the basis of an estimate of cost and detailed plans prepared by myself for a system of disposal by intermittent filtration through sand beds, substantially as since actually carried out, together with utilization of the sewage for fertilization of growing crops by irrigation during part of the year.

Before proceeding with the construction of the system the board of trustees, recognizing that no such plant had ever before been constructed in this state, made a long and careful investigation as to the feasibility of carrying out the plans. The result was a delay of two years, so that construction was not proceeded with until 1898. They also decided to omit the irrigation feature of the plans, which was not essential to a complete system, and, as the law permitted, use the money so saved for extending the college sewage system.

Short lines of sewers were thus constructed late in 1897, competitive bids being secured from local parties. Bids for the remaining sewers and for the sewage disposal system proper were advertised to be opened April 29, 1898. On that date the following bids were received:

BIDDER.	SEWAGE DISPOSAL	SEWERS.	TOTAL.
J. L. Black, Boone, Iowa	$2,390.00	$856.75	$3,246.75
J. Hurley & Co, Des Moines	3,437.00	950.55	4,387 55
Crellin & Lovell, Des Moines	3,720.00	828.53	4,548.53
W. L. Thomas, Ames, Iowa	3,175 00	777.65	3,952.65
Jackson & Moss, Des Moines	2,825.00	745.70	3,570.70

The contract was awarded to the lowest bidder, Mr. J. L. Black, of Boone, Iowa. He began work May 9, 1898, and finished August 4, 1898. In addition to his contract price for the sewage disposal plant he was paid $31.45 for various extras, making a total for the disposal plant proper of $2,421.45. His final estimate on the sewers was $840.60, of which $1.65 was for extras. The reduction from the contract price was due to the omission of one short sewer and to some slight changes in the lengths of others, so that only 2,615 lineal feet were actually constructed as compared with 2,670 feet, included in the bid.

The total expenditures from the sewage disposal appropriation were as follows:

J. L. Black's contract for sewage disposal plant	$2,421.45
J. L. Black's contract for 2,615 feet of sewers	840.60
Seven hundred and fifteen lineal feet of sewers constructed in 1897	142.14
*Surveying, draughting and inspection	43.30
Printing specifications and advertising	47.55
Express, freight, telephone, postage, type-writing	4.96
Total	$3,500.00

*NOTE—In addition to the above some surveying and inspection was paid for from the repair fund.

The original bills for all of the above are on file with the college treasurer.

All of the work was very carefully inspected during its progress. In this work and in the draughting on the plans I was assisted by Miss Elmina Wilson, instructor, and by Messrs. J. H. Mykoff, M. J. Hammer, S. W. Tarr and A. J. Perrin, students in the civil engineering department. I desire to commend their faithful services. I also desire to acknowledge valuable advice received from Messrs. H. W. Clark and H. F. Mills, gentlemen connected with the Massachusetts State Board of Health. Their advice in connection with the preparation of the plans was freely given as a matter of courtesy from the state of Massachusetts to the state of Iowa.

The work was executed under the direction of the building committee of the board of trustees.

The sewage disposal plant which was planned and constructed in the manner described above is shown on the accompanying general plan. It is located about 1,000 feet east of the college creamery, which is the nearest inhabited building.

The plant consists first of a receiving tank, about 22x56x4 feet, having a concrete bottom, brick walls, and a wood cover coated with tar and gravel. At the end of the tank where the sewage enters, an area about 8x20 feet is partitioned off for a settling chamber, to retain most of the solids in the sewage. By division walls the sewage is compelled to flow slowly back and forth across the chamber for a distance of sixty feet, after which it passes through a screen into the other part of the tank, which is called the flushing chamber. The flushing chamber has a capacity of about 20,000 gallons, and whenever the sewage in it rises to a high-water line the entire contents are rapidly discharged automatically, by means of a siphon, upon the filter beds. By this means an intermittent application of the sewage to the beds is secured.

Each of the two filter beds shown on the plans contains an area of about two-tenths of an acre, and is made of sand and gravel, averaging four feet in depth. The sewage from the receiving tank is brought in sewer pipes, extending along two sides of each bed, and flows out upon the surface. After the sewage has percolated through the sand and gravel the purified effluent is removed by three tile drains under each bed, extending lengthwise of the beds and discharging into the channel of a small creek. The sewage as it flows upon the beds is foul-smelling and appearing, but the effluent coming from the tile drains is as limpid, clear and odorless as the purest spring water. This high degree of purification is effected by countless billions of bacteria which live in the pores of the sand and eat up the impurities in the sewage. At intervals of a few weeks a little scum has to be removed from the surface of the beds, but otherwise there is practically no accumulation of filth in or upon them, and with proper attention they will last indefinitely. This system is known as intermittent filtration, and intermittent application of the sewage is necessary to the life of the purifying organisms.

The completed beds and the receiving tank are surrounded by neat painted fences. A waste sewer with a by-pass, together

with valves on all pipes, allows exact control of the disposition of the sewage under all conditions likely to occur. The average flow of sewage is about 40,000 gallons daily while college is in session, so that the filter beds are worked at the rate of about 100,000 gallons per acre per day.

About once a month the settling chamber has to be cleaned. This is easily done by merely opening a valve and allowing the semi-liquid contents to flow out upon the surface of a small covered sand filter, called the sludge bed, located upon lower ground near by. Here the sludge is allowed to stand and drain until it becomes dry enough to handle with a shovel, after which it is loaded on wagons and hauled away to be spread for fertilizer upon the farm. Usually six to eight loads are obtained at each cleaning.

The sewage disposal plant has now been in operation since August, 1898, and has been an unqualified success in every particular. The plant is not especially offensive, and such odors as exist cannot be noticed at any great distance. I have kept a vial containing a sample of the affluent (taken at random) for months at a time on my desk, side by side with another vial containing perfectly pure water from our deep well. People who were asked to examine them could not tell either from appearance or from odor which was which. Our weekly chemical analyses show 90 per cent to 95 per cent of purification, while the bacterial analyses show that 99.9 per cent of the bacteria are removed. We would not pronounce the affluent a safe drinking water, but we have no doubt that a great deal of less pure water is actually drank.

This sewage disposal plant, the first in Iowa, is not only abating a nuisance at the college but also is serving as an object lesson to the cities of the state. More and more as the population of our state increases is the question of sewage disposal becoming of vital importance to our towns. One Iowa city this year advertised for bids for the construction of a plant, and I am informed that its authorities employed an eastern engineer and made an expensive trip to New England to inspect disposal systems. More sensibly the authorities of another place, one of our principal cities, came here to examine a plant in actual operation under Iowa conditions.

Realizing the great value to Iowa citizens of properly kept records of the college plant and of investigations conducted in

connection with it, my colleagues, Professors J. B. Weems and L. H. Pammel, have joined with me in obtaining the data for complete records and in conducting investigations. The board of trustees has given authority for this and has provided the necessary funds. We are making regular weekly chemicall and bacterial analyses of the sewage and affluent, and are keeping many other records in connection with the plant. We are studying the degree of purification secured, the effect of Iowa climatic conditions upon the operation of such a plant, the amount of sewage which can be cared for, and the effect of the receiving tank in increasing this amount by effecting a partial preliminary purification. The investigations will be extended to other subjects when practicable and the results will be published in such a way as to make them accessible to all persons wishing to know them.

Respectfully submitted,

A MARSTON,
College Engineer.

REPORT OF THE SECRETARY.

INCLUDING A SUMMARY OF PROCEEDINGS OF THE BOARD OF TRUSTEES.

MEMBERS OF BOARD OF TRUSTEES.

Leslie M. Shaw, ex-officio, Governor of the State.
R. C. Barrett, ex-officio, Superintendent of Public Instruction.

	TERM EXPIRES.
First district—HON. S. H. WATKINS, Libertyville	1904
Second district—HON. C. L. BARCLAY, West Liberty	1904
Third district—HON. J. S. JONES, Manchester	1902
Fourth district—HON. A. SCHERMERHORN, Charles City	1904
Fifth district—HON. A. V. STOUT, Parkersburg	1900
Sixth district—HON. W. O. MCELROY, Newton	1902
Seventh district—HON. C. F. SAYLOR, Des Moines	1900
Eighth district—HON. W. B. PENICK, Tingley	1904
Ninth district—HON. L. B. ROBINSON, Oakland	1902
Tenth district—HON. J. B. HUNGERFORD, Carroll	1900
Eleventh district—HON. W. J. DIXON, Sac City	1900

OFFICERS OF THE BOARD.

HON. W. O. MCELROY, Newton	Chairman
EDGAR W. STANTON, Ames	Secretary
HERMAN KNAPP, Ames	Treasurer
JOHN FRANKLIN CAVELL, Ames	Steward

STANDING COMMITTEES OF THE BOARD.

GROUP 1.

Finance Committee—Governor Shaw and Trustees Robinson, Barclay, Penick, Barrett, Saylor and McElroy.

Building Committee—Trustees Hungerford, Jones, Dixon, Stout and Watkins, the first three named to constitute the statutory committee.

GROUP 2.

Committee on Agriculture, Horticulture, Experiment Station and Veterinary Science—Trustees Stout, Schermerhorn, Barclay, Governor Shaw, Dixon and Saylor.

Committee on Steward's Department, College Hospital and Sanitary Arrangements—Trustees Watkins, Hungerford, Robinson and Barrett.

Committee on Engineering Departments and Physics—Trustees Jones, Penick, and McElroy.

GROUP 3.

Committee on Faculty and Courses of Study—Trustees Barrett, Robinson, Hungerford, McElroy, Stout and Schermerhorn.

Committee on College Lands and Investments—Trustees Penick, Jones, Governor Shaw and Barclay.

Committee on Rules—Trustees Saylor, Watkins and Dixon.

GROUP 4.

Committee on Scientific Departments—Trustees Schermerhorn, Stout, Hungerford and Governor Shaw.

Committee on Literary Departments and Library—Trustees Robinson, Saylor, Barrett and Watkins.

Committee on Public Grounds and Assignment of Rooms—Trustees Barclay, Jones and McElroy.

Committee on Bonds—Trustees Dixon and Penick.

PERIOD COVERED BY THIS REPORT.

The last general assembly changed the fiscal year of the college, which had previously ended on the second Wednesday following the first Monday in November, so as to make it end on June 30th. This report, therefore, does not extend over two full years, but includes only the period from November 11, 1897, to July 1, 1899.

MEMBERSHIP OF THE BOARD.

The board of trustees consists of the governor of the state and the superintendent of public instruction, who are members by virtue of their office, and one trustee from each congressional district. The term of office is six years, beginning with the first of May following election by the general assembly. The terms of the following trustees expired on May 1, 1898: Hon. Hamilton Smith, First district; Hon. C. M. Dunbar, Second district; Hon. A. Schermerhorn, Fourth district and Hon. A. B. Shaw, Eighth district. Hon. S. H. Watkins was chosen to succeed Mr. Smith, Hon. C. L. Barclay to succeed Mr. Dunbar and Hon. W. B. Penick to succeed Mr. Shaw. Mr. Schermerhorn was re-elected, but owing to illness has been unable to perform the duties of trustee. In addition to filling this vacancy, members to represent the Fifth, Seventh, Tenth and Eleventh districts are to be elected by the Twenty-eighth General Assembly.

THE COLLEGE PLANT.

It is one of the duties of the board of trustees "to control and manage the property of the college and farm, whether real or personal." Aside from the college endowment this property consists of a farm of about 840 acres, forty-three farm and college buildings and the equipment of the several departments of the institution. The following is an estimate of the value of this property which may be said to constitute the college plant:

Land—

Farm proper, 581.38 acres at $60	$ 34,882.80	
Experiment station grounds, 60 acres at $100	6,000.00	
Plots for horticultural experiments, 13 acres at $65	845.00	
Orchard and arboretum, 25 acres at $75	1,875.00	
College campus, 125 acres at $100	12,500.00	
College park, 37 acres at $45	1,665.00	
Total for 841.38 acres		$ 57,767.80

Buildings—

Main college building	$ 150,000.00	
Boarding cottages	10,000.00	
Margaret hall	60,000.00	
Morrill hall	40,000.00	
Chemical and physical building	25,000.00	
Music hall	5,000.00	
Chime and clock tower	7,000.00	
College hospital	3,500.00	
Office building	7,000.00	
Book department building	1,800.00	
Engineer hall	15,000.00	
Carpenter shop	5,000.00	
Forge shop	5,000.00	
Power station	4,500.00	
Old pumping station plant	1,450.00	
Fire department building	175.00	
Foundry store house	100.00	
Greenhouse	5,000.00	
Veterinary hospital	8,000.00	
Agricultural hall	45,000.00	
Creamery, { Creamery proper, $10,000.00 / Dormitory portion, $5,000.00 }	15,000.00	
Ice house	600.00	
Cattle barn	7,000.00	
Feeding shed	600.00	
Experiment station barn	4,000.00	
Horse barn	500.00	
Hog house	1,500.00	
Movable hog houses, fifteen	150.00	
Sheep barn	1,000.00	
Servant's hall	3,000.00	

Residences occupied by—

Professor Curtiss	5,000 00	
Professor Weems	2,500 00	
Professor McKay	1,500 00	
Professor Bissell	2,500 00	
Professor Summers	2,500.00	
Professor Noble	3,000 00	
Professor Stanton	4,000 00	
Professor Marston	3,000 00	
Boarding club	1,000.00	
Farm foreman	1,100.00	
Horticultural foreman	1,200.00	
Experiment station foreman	1,000.00	
Farm laborer	800.00	
Total		$ 460,975.00

General equipment—

Waterworks including water tower, deep well, pumping machinery and piping system	$ 37,000.00	
Power plant including three boilers, three high speed engines, piping, boiler and engine room appliances, etc	6,500.00	
Electric light including four dynamos, switch board appliances, pole line and transformers	5,500 00	
Sewerage system	3,500.00	
Sewage disposal system	2,500.00	
Office building furniture	2 000.00	
Furniture of public rooms	5,300,00	
College hospital furniture	3,500.00	
Boarding department	2,200.00 *	
Fire department	1,525.00	
Total		$ 69,525.00

Department equipment—

Experiment station:			
Agricultural section	$ 3,400.00		
Horticultural section	125 00		
Chemical section	2,861.90		
Botanical section	1,826.50		
Dairy section	100.00		
Entomological section	1,055.35		
Veterinary section	468.00		
Library	500 00		
Total		$ 10,336 75	
Farm		18,919.92	
Creamery		3,442.87	
Horticultural department		1,850.00	
Veterinary department		2,310.72	
Pathology and histology		356.75	
Agricultural chemistry		1,624 00	
General chemistry		8,340.63	
Zoology (including gas machine)		14,461.00	
Botany		15,500.00	
Geology		2,912.00	
Physics and electrical engineering		14,718.98	
Civil engineering		5,344.20	
Mechanical engineering		28,005.91	
Mining engineering		855.00	
Domestic economy		1,532.87	
Military department		450 00	
English literature and rhetoric		175.00	
Political economy		100 00	
Public grounds		122 50	
Library		23,200.00	
Muscial department		1,000.00	
Pipe organ		2,500.00	
Chimes and clock		9,000 00	
Total			167,059.10
Total value of college plant			$755,326.90

This amount would divide along the line of the purposes to which it is devoted, about as follows:

General, including dormitories, public grounds, offices, general library, waterworks plant, etc	$397,948.00
Agriculture	244,354.81
Mechanic arts	113,024.09
Total	$755,326.90

It is provided in the national law that a portion of the endowment fund may be used to purchase land for college farm purposes whenever authorized by the legislature. Under the authority granted by the last general assembly the board of trustees purchased forty acres known as the Kintzley tract, joining the land already owned by the college on the north and east, paying therefor $2,000. The board had previously sold a tract of 85 acres, which was disadvantageously situated on the north side of Squaw creek, crediting the proceeds, $3,625, to the endowment fund. The farm, with these changes, consists, as already stated, of 841.38 acres, described as follows:

W. fr. ½ of Sec. 3, E. fr. ½ of Sec. 4, E. fr. ½ of W. ½ of Sec. 4. Ten acres off from the east side of the W. ½ of the N. W. ¼ of Sec. 4, Twp. 83, Range 24, containing 657.88 acres.

Also the S. E. ¼ of the S. E. ¼ of Sec. 33, and the W. ½ of the S. E. ¼ of Sec. 33, and the East 3-8 of the S. W. ¼ of Sec. 33, and 2½ acres south of Chicago & N. W. R. R. track in the S. W. ¼ of Sec. 33, all in Twp. 84, Range 24, containing 182.51 acres. Lot 2, N. E. of N. E. 9-83-24, containing one acre.

The funds derived from national sources cannot be applied directly or indirectly under any pretense whatever to the purchase, erection, preservation or repairs of any building or buildings. Outside of the purchase of farm land the enlargement and maintenance of the college plant is made to rest entirely upon the state.

THE COLLEGE ENDOWMENT FUND.

A second important duty of the board of trustees is the management of the college endowment fund. This fund had its origin in the grant of lands made in 1862 by the national government to the several states and territories for the purpose of providing colleges for the benefit of agriculture and mechanic arts. Under this grant Iowa received about 204,000 acres of land. This land was rented on ten-year leases at an annual rental of 8 per cent on a valuation fixed in advance by the board of trustees. The lessee was granted the privilege of purchase at this valuation upon the expiration of his lease or a renewal of such lease on the same valuation for a new term of five or ten years. When leases were forfeited for non-payment of rental the land was re-appraised and again rented. By the increase in appraisement and the transfer, in the earlier years, of the unused income, the endowment fund was gradually augmented

until at the beginning of the period covered by this report it amounted to $681,033.52. During this period there has been added to this fund:

The proceeds of the sale of North farm	$	3,625.00
Part payment on sale of donated land situated near Ontario		150.00
Proceeds of sale of old buildings on Kintzley tract		25.00
Total	$	3,800.00
Less amount paid under the authority of the general assembly for the purchase of the Kintzley tract of 40 acres		2,000.00
Net addition to the fund	$	1,800.00

Thus bringing the total endowment to $682,833.52, credited in its origin as follows:

To the original congressional land grant	$	589,379.01
To transfers and investments of interest fund		93,304.51
To sale of donated land		150.00
Total	$	682,833.52

The fund is invested in land and farm mortgages, and with the exception of two tracts of land leased directly by the board of trustees, is managed through (*a*) the land and loan agency, under the charge of Herman Knapp, and (*b*) the financial agency, under the charge of W. A. Helsell. The fund in amount is divided along these several lines as follows:

1. Under direct control of the board, land valued at	$	3,613.55
2. Land and loan agency, Herman Knapp, agent		81,125.45
3. Financial agency, W. A. Helsell, agent		598,089.52
Total	$	682,833.52

I. FUND UNDER DIRECT CONTROL OF THE BOARD.

The land composing this portion of the endowment fund includes the following tracts, obtained under foreclosure of mortgage:

120 acres in Ringgold county, cost...	$	1,200
40 acres in Polk county, cost.....		2,418 55
Total.....	$	3,618.55

The Ringgold tract is rented at an annual rental of $126; the Polk county tract on short time at $85.

II. LAND AND LOAN AGENCY.

In the last biennial report, the land charged to the agency is stated at 11,989.17 acres. In an accounting with the agent at a later date the following corrections were found necessary:

Add N. W. 1-4 30, 97, 28, a tract in conflict with swamp land entry, which, through mistake, had been deducted twice, acres.....	149.67
Add amount of error in original list, acres.....	.10
Total.....	149.77
Deduct error in amount of land sold during biennial period of 1896-97, acres.....	60.00
Net additional, acres.....	89.77

These changes affect the acreage only, and not the value of the land as a whole, which is correctly given in the last biennial report. At the beginning of the present period then the land chargeable to the agency amounted to 12,078.94 acres, appraised at $52,791.45.

During the year there has been patented:

Of the congressional grant, 3,840 acres, appraised at.....	$	15,016.00
Of land purchased with accumulated interest fund, 160 acres, appraised at		800.00
Total, 4,000 acres, appraised at....	$	15,816.00
Leaving as the amount now charged to the agency 8,078.94 acres, appraised at.....		36,975 45

All of this land is under lease at an annual rental, payable in advance, of 8 per cent on its appraised value.

At the beginning of the period covered by this report there was in the hands of Agent Knapp an uninvested balance of accumulated interest of.....	$	2,530 00
During the period loans have been paid amounting to.....		27,000.00
Land purchased with accumulated interst, sold, amounts to.....		800 00
North farm sold and proceeds credited to accumulated interest fund..		3,625.00
Total.....	$	33,955.00

This amount has been forwarded to the state treasurer and placed to the credit of the financial agency. The uncollected principal on loans made by Agent Knapp amounts to $44,150.

III. THE FINANCIAL AGENCY.

At the beginning of the fiscal period there was an unexpended balance to the credit of this agency of.....	$	29,119.89
Mortgage loans paid during the period amounted to.....		158,185.06
Principal of leases paid during the period.....		15,016.00
Transferred from land and loan agency..		33,955.00
Proceeds of sale of donated land....		150.00
Old building on Kintzley tract sold...		25.00
Making a total to be invested of..	$	236,450.95
The agent has loaned during the period.... $146,200.00		
The board under authority of the legislature purchased the Kintzley tract for..... $ 2,000.00		
Total.....	$	148,200.00
Leaving an uninvested balance of	$	98,250.95

In hands of the financial agent	$ 5,728.99	
In the hands of the state treasurer	92,521.96	
Total		$ 98,250.95

Extensions have been granted during the period as follows:

Bearing 7 per cent interest	$ 6,300.00
Bearing 6 per cent interest	3,200.00
Total	$ 9,500.00

The financial agency was established in 1884. It has loaned $1,035,625.80.

Only three foreclosures have been made and these resulted in a gain to the college. The present agent, W. A. Helsell, has had charge of the agency since June 15, 1891. To meet the provisions of the code of 1897 a new contract with Mr. Helsell was made in July, 1898, of which the following is a copy:

CONTRACT WITH FINANCIAL AGENT HELSELL.

This contract by and between the board of trustees of the Iowa State College of Agriculture and Mechanic Arts and W. A. Helsell, witnesseth: That the said Helsell, having been appointed financial agent of said college by the trustees thereof, by virtue of chapter IV, title XIII of the code, he (the said Helsell) agrees to conduct said agency according to the terms of said code and this agreement.

1. All loans negotiated shall be upon the following terms: The rate of interest shall be such as is or shall be designated by the board of trustees, payable annually, principal and interest payable to the order of said board of trustees at the office of the state treasurer at Des Moines, Iowa. The principal to be due in not less than five nor more than ten years and the borrower to have the privilege, after such time as shall be fixed by the board, 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 purpose of and pursuant to the fourth paragraph of section 2667 of the code.

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 2665 of the code to enable him to make such loans, provided that he at no one time shall have in his possession nor under his control, more than $10,000. In determining this amount, the secretary may credit the financial agent with the amount of any loan when the application therefor, its accompanying examiner's report, coupon note and mortgage duly recorded, or, in lieu of the mortgage the certificate of the county recorder or the abstractor of title, showing that the mortgage has been duly filed for record, are filed with him; but, in such case, the responsibility of the financial agent for the loan shall continue and he shall be charged again with each such loan not fully completed within forty days thereafter. He shall exercise care and diligence in making such loans and in selecting or retaining any one to assist him in preparing abstracts of title and in the doing of any act in any way connected with said loans, and if any sum of money is lost or expense incurred, through his wilful or negligent acts or the wilful or negligent acts of his sub-agents, the said Helsell shall be fully liable to the said board of trustees therefor.

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 during which, 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 7 per cent per annum.

6. He shall report to the secretary of the said board of trustees annually, or as often as may be required by the said board, his doings since his last report. He shall keep a complete abstract of each of said loans and a full and complete record and register of all his doings, and keep all letters received and press or typewritten copies of all letters sent, all of which records and correspondence shall be turned over to his successor in office, or said board, 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, or their duly appointed agent. The agent shall forward to the secretary of the board all papers relating to such loans.

7. He shall receive a salary of $1,200 per annum, payable monthly, and all necessary expenses connected with the discharge of his duties, and, also, not to exceed the sum of $800 per annum in addition for assistants and sub-agents. The $1,200 to be paid out of the state treasury in equal monthly installments as provided by law, and the expenses and money for assistants and sub-agents to be drawn as required, by itemized statements duly verified by the financial agent, and approved by the chairman and secretary of the board of trustees.

8. Each loan shall be secured by a mortgage paramount to all other liens upon improved farms in the state of Iowa, and shall not exceed 50 per cent of the cash value of the mortgaged premises, exclusive of buildings.

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

10. The said Helsell shall take charge of the foreclosure of mortgages and collection of bonds from delinquent debtors to the endowment fund, as provided by law, and shall promptly remit all amounts thus collected to the treasurer of state as directed by law; but the agent shall, before commencing foreclosure proceedings, give twenty days' notice by letter deposited in the postoffice, directed to the mortgagor at his known place of residence.

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

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

In witness thereof, this contract is executed in duplicate by the Iowa State College of Agriculture and Mechanic Arts, by the chairman and secretary of the board of trustees, duly authorized so to act, and by the said W. A. Helsell, in his own proper person, this 20th day of July, 1898.

W. A. HELSELL.

The board of trustees of the Iowa State College of Agriculture and Mechanic Arts. By W. O. MCELROY,
Chairman.
E. W. STANTON,
Secretary.

The bond of the agent was fixed at $50,000. Trustee Dixon, who was appointed a committee to investigate the financial responsibility of the bondsmen, reported that they were large land owners in Sac county, and that he considered the bond ample to protect the interests of the college. The bond was approved by the board of trustees and afterwards by the state executive council.

Under the law all payments for land are forwarded to the state treasurer and credited to the financial agency. The 8,000 acres remaining under lease will be patented in the near future and the entire land system closed out. The accumulated interest portion of the endowment which has hitherto been managed in connection with the land department has been ordered by the board transferred to the financial agency. This is being done as rapidly as loans are paid in. The endowment fund as a whole will thus in a few years come to be managed through the financial agency. It is therefore a matter of special congratulation that this method of handling the fund has proven a safe and efficient one. An experience of fifteen years has shown that it is well suited to conserve the safety and promote the productiveness of the fund. One special advantage of the system is that the board of trustees can at any time obtain, in the office of their secretary, full information regarding the condition of the fund. When money is drawn by the agent from the state treasury for investment, the orders are countersigned by the secretary of the board of trustees. The papers connected with each loan are sent by the agent to the secretary, who enters them of record and then forwards them to the state treasurer, who collects principal and interest when due. Monthly reports are rendered to the secretary, whose books are thus made to show at the close of each month the condition of each loan and of the fund as a whole. The accounts of the secretary are compared with those of the officers handling the fund and the correctness of their books thus tested.

With no losses in its history, and an aggregate income second only to that received by New York from the national grant, the management of this fund may be considered as an example of wise and conservative public financering.

PRESENT CONDITION OF THE ENDOWMENT FUND.

The books of the secretary show that on June 30th, last, the condition of the fund was as follows:

INVESTED.

Land under lease at 8 per cent (including Ringgold tract), 8,198.94 acres, appraised at	$ 38,175.45
Farm mortgages at 7 per cent	402,088.57
Farm mortgages at 6 per cent	141,900.00
Polk county tract at $85 per annum	2,418.55
Total yielding income	$584,582.57

UNINVESTED.

Cash balance	$ 98,250.95
Total endowment	$682,833.52

It will be noticed that nearly $100,000 of the endowment fund is invested. Many additional loans are payable on October 1st and January 1st. By the first named date the uninvested balance will be increased to $150,000, and by January 1, 1900, will probably exceed $200,000. This most serious condition of affairs is due to the fact that the law will not permit the fund to be loaned at less than 6 per cent, while it is only now and then that a 6 per cent loan can be obtained. The matter should receive the early attention of the legislature. The following draft of a bill was approved by the board of trustees, and is submitted to the general assembly for consideration:

A BILL

For an act to amend section twenty-six hundred and sixty-seven of the code, relating to the rate of interest to be charged in the lending of money of the endowment fund of the State College of Agriculture and Mechanic Arts.

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

SECTION 1. That section twenty-six hundred and sixty-seven of the code be, and the same is hereby amended, by striking out of the fourth and fifth lines of said section, as found in subdivision one thereof, the words "not less than 6 per cent per annum, payable annually."

SEC 2. This act, being deemed of immediate importance, shall take effect and be in force on and after its publication in the Iowa State *Register* and the Des Moines *Leader*, newspapers published in Des Moines, Iowa.

INCOME AND EXPENDITURES.

The following statement shows the sources from which the funds for maintaining and developing the college are derived. They also give in condensed form the income and expenditures for the time included in this report:

(A) FOR THE PERIOD EXTENDING FROM NOVEMBER 11, 1897, TO JULY 1, 1899.

	Receipts.	Expenditures.
1. National support funds	$ 39,609 62	$ 42,499.27
2. National experiment station fund	7,500.00	7,521.81
3. Miscellaneous items: rent of rooms, diploma fees and rental on donated land	1,260 85	986 00
4. Annual state appropriation	11,578 53	11,585.47
5. Special appropriations by the state for buildings and improvements	8,461.33	8,461.52
Totals	$ 68,410.33	$ 71,054.07

The excess of expenditures over income, amounting to $2,643.74, is represented by a corresponding decrease in the cash balance which was in the hands of the treasurer at the beginning of the period. It should be noted that owing to the change in the college fiscal year the foregoing statement covers only seven and two-thirds months.

(B) FOR THE FISCAL YEAR ENDING JUNE 30, 1899.

	Receipts.	Expenditures.
1. National support funds	$ 71,178.42	$ 70,496.40
2. National experiment station fund	15,000.00	15,000.00
3. Miscellaneous items: rent of rooms, diploma fees and rental on donated lands	3,265.81	2,254.84
4. Annual state appropriation	22,781.78	22,790.75
5. Special appropriations by the state for buildings and improvements	7,420.91	7,420.82
Totals	$ 119,646.92	$ 117,962.81

Since the income exceeded the expenditures by $1,684.11, the treasurer's cash balance was increased by that amount.

The income for the year was increased by the payment, owing to prosperous business conditions, of considerable delinquent interest, and by the drawing of an old balance to the credit of the annual state appropriation. With these items stricken out the income inclusive of new buildings would have been about $105,000.

Proceeding now to consider the income and expenditures in detail under the headings used in the condensed statement, we find:

I. NATIONAL SUPPORT FUNDS.

The following shows the ordinary income of the college from the national support funds for the partial fiscal year ending June 30, 1898, together with the expenditures on account of the various departments:

INCOME 1897-8.

Rental on endowment fund land	$ 2,374.83	
Rental on land purchased with interest fund	108.75	
Interest on endowment fund invested in farm mortgages	23,027.81	
Rental on land obtained by the foreclosure of endowment fund mortgages	168.50	
Interest on interest fund invested in farm mortgages	5,929.73	
		$ 31,609.62
Morrill support fund—part of installment for 1897-8		8,000.00
Total net income from national support funds		$ 39,609.62

EXPENDITURES.

Salaries—		
Morrill fund	$ 13,635.83	
Interest fund	8,397.94	
Total		$ 22,033.77
Agricultural department—		
Current expenses	$ 1,393.85	
Foreman	400.00	
Class expenses	91.91	
Total		1,885.76
Creamery	cr. $248 78	
Dairy—		
Salary of G. L. McKay	$ 800 00	
Salary of assistant	66.64	
Total		866 64
Apparatus and current expenses	cr. $85.59	
Horticultural department—		
Current expenses and experimentation	cr. $1,220.98	
Assistant		255.12

Veterinary department—		
House surgeon	$ 75.00	
Current expenses and apparatus	94.68	
Total		169.68
Pathological department—		
Current expenses and apparatus		33.29
Mechanical department—		
Assistants	$ 1,545.26	
Current expenses and equipment	1,219.38	
Total		2,764.64
Civil engineering—		
Assistants	$ 150.00	
Current expenses and equipment	403.78	
Total		553.78
Physics and electrical engineering—		
Current expenses and apparatus	$ 266.48	
Assistants	350.00	
Total		616.48
Mining engineering		10.55
Military tactics and physical culture—		
Currrent expenses and flags		166.73
Department of chemistry—		
Assistants	$ 475.00	
Current expenses and apparatus	526.71	
Total		1,001.71
Agricultural chemistry—		
Assistant, current expenses and apparatus		426.00
Entomology and zoology—		
Current expenses and apparatus		619.14
Botany—		
Assistants	$ 174.99	
Current expenses and apparatus	452.60	
Total		627.59
Mathematics and secretary's office—		
Assistants and clerk hire		1.068.64
Political economy		22.00
Domestic economy		208.64

Department of music—		
Salary of director	$ 250.00	
Instrumental music, public exercises	50.00	
Current expenses	13.60	
Music for Sabbath services	50.00	
Total		363 60
Library—		
Librarian	$ 370.83	
Assistant	175.00	
Expenses, books and periodicals	1,090.99	
Total		1,636.82
Public grounds		1,220.60
Sabbath services		266.25
Public rooms—		
Furniture	$ 15.52	
Heating, lighting and janitor service	1,961.38	1,976.90
Contingent expenses		5,260.29
Total		$ 44,054.62
Less dairy credit	85.59	
Creamery credit	248.78	
Horticultural credit	1,220.98	1,555.35
Total net ordinary expenses		$ 42,499.27

The following shows the ordinary income of the college from the national support funds for the fiscal years ending June 30, 1899, together with the expenditures on account of the various departments:

INCOME 1898–9.

Rental on endowment fund	$ 3,217.47	
Rental on land purchased with interest fund	415.95	
Interest on endowment fund invested in farm mortgages	37,869.14	
Rental on land obtained by the foreclosure of endowment fund mortgages	253.50	
Interest on interest fund invested in farm mortgages	5,422.36	
		$ 47,178.42
Morrill support fund		24,00.00
Total		$71,178.42

EXPENDITURES.

Salaries—		
Morrill fund	$ 21,603.64	
Interest fund	12,770.08	
		34,373.72

Agricultural department—		
Current expenses and purchase of cattle	$ 2,047 32	
Foreman	600.00	
Class expenses	354.24	
Omaha exhibit	75 00	
		3,076.56
Creamery		1,799.98
Dairy—		
Salary of G. L. McKay	$ 1,299.96	
Salary of assistant	260.91	
Apparatus and current expenses	81.42	
		1,642.29
Horticultural department—		
Assistant	$ 399.96	
Current expenses and apparatus	1,500.00	
		1,899.96
Veterinary department—		
House surgeon	$ 225.00	
Assistant	200 00	
Current expenses and apparatus	345.99	
		770.99
Pathological department		92.08
Mechanical department—		
Assistants	$ 3,086.25	
Current expenses and equipment	995.00	
		4,081.25
Civil engineering—		
Assistant	$ 799.96	
Current expenses and equipment	800.00	
		1,99.596
Physics and electrical engineering—		
Assistants	$ 800 00	
Current expenses and apparatus	1,300.55	
		2,100.55
Mining engineering		99.79
Military department—		
Current expenses and flags		199.64
Department of chemistry—		
Assistants	$ 950 00	
Current expenses and apparatus	90 05	
		1,040.05
Agricultural chemistry—		
Assistant, current expenses and apparatus		498.66

Department of zoology—		
Assistants	$ 191.40	
Current expenses and apparatus	349.48	
		540.88
Geology		190.00
Botany—		
Assistants	$ 350.00	
Current expenses and apparatus	296.57	
		646.57
Mathematics and secretary's office—		
Assistants and clerk hire		1,848.24
Political economy		69.80
English literature and rhetoric—		
Assistant	$ 600.00	
Current expenses and student help	120.00	
		720.00
Domestic economy—		
Assistant	$ 600.00	
Current expenses and furniture	374.30	
		974.30
Music—		
Salary of director	$ 500.00	
Instrumental music at public exercises	100.00	
Current expenses	39.47	
		639.47
Library—		
Librarian	$ 600.00	
Assistant	350.00	
Expenses, books and periodicals	1,620.89	
Cabinet	120.50	
		2,691.39
Public grounds		1,326.37
Sabbath services		422.03
Public rooms—		
Heating, lighting and janitor service		432 05
Contingent expenses		6,719.82
Total net ordinary expenses		$70,496.40

It will be noticed that the aggregate of these detailed exhibits agrees with the "national support" items in the general statements.

In certain of the educational departments students are charged the cost of materials used in the laboratories; in other departments, such as the farm and creamery, there is a commercial feature connected with the educational work. These departments are credited with the proceeds of the sales of

material and products and use the moneys thus received to meet in part the current expenses. These sales, and expenses equal thereto in amount, are not included in the statements given, such statements showing only the net income and net expenditures. In the first of the fiscal periods considered these sales aggregated $21,800.45; for the fiscal year ending June 30, 1899, they amounted to $33,720.98. Divided for this year according to departments, the account stands as follows:

RECEIPTS FROM SALES FOR THE YEAR ENDING JUNE 30, 1899.

Creamery	$ 19,033.94
Farm	6,973.34
Dairy	974.88
Mechanical department	3,121.44
Chemical department	952.60
Horticulture	645.48
Agricultural chemistry	480.60
Botany	393 00
Domestic economy	326.55
Physics and electrical engineering	300.05
Veterinary department	240.80
Zoology	213.31
Public grounds	31.89
Civil engineering	20.00
Mining engineering	2.50
Geology	3.35
Pathology	6 50
Library	.75
Total	$ 33,720.98

When, further along in this report, the account with the college treasurer is considered, the amount of these sales will be found to appear on both the debit and credit sides of his cash account. Such accounts, however, should not be taken into account in determining the income of the institution or the cost of its maintenance.

It is not practical to give in further detail the financial operations of each department. A statement regarding the farm and creamery may not, however, be out of place.

The farm statement is as follows:

DEBIT.

Inventory November 11, 1897	$14,402.37
Expenditures from November 11, 1897, to July 1, 1898	5,257.78

Cash expenditures for year ending June 30, 1899	9,095.66	
Unpaid bills	801.14	
Total		9,896.80
Total		$29,556.95

CREDIT.

Receipts from November 11, 1897, to July 1, 1898	$ 3,863.93
Receipts for year ending June 30, 1899	6,973.34
Inventory June 30, 1899	18,919.92
Total	$29,757.19

The excess of credits over debits shows a gain of $200.24. This is represented by:

Increase in inventory	$4,517.55
Less appropriations from interest fund and unpaid bills	4,317.31
Total	$ 200.24

It should be borne in mind in this connection that the main purpose of the entire farm plant, buildings, fields, and stock, is educational. Instead of showing a gain it would not be surprising if, like the other educational departments, its expenditures were to exceed the receipts. It can hardly be expected that in the long run the agricultural, any more than any other educational, department of the college can be self-sustaining.

The financial operations of the creamery are shown in the following exhibit:

DEBIT.

Inventory November 11, 1897		$ 689.31
Expenditures from November 11, 1897, to July 1, 1898		11,548.53
Cash expenditures for year ending June 30, 1899	$ 20,833.92	
Unpaid bills	87.12	
Total		20,921.04
Total		$33,158.88

CREDIT

Sales from November 11, 1897, to July 1, 1898	$11,797.31
Sales during year ending June 30, 1899	19,033.94
Inventory June 30, 1899, including $153.98 of collections due	1,101.85
Total	$ 31,933.10

Net cost of maintaining the creamery during the period	1,225.78
Total	$33,158.88
This is represented by:	
Appropriations from interest fund	$ 1,551 20
Unpaid bills	87.12
Total	$ 1,638 32
Less increase in inventory	4 2 54
Total	$ 1,225.78

These figures show that it cost about $800 per annum to maintain the creamery. Comparison with the cost of similar departments in other state colleges, where the commercial feature is not introduced, shows that the combination of the commercial and educational ideas lessens the cost of maintenance. It at the same time adds greatly to the educational value of the creamery department.

II. NATIONAL APPROPRIATION FOR EXPERIMENT STATION.

	1897-8. Part of year. Appppropriation.	Sales.	1898-9. Full year. Appropriation.	Sales.
Income	$7,500.00	$1,324.36	$15,000	$2,343.34
Expenditures	7,521.81	1,311.51	15,000	2,355.81

By an act of congress known as the Hatch act of 1887, provision was made for the establishment of an experiment station in each state. An annual appropriation of $15,000 was made to each station for its support. By an act of the legislature the station in Iowa was made a department of the college. In addition to the services it has rendered the state in the conduct of valuable experiments it has incidentally been an important help to the educational side of the agricultural department. The provisions of the national law regarding the use of the station appropriation are exceedingly stringent. It must be kept entirely separate from the educational funds and at the close of each year a detailed report must be rendered the department of agriculture at Washington. The following is a summary of the report for the last fiscal year. The sales of the station are devoted to the same purposes as the appropriation itself, but under the law they are not included in the report.

Iowa Agricultural College Experiment Station, in account with the United States appropriation, 1898-9.

DR.

To receipts from the treasurer of the United States as per appropriation for fiscal year ending June 30, 1899, as per act of congress, approved March 2, 1887		$ 15,000

CR.

By salaries	$ 8,482.41	
By labor	2,370.73	
Publications	389.23	
Postage and stationery	359.41	
Freight and express	578.67	
Heat, light and water	405.10	
Chemical supplies	435.75	
Seeds, plants and sundry supplies	1,051.31	
Library	4.77	
Tools, implements and machinery	225.98	
Scientific apparatus	231.34	
Traveling expenses	372.20	
Contingent expenses	12.50	
Building and repairs	10.60	
Total		$ 15,000

HERMAN KNAPP,
Treasurer.

We, the undersigned duly appointed auditors of the corporation, do hereby certify that we have examined the books and accounts of the treasurer of the Iowa Agricultural College and Experiment Station for the fiscal year ending June 30, 1899; that we have found the same well kept and classified as above, and that the receipts for the year from the treasurer of the United States are shown to have been $15,000 and the corresponding disbursements $15,000; for all of which proper vouchers are on file and have been by us examined and found correct, thus leaving no balance.

And we further certify that the expenditures have been solely for the purpose set forth in the act of congress approved March 2, 1887. Signed,

W. M. BEARDSHEAR,
E. W. STANTON.

[SEAL]

Attest:
W. M. BEARDSHEAR,
Custodian.

III. MISCELLANEOUS ITEMS, ROOM RENT, DIPLOMA FEES AND RENTAL ON DONATED LAND.

The most important of the items considered under this head is the rental on rooms. Students and others rooming in the college dormitories are charged $3 per term. The fund thus realized is used to repair students' domitories and purchase furniture for student rooms.

The following exhibit shows the receipts and expenditures on account of this fund during the fiscal period:

RECEIPTS.

Balance on hand at the beginning of the fiscal period			$ 370.98
Received from students and teachers, 1898 (part of year)	$ 1,207 05		
Received from students and teachers, 1899	2,778 81		
Total			$ 3,985.86
Total available fund			$ 4,356.84

EXPENDITURES.

Main building—			
General repairs			1,064.04
Margaret hall—			
General repairs	$ 165.14		
Heating and lighting dining room and kitchen	382.25		
		$ 547.39	
Boarding cottages—			
General repairs			112.33
Creamery dormitory—			
General repairs			8.63
Repairs on office building			1.05
Wages of general carpenter working on dormitory buildings			466.70
Furniture for students' rooms			685.48
Total expended		$ 2,885 62	
Balance on hand		1,471.22	
		$ 4,356.84	

The receipts on the diploma account arise from a fee of $5 charged each graduate for his diploma. The fund is expended in the purchase of diplomas, programs, student register book, etc.

Rental is received on two small tracts of donated land. The receipts and expenditures on account of these two items are shown in the following summary:

	INCOME.		EXPENDITURES.	
	1897-8	1898-9	1897-8	1898-9
Room rent	$ 1,207.05	$ 2,778.81	$ 871.86	$ 2,013.76
Diploma fees	25.00	455.00	104.57	241.08
Rent on donated land	28.80	32 00	9.57	
Total	$ 1,260.85	$ 3,265.81	$ 986.00	$ 2,254.84

IV. ANNUAL STATE APPROPRIATION.

	1897-8.	1898-9.	TOTAL.
Income, drawn from state treasury	$11,578.53	$22,781.78	$34,360.31
Expenditures	11,585.47	22,790.75	34,376 22

The following is the section of the code granting this appropriation:

SECTION 2674. *Appropriations.*—For the repairs, general improvement and current expenses of the State College of Agriculture and Mechanic Arts, in its several departments and chairs, and in aid of the income fund, the sum of $18,500 is annually appropriated out of any money in the state treasury not otherwise appropriated.

At the time when the code went into effect there was in the state treasury an undrawn balance of the annual appropriations to the college of $9,575.11. This balance had been allowed to accumulate by the board to enable the college to erect a tower for the chimes and clock and make other needed improvements and repairs. The attorney-general rendered an opinion to the auditor of state in which he held that the new code in repealing former statutes deprived the board of trustees of authority to issue requisitions for this balance. The matter of granting them such authority was presented to the legislature and an act passed restoring to the college the amount in question. After paying for the erection of the tower $6,671.48 there remained a balance of $2,903.63 which was used for general repairs and improvements. The following statement shows the entire amount drawn from the state treasury during the period covered by this report and also the purposes for which it was expended:

INCOME (DRAWN FROM STATE TREASURY).

Amount of annual appropriation undrawn on October 1, 1897, when code went into effect; restored to college by legislative act	$ 9,575.11
Balance of annual appropriation for year ending June 30, 1898, drawn	12,272 91
Amount of annual appropriation for year ending June 30, 1899, drawn	12,512.29
Total drawn from the state treasury during fiscal period	$34,360 31

EXPENDITURES.

Agricultural hall—		
Gas machine for agricultural chemistry	$ 458.85	
Storm windows in recitation room	32.40	
Storm windows, ceiling, etc., for agricultural chemistry	109 76	
Shelves in agricultural chemistry laboratory	81.21	
Pathological laboratory	1,096.61	
Microscopes for pathology and histology	135 00	
Blackboard, photo room and office furniture for horticultural department	230.43	
Filter at room for agricultural physics	37.59	
General repairs on building	43.98	
		$ 2,225.83
Farm buildings—		
Improvements in cattle barn	$ 1,517.47	
Farm dairy room and sheep barn	1,925.17	
Farm foreman's house	1,042.90	
Implement shed	874.00	
Repairs on farm cottage	127.12	
Repairs on ice house	58.80	
Putting up windmill	52.57	
Repairing barns, hog house, and other general repairs	255.90	
		5,853.93
Fencing, tiling and repairing of north bridge		1,149.53
Experimentation		1,797.60
Creamery—		
Equipment for Pasteurization	$ 237.94	
Window caps	135.65	
Window shades and rollers, and farm dairy equipment	58.59	
Calcimining dormitory rooms	106.00	
Roof on boiler house	55.00	
General repairs	847.79	
Total		1,440.97
Tower for chimes and clock		6,671.48
Painting college buildings		1,657.60
Plumbing in college buildings (including carpenter work in connection therewith)		1,448 26
Fires, lights and incidentals, repairs		1,239.26
Carpenter shop—		
Equipment	$ 1,468.69	
Advertising for bids	17.36	
Total		1,486.05

Chemical and physical building—		
Cases for physical department	$ 597.75	
Floor for chemical lecture room	100.00	
Calcimining	97.23	
Sinks and faucets in chemical laboratory	66.93	
Repairing skylights, photo room, porch, papering wall for lantern screen, and making minor repairs	100.28	
Total		962.19
Professors' houses		1,329.07
Fire station, hook and ladder wagon, hose carts, hose and other fire department equipment		942.98
Engineering buildings—		
Hydraulic laboratory	$ 827.48	
Repairing roof and gutters of engineering hall	323.00	
General repairs	95.88	
		1,246.36
Water works extension and repairs		884.08
Local telephone system		693.05
Furniture for public rooms		593.41
Sewage disposal plant—		
Completion of plant	$ 319.04	
Maintenance of plant	139.15	
		458.19
Morrill hall—		
Cases for zoology	$ 285.00	
Cases for geology and mining	28.00	
Gas machine for geology and zoology	86.61	
Screens for library	27.26	
Awnings for zoological rooms	12.70	
Fitting up room for repair of library books	33.59	
General repairs	56.70	
		529.86
Main building—		
Botany cases	$ 247.81	
Blackboards in recitation rooms	54.60	
Wainscoting botany rooms	44.10	
General repairs	120.34	
		466.85
Sewer extension and repairs		211.00
Telephone and electric light repairs		148.22

Margaret hall—		
Fire escapes	$ 112.50	
Storm windows for domestic economy rooms	42.95	
General repairs	49.70	
		$ 205.15
Boarding cottages—		
General repairs		153.52
Boiler inspection		144.00
Lighting barns in winter		153.70
Repairs in south hall		81.12
Repairs in greenhouse		42.47
Repairs in horticultural foreman's house		10 00
Repairs in office building (including bath room)		69.83
Repairs in club house		9.95
Repairs in college hospital		14.90
Repairs in veterinary hospital		8.00
Advertising for bids		20.81
Telephone messages, postage and other miscellaneous matters		27.00
Total		$ 34,376.22

The excess of expenditures over amount drawn from state treasury is accounted for by a balance of $15.91 in the hands of the college treasurer at the beginning of the period.

The expenditure of this fund is under the general direction of the building committee. This committee selects from the repairs and improvements asked for by the heads of the different departments those which are the most urgent, and recommends them to the board. Such of these as the available funds will reach are ordered. Whenever the character of the work will permit bids are secured and contracts made. The execution of the work whether by contract or otherwise is generally under the direct supervision of the college engineer, Professor Marston, or the steward, Mr Cavell. The undrawn balance of the appropriation amounts to $5,987.11. Improvements and repairs have been authorized by the board amounting to about $7,500, a portion of the cost of which must necessarily be paid from the next quarterly payment due August 15th. Demands upon the fund, which the building committee considered urgent, amounting to over $10,000, were not granted because of want of means. Hitherto the fund has been used entirely for repairs, improvements, experimentation and the purchase of furniture for public rooms. Owing, however, to decreasing income from the endowments due to the lower

rate of interest, and the increasing expense attendant upon the growth of the institution, the board of trustees was compelled at its annual meeting to set aside $6,500 of the fund to be used in aid of the national support funds. As this only partially meets the needs in that direction it is probable that an additional draft will be made upon this fund for general purposes before the close of the year.

V. SPECIAL APPROPRIATIONS BY THE STATE FOR BUILDINGS AND IMPROVEMENTS.

At the time of the last biennial report the following balances remained to the credit of the special appropriations of the Twenty-sixth General Assembly:

Deep well	$ 933.63
Water works	3,321.35
Forge shops and foundry, with fixtures	3,168.59
Remodeling farm barns	3.32
Sewage disposal system	3,455.45
Total	$ 10,882 34

These amounts have been extended for the purposes contemplated by law as follows:

1. Deep well—		
Part of balance due Henion & Hubbell on pump		$ 933.63
2. Water works—		
Balance due King Bridge Co., on contract of $8,888 for erection of tower and tank		1,335.92
Paid for fixing rods and slides in pump		97.24
Balance due Henion & Hubbell on pump less amount above paid for fixing rods and slides	$ 1,233 49	
Balance due Jackson & Moss on pumping station contract	345.00	
Paid Jackson & Moss, extras	88.63	
Pumping station fixtures	80.39	
Inside plumbing to connect college buildings with distribution system	99.37	
Minor items including stationery, postage, typewriting, engineer's expenses, and express	41 31	
		3,321.35
3. Forge shop and foundry with fixtures—		
Balance on Atkinson & Bro. contract of $3,469, for erecting of shop	$ 2,422.96	
Balance of architect's fee	86.60	
Stock house for coke and coal	86.73	

Benches, cases, line shaft and other necessary equipment	572 30	
		3 168.59
4. Remodeling farm barns—		
Carpenter work		3.32
5. Sewage disposal system—		
Contract of J. L. Black, sewage disposal plant	$ 2,421.45	
Contract of J. L. Black, 2,616 feet of sewers	840 60	
Sewers constructed in 1897, 715 feet	142.14	
Surveying, draughting and inspection	43.30	
Advertising	4.00	
Express, postage, telephone, freight, typewriting	3.96	
		3,455.45
Total		$ 10,882.34

The original appropriation of the legislature for the sewage disposal system was $3,500. The trustees had considerable difficulty in agreeing upon a satisfactory system. The work was thus delayed, and at the time of the meeting of the last legislature only $44.55 of the appropriation had been expended. A statement of the action of the board up to that time may be found on page 64 of the last biennial report. At the meeting of the trustees in April, 1898, the whole matter was referred to the committee on engineering departments with power to act. The committee decided to adopt the plan proposed by the college engineer, Professor Marston. Bids were received and the contract let in the following May. A list of the bids and a description of the plant will be found in the report of the college engineer.

The only special appropriation of the Twenty-seventh General Assembly to the college was one of $5,000 for a carpenter shop. The board at its meeting in April following the passage of the bill directed the building committee to advertise for bids and make contract for the erection of the building, the same to be completed by July 19th.

The committee met on the 29th of the month and opened the bids, which were as follows:

Zitterell & Atkinson	$ 4,387
Crellin & Lovell	4,694
W. M. Rich	4,397
H. J. Fritz	5,400

The contract was awarded to Zitterell & Atkinson on the basis of their bid of $4,387. A bond of $2,500 was given conditioned upon the faithful performance of the contract. The

building was completed to the satisfaction of the board of trustees for the price agreed upon. The account with the appropriation as a whole stands as follows:

RECEIPTS.

Amount of appropriation	$ 5,000

EXPENDITURES.

Zitterell & Atkinson's contract for erection of building	$ 4,387
Paid for steam heating, water supply and plumbing	613
Total	$ 5,000

The special appropriations asked by the board of the Twenty-eighth General Assembly are as follows:

General engineering hall for mechanical, civil, electrical and mining engineering	$ 150,000
President's residence	10,000
Horse barn and stock pavilion	10,000
Purchase of pure-bred stock	10,000
Total	$ 180,000

The board also asks that the annual appropriation be increased from $18,500 to $50,000 per annum, and that the college be granted one-tenth of a mill tax for five years, for buildings, improvements and equipment.

The urgent need of these appropriations is fully set forth in the president's report.

STEWARD'S DEPARTMENT ACCOUNTS.

In addition to the college proper with its various departments devoted to educational and experimental purposes the board of trustees has charge of an extensive dormitory system which furnishes rooms and table board to the greater portion of the students. The board also manages a college hospital supported by the student body.

THE BOARDING DEPARTMENT.

The boarding department is under the direct charge of a steward who receives a salary of $1,000 per annum and board, room, fires and lights for self and wife during the college terms and for such portion of the vacation as the college may need his services. The current expenses of the department are paid

from its income and it is only incidentally in the repair of buildings that it receives any benefit from college funds. The following statement shows the receipts and disbursements for the period included in this report:

RECEIPTS.

From students and other sources in 1898 (part of year)	$ 11,386.76	
From students and others, 1898-9	27,580.67	
Total		$ 39,967.43

DISBURSEMENTS.

Paid for labor and supplies in 1898	$ 11,938.71	
Paid for labor and supplies in 1899	28,050.61	
Total		39,989.32
Excess of disbursements over receipts		21.89
This reduces the cash balance of $557.52 on hand at the beginning of the period to the present cash balance of		535.63
Add supplies on hand	$ 231.45	
Collections due	495.34	
Total	$ 726.79	
Deduct bills unpaid	30.75	
Total		696.04
Net credit, cash, supplies, etc.		$ 1,231.67

As against a net balance at the beginning of the period as shown by the last biennial report of $724 68.

DEPARTMENT OF FIRES, LIGHTS AND INCIDENTALS.

Students rooming in the boarding cottages are charged 70 cents per week for fires, lights and incidentals; the charge in the other college buildings is 85 cents per week. Students boarding outside of the college pay into this fund $5 per term. The account also realizes a small profit on coal sold to parties living on the campus. If these sources of income are not sufficient to cover the expenses the deficit at the end of the year is paid by the college from its support funds, such payment being deemed a fair equivalent for heating, lighting and care of the public rooms. The following are the receipts and expenditures:

RECEIPTS.

Receipts from students and others, 1898 (part of year)	$ 6,256.22	
Receipts from students and others, 1898-9	13,930.90	
Total		$ 20,187.12
From college support fund, 1898	$ 1,960.38	
From college support fund, 1898-9	432.05	
Total		2,392.43
Total receipts		$ 22,579.55

EXPENDITURES.

For supplies and labor, 1898 (part of year)	$ 8,216.60	
For supplies and labor, 1898-9	14,362.95	
Total expenditures		$ 22,579.55

For several years Professor Bissell has had charge of the greater portion of the expenditures in this department. He has made a study of the problems connected with heating, lighting, pumping and plumbing, and his reports to the board have given much valuable information regarding the details of the care of the college buildings. The following is taken from his report for the year ending June 30, 1899:

Total expenditures for the year	$ 14,362.95	
Deduct amount received for coal and employes working for other departments	1,979.71	
Net cost of service for the year	$ 12,383.24	
Classified as follows:		
Janitor service		$ 3,607.31
Heating service		4,928 51
Lighting service		2,021.10
Water service		1,383.86
Plumbing service		179.34
Office expenses		190.75
Miscellaneous		72 37
Total		$ 12,383.24

The following shows the cost of heating the more important buildings during the period from January 1, 1899, to July 1, 1899:

Buildings	Cost.	Cubic feet of space heated.	Cost per mo. per 10,000 cubic feet.
Main building and Morrill hall	$1,192.35	800,000	$ 4 26
Margaret hall	598.39	275,000	6.20
Agricultural hall	172.41	75,000	4.60
Creamery	237.30	44,500	14.05
Music hall	21.64	30,000	2 05
Office	74.84	40,000	3.74
Cottages	164.59	120,000	4 57
Engineering buildings and chemical and physical buildings	525 27	440,000	3.41
Total	$ 2,986 79		

In the matter of electric lighting his report shows that the cost per lamp per month for the year was slightly in excess of 25 cents.

The cost of pumping is given at 5 cents per 1,000 gallons.

At the meeting of the board in July Professor Bissell was given full charge of the department.

COLLEGE HOSPITAL.

The college hospital is of the nature of an insurance company. The student pays at the beginning of each term the sum of $1.25, which entitles him to medical attendance, nursing and medicine and all the privileges of the hospital. Dr. W. E. Harriman is the physician in charge. He receives for his services an annual salary of $300, payable from the hospital fund. Thus far the income has proven sufficient to meet all expenses. The showing for the period from November 11, 1897, to June 30, 1899, is as follows:

EECEIPTS.

Cash on hand at the beginning of the period	$ 299.85
Receipts for period from November 11, 1897, to June 30, 1898	435.33
Receipts for year ending June 30, 1899	1,011.30
Total	$ 1,746 48

EXPENDITURES.

Paid for labor and supplies for the period from November 11, 1897, to June 30, 1898	$ 686.19
Paid for labor and supplies for the year ending June 30, 1899	903.85
Cash balance on hand	156.44
Total	$ 1,746.48

OTHER STEWARD ACCOUNTS.

Certain minor accounts of the steward's department may be summarized as follows:

	Old balance.	Receipts.	Expenditures.	Present balance.
Damages	$ 241.99	$ 92.15	$ 41.00	$ 293.14
Piano rent	1 50	116.00	76.30	41.20
Elocution fees	------	200.80	125.25	75.55

The present balance of the foregoing accounts together with:

Boarding department balance	$ 535.63
College hospital balance	156.44
Makes the total cash balance to the credit of the steward's department funds	$1.101.96

ACCOUNT WITH THE COLLEGE TREASURER.

As directed by law an account is kept by the secretary with the college treasurer. A monthly comparison of books is made with that officer and a monthly settlement thus effected. A classification of the treasurer's receipts and disbursements along the lines followed in the detailed presentation of the college finances will, exclusive of the steward's accounts, lead to the following exhibits:

(A) Receipts and disbursements of the college treasurer for the fiscal period from November 11, 1897, to July 1, 1898.

RECEIPTS.

Cash balance on hand November 11, 1897		$ 16,858.23
Total income from all sources, including nation support and experiment station funds, annual and special appropriations by the state and miscellaneous items		68,410.33
Sales by experiment station re-appropriated to the station	$ 1,324.36	
Sales by other departments re-appropriated to the departments	21,800.45	
Total		23,124.81
Accumulated interest fund paid in and transferred to the financial agency		23,575.00
Donated land sold		150.00
Total charged against the treasurer		$ 132,118.37

DISBURSEMENTS.

Total expenditures on account of educational departments, experiment station, repairs, improvements, furniture and diplomas		71,054.07
Experiment station sales, used by the station (except balance of 12.85)	$ 1,324.36	
Other department sales used by the departments	20,787.60	
Total		23,111.96
Accumulated interest endowment remitted to the state treasurer		24,105.00
Kintzley tract of land purchased		2,000.00
Proceeds of sale of donated land sent to state treasurer		150.00
Total disbursements		$ 120,421.03
Cash balance on hand June 30, 1898		11,697.34
Total		$ 132,118.37

(B) Receipts and disbursements of the college treasurer for the year ending June 30, 1899.

RECEIPTS.

Cash balance on hand July 1, 1898		$ 11,697.34
Receipts from all sources, including national support and experiment station funds, annual and special appropriations by the state, and miscellaneous items		119,646.92
Sales of the experiment station re-appropriated to the station	$ 2,343.34	
Sales of other departments re-appropriated to those departments	33,720.98	
		36,064.32
Accumulated interest endowment laid in and transferred to the financial agency		19,850.00
Total charged against the treasurer		$ 187,258.58

DISBURSEMENTS.

Total expenditures on account of educational departments, experiment station, repairs, improvements, buildings, furniture and diplomas		$ 117,962.81
Sales of the experiment station used by the station, including balance of $12.85	$ 2,355.81	
Sales of other departments used by those departments	33,720.98	
		36,076.79
Accumulated interest endowment fund remitted to state treasurer		19,850.00
Total disbursements		$ 173,889.60

Cash balance on hand June 30, 1899		13,368.98
Total		$ 187,258 58
The cash balance is to the credit of the following accounts:		
Interest fund	$ 9,909.34	
Morrill fund	800.53	
		10,709.87
Experiment station fund		.38
Railroad damages		88.00
Room rent		1,471.22
Diploma		1,038.68
Donation		60.83
Total		$ 13,368.98

Settlements are made with the treasurer by the board of trustees at the close of each fiscal year. A careful examination of his books and vouchers is made by a special committee appointed for that purpose. In July, 1898, Trustees Dixon and Robinson were the committee on settlement of the regular college accounts, while Trustees Watkins and Stout were assigned the steward's division. These committees reported the accounts correct, and the books neatly kept and in good condition. At the close of the fiscal year ending June 30, 1899, Trustees Dixon and Robinson were again appointed on the settlement committee, having charge this time of both college and the steward's accounts. The committee, after a careful examination in which they checked the duplicate receipts filed with the secretary with the debit side of the treasurer's cash account, compared his vouchers with the items on the credit side and tested the footings and balances, reported that the accounts were correct and that the cash on his hands amounted to $14,470.94, divided as follows:

General college accounts	$ 13,368.98
Steward department accounts	1,101.96
Total	$ 14,470.94

It will be noticed that these amounts agree with the balances already given in the exhibits taken from the secretary's books. The accounts of the treasurer are thus pretty thoroughly tested.

The board of trustees at its last annual meeting re-elected Herman Knapp treasurer. A full statement of his duties can be found on pages 83 and 84 of the last biennial report. His salary is the same as stated on page 86 of that report. His

bond, which was fixed at $50,000, has been filed with the secretary of state and approved by him.

APPROPRIATIONS FOR FISCAL YEAR ENDING JUNE 30, 1900.

1. From Collegiate Support Funds.

The amount available for the year to pay the salaries of professors and instructors, provide for general expenses and meet the needs of the collegiate departments is estimated by the secretary at $73,500. Part of this amount is derived from the balance brought over from last year. The trustees, realizing that the endowment paid in could not be reloaned under the law fixing the rate of interest at 6 per cent, reduced appropriations to the lowest possible limit consistent with simply maintaining the present position of the institution. In this way an available balance was secured with which to meet in part the serious reduction in this year's income. The board also directed, as already stated, that $6,500 of the annual appropriation by the state should be devoted to general support purposes. Taking these items into account the estimated income is made up as follows:

Available balance	$ 4,000
Income from national support funds	63,000
Portion of state annual appropriation set aside for general support	6,500
Total	$73,500

The following are the appropriations made by the board of trustees:

APPROPRIATIONS FOR 1899-1900.

For salaries as per list under salaries for 1899-1900.			
From interest fund	$ 12,983 33		
From Morrill fund	22,550.00		
Total			$ 35,533.33
Agricultural department—			
Current expenses	$ 1,300		
Foreman, in addition to house	800		
Class expenses, including animal husbandry assistant and $100 increase in Mr. Atkinson's salary	650.00		
Total			2,750.00

Creamery—		
Current expenses and instruction		1,000 00
Dairy—		
Current expenses and apparatus	$ 100.00	
Salary of G. L. McKay, director	1,300.00	
Salary of assistant	400.00	
Total		1,800.00
Department of horticulture—		
Assistant	$ 400.00	
Current expenses and apparatus, including greenhouse instructor	1,500.00	
Total		1,900.00
Veterinary department—		
House surgeon	$ 200.00	
Current expenses and apparatus	350.00	
		550.00
Mechanical department—		
Assistants	$ 3,155.00	
Current expenses and equipment	1,000.00	
		4,155.00
Civil engineering department—		
Assistant	$ 800.00	
Current expenses and equipment, including sewage disposal experiments	1,150.00	
		1,950.00
Physics and electrical engineering—		
Assistants	$ 1,500.00	
Current expenses and apparatus	900 00	
		2,400.00
Mining engineering—		
Current expenses and equipment		300.00
Military department—		
Current expenses and flags		100.00
Agricultural chemistry—		
Assistants, current expenses and apparatus		700.00
Department of chemistry—		
Assistants	$ 950.00	
Current expenses and apparatus	500.00	
		1,450.00
Geology—		
Current expenses and equipment		200.00

Department of zoology—		
Assistant	$ 300.00	
Current expenses, increase of equipment and additions to museum	300.00	
		€00.00
Pathological department—		
Current expenses and apparatus		50.00
Histology—		
Current expenses and apparatus		50.00
Department of botany—		
Assistants	$ 350.00	
Current expenses and apparatus	300.00	
		650.00
Mathematics and secretary's office—		
Assistants and clerk hire		1,400.00
Department of English literature and rhetoric—		
Assistants (three)	$ 1,600.00	
Student help and current expenses	200.00	
		1,800.00
Political economy—		
Current expenses and equipment		75.00
Department of domestic economy—		
Assistant	$ 600.00	
Current expenses and equipment	300 00	
		900.00
Department of music—		
Salary of director and band instructor	500.00	
Instrumental music at public exercises	100.00	
Current expenses	50.00	
Piano	275.00	
		925.00
Library—		
Librarian	$ 600.00	
Assistant	350.00	
Current expenses, books and periodicals, including student assistant	1,800.00	
		2,750.00
Sabbath services		450.00
Public grounds		1,220.00
Public rooms—		
Heating, lighting and janitor service		1,500.00
Contingent expense—		
Private secretary and clerk for president's office	$ 1,025.00	
Catalogues, printing, stationery and advertising	2,750.00	

Extra fund for advertising	500.00	
Telephone service	80.00	
Ringing bell for recitations	75.00	
Mail service	270.00	
Proctors	400.00	
Preceptress fund	150.00	
Pumping pipe organ	25.00	
Clerks for treasurer's office	350.00	
Emergency	150.00	
Department of history	25.00	
French and German	135.00	
Physical culture for ladies	125.00	
Advertising in Student	50.00	
Advertising in Junior annual for 1900, the annual to contain nothing not approved by the president	50.00	
Address before college and trustees	100.00	
Annual fee for agricultural college association	10.00	
Fund for attending teachers' institutes and associations (intended for president and professors authorized by the president to attend such meetings)	70.00	
Commencement write-up	20.00	
New ledger for treasurer's office	15.00	
Typewriter for president's office	90.00	6,465 00
Total		$ 73,623.33

The largest item in this list of appropriations is, of course, the cost of instruction. A part of this cost appears under the head of salaries. Assistants however, are, with one or two exceptions, charged to the department accounts. Under the head of salaries the list in detail is as follows:

SALARIES FOR 1899–1900.

W. M. Beardshear, A. M., LL. D., president, psychology and ethics	$3,850.00
M. Stalker, M. Sc., V. S., veterinary science, station veterinarian	1,600.00
E. W. Stanton, M. Sc., mathematics and economic science, secretary of board of trustees	2,400.00
J. R. Lincoln, military science	1,000.00
Alfred A. Bennett, M. Sc., chemistry	1,800.00
H. E. Summers, B. S., zoology station entomologist	1,600.00
W. H. Wynn, Ph. D., D. D., history	1,200.00
L. H. Pammel, B. Ag., M. Sc., Ph. D., botany, station botanist	1,800.00
Miss Gertrude Coburn, B. Sc., domestic economy	1,200.00
C. F. Curtiss, M. S. Ag., agricultural director, experiment station	2,000.00
J. B. Weems, Ph. D., agricultural chemistry, station chemist	1,600.00
A. B. Noble, B. Ph., rhetoric and English literature	1,600.00
L. B. Spinney, B. M. E., M. Sc., physics and electrical engineering	1,500.00
G. W. Bissell, M. E., mechanical engineering	1,600.00

A. Marston, C. E., civil engineering, college engineer	2,000.00
Miss Lizzie May Allis, B. A., M. A., French and German	1,200.00
Mrs. Sally S. Smith, B. S., preceptress	750.00
W. E. Harriman, B. Sc., M. D.	700.00
Histology and physiology ($700) college physican ($300) paid from hospital fees charged students.	1,000.00
W. H. Meeker, M. E., assistant in mechanical engineering	1,400 00
A. M. Newens B. O., elocution and oratory, associate in English	1,200.00
S. W. Beyer, B. Sc., Ph. D., geology and mining	1,600.00
John A. Craig, B. S. A., animal husbandry	1,800.00
John A. Craig, B. Ag., horticultural station horticulturist	2,000 00
J. J. Repp, V. D. M., assistant in pathology and therapeutics	1,200.00
Miss Maria M. Roberts, B. L., mathematics	900.00
James Atkinson, B. S. A., assistant in station ($100 additional charged to farm department)	800.00
Herman Knapp, B. S. A., college treasurer and recorder, station treasurer ($250)	1,100.00
Due General Lincoln on salary account at beginning of fiscal year	133.33
Total appropriation for salaries	$41,533.33

Houses on the college grounds are occupied by Professors Noble, Summers, Curtiss, Marston, Bissell, Weems and Stanton. Their annual rental is considered by the board to be equivalent to $200. The salaries included in the salary list were ordered charged to the following funds:

Support funds:		
Morrill fund	$22,550.00	
Interest fund	12,983.33	
Total		$35,533.33
Experiment station fund		6,000.00
Total		$41,533.33

Though the salaries of assistants are at first charged to department accounts they are, of course, ultimately paid from the funds which support these departments.

The following is a list of assistants, with the salary of each and the fund from which it is paid:

SALARIES OF INSTRUCTORS AND ASSISTANTS.

NAME AND DEPARTMENT.	Support funds.	Experiment station funds.	TOTAL.
G. L. McKay, dairy	$ 1,300		$ 1,300
C. H. Eckles, dairy	400	400	800
H. J. Evans, creamery	500		500
J. J. Edgerton, farm (house rent in addition)	800		800
Jas. Atkinson, agriculture	100		100
G. M. Rommel, animal husbandry	200	200	400
F. J. Resler, music	500		500
Mrs. Elizabeth Rastler music	100		100
Elmina Wilson, civil engineering	800		800
T. Lennox, mechanical engineering	1,080		1,080
E. C. Potter, mechanical engineering	810		810
E. O. Boutelle, mechanical engineering	765		765
G. F. Dodge, mechanical engineering	500		500
Miss Bessie Larrabee, Latin	600		600
Miss L. Simonson, English	500		500
Miss Elizabeth McLean, English	500		500
R. E. King, physics	450		450
E. G Reed, physics	450		450
Lola Placeway, chemistry	650		650
Hazel Beardshear, chemistry	300		300
, physical culture for ladies	125		125
Miss Maud Gardiner, domestic economy	600		600
J. J. Vernon, horticulture	400	200	600
P. T. Barnes	600		600
B. H. Hibbard, mathematics	400		400
Julia A. Wentch, mathematics	750		750
H. W. Grettenberg, agricultural chemistry	400		400
A. Estella Paddock, botany	175	150	325
Elmer Hodson, botany	175	150	325
J. R. Allen, zoology	300		300
Vina E. Clark, library	600		600
Helen Louise Knapp, library	350		350
W. W. Otto, library	100		100
S. P. Smith, house surgeon	200		200
Ira A. Williams, geology and mining engineering	200		200
J. C. Brown, chemistry		400	400
Wilmon Newell, entomology		400	400
E. E. Little, horticulture		200	200
Miss C. M. King, artist		375	375
Total	$16.680	$ 2.475	$19,155

This makes the total salary appropriation for the college and station $60,688.33.

Considering now the appropriations as a whole, those made from the support funds may be classified as follows:

Salaries charged to salary account	$ 35,533.33	
Salaries of assistants charged to department account	16,680	
Total		$ 52,213.33
General expenses of the college		10,285.00
Current expenses of departments		8,625.00
Total for salaries and current expenses		$ 71,123.33
Additions to library, apparatus and collections		2,500.00
Total appropriations from support funds		$ 73,523.33

It will be seen from this analysis that the college has only $2,500 available with which to meet the urgent demands for increased laboratory and library facilities which the rapid growth of the institution renders imperative.

The following action of the board relates to the expenditure of the department appropriations.

First.—The secretary was directed to notify the heads of departments that the appropriations made will exhaust the income for the year and that the board desires the utmost possible economy in the expenditure of such appropriations.

Second.—It was ordered that not more than one-half of the appropriation to any department for the purchase of apparatus be expended before January 1, except upon the approval of the board of audit before the expenditure is made.

Third.—Each department was authorized to use its ordinary income to meet in part its current expenses.

Fourth.—The following order looking to the prompt payment of bills was adopted:

"Heads of departments and other officers employing labor or purchasing materials or supplies of any kind on account of the college, will be held responsible for the presentation of a proper bill for the same, to the board of audit on or before the 20th day of the month following that in which the expense is incurred; any bill not presented by this date shall be considered an 'old bill.' The board of audit shall report to the treasurer at the end of each month the amount of such old bills filed during the month, and the treasurer is directed to deduct from the salary of the officer employing the labor or making the purchase the amount of the bills thus unpaid. Such bills shall be presented to the board of trustees at their next meeting and if allowed the salary reserved shall be paid by the treasurer to the amount of the bills allowed.

"*Second.*—Bills for expenses incurred in the month of June shall be presented by the heads of the departments on or before a date to be fixed by the board of trustees or the president of the college."

II. APPROPRIATIONS FROM EXPERIMENT STATION FUND 1899–1900.

Upon the recommendation of the station council this fund was divided among the different sections as follows:

DIVISION OF EXPERIMENT STATION FUND FOR 1899-1900.

1. Salaries of station staff—

C. F. Curtiss	$ 1,350.00	
J. B. Weems	900.00	
John A. Craig	900.00	
J. J. Repp	900.00	
James Atkinson	800.00	
H. E. Summers	300.00	
L. H. Pammel	300.00	
John Craig	300.00	
Herman Knapp	250.00	
		$6,000.00

2. Salaries of assistants—

Assistant for chemical section	$ 400.00	
Assistant for botanical section	300.00	
Assistant for dairy section	400.00	
Assistant for entomological section	400.00	
Assistant for horticultural section	400.00	
Artist	375.00	
		$ 2,275.00

3. Appropriations to sections—

Chemistry	$ 556.00	
Botany	188.17	
Dairy	515.47	
Entomology	252.00	
Horticulture	461.48	
Veterinary	368.15	
Agriculture, including salary of assistant in animal husbandry, and $195 for building and repairs	1,902.07	
		$ 4,243.34

4. General expenses, including heating of building, janitor service, mail and express, water, etc.		891.66
5. Stenographer		240.00
6. Bulletin fund		1,350.00
Total		$ 15,000.00

The salaries of the station staff, appearing in the foregoing exhibit, represent simply the portion of the salaries of these officers charged to this fund, and are not additional to the salaries already given in the salary list. The same is true of the assistants.

The president of the college was given authority, when it should appear that there was an unused surplus in any section and a demand for funds in another, to call the station council together for a reapportionment of the funds to meet such emergency.

The board of trustees directed that hereafter the accounts of the different sections be kept separate upon the books of the secretary and treasurer and managed in the same way as the regular college departments. The sum of $1,550 was set aside for the use of the station upon condition that so much as may be found necessary be applied to the payment of bills of the station for the fiscal year ending June 30, 1899, and that the remainder of said amount be placed to the credit of the agricultural section.

MATTERS RELATING TO STUDENTS.

The expenses charged against the students remain the same as in the last biennial report. As there stated, the entire cost to a student entering college, of board, fires, lights, laundry, books and incidentals for the school year of thirty-three weeks will be from $140 to $150, according to the course of study chosen. The expense of students of the higher classes will be somewhat in excess of these amounts, owing to the laboratory fees and the greater cost of books used.

Owing to the change in the beginning of the fiscal year from November to July, only one commencement is included in the period. The following is the list of graduates of this class of 1898:

In the course in agriculture	14
In the course in science related to the industries	32
In the course in mechanical engineering	7
In the course in civil engineering	6
In the course in electrical engineering	10
In the course for women	12
In the course in veterinary science	4
Total	85

Appropriate degrees were conferred upon these graduates. The degree of master of science (M. Sc.) was conferred upon E. D. Ball and Robert Combs; the degree of master of agriculture (M. Ag.) upon I. J. Mead, H. C. Taylor and J. W. Wilson; the degree of master of philosophy (M. Ph.) upon C. H. McLean. Respectfully submitted,

E. W. STANTON,
Secretary.