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FOR THE YEAR

1887

VOLUME II.

AUGUSTA:
BURLEIGH & FLYNT, PRINTERS TO THE STATE.
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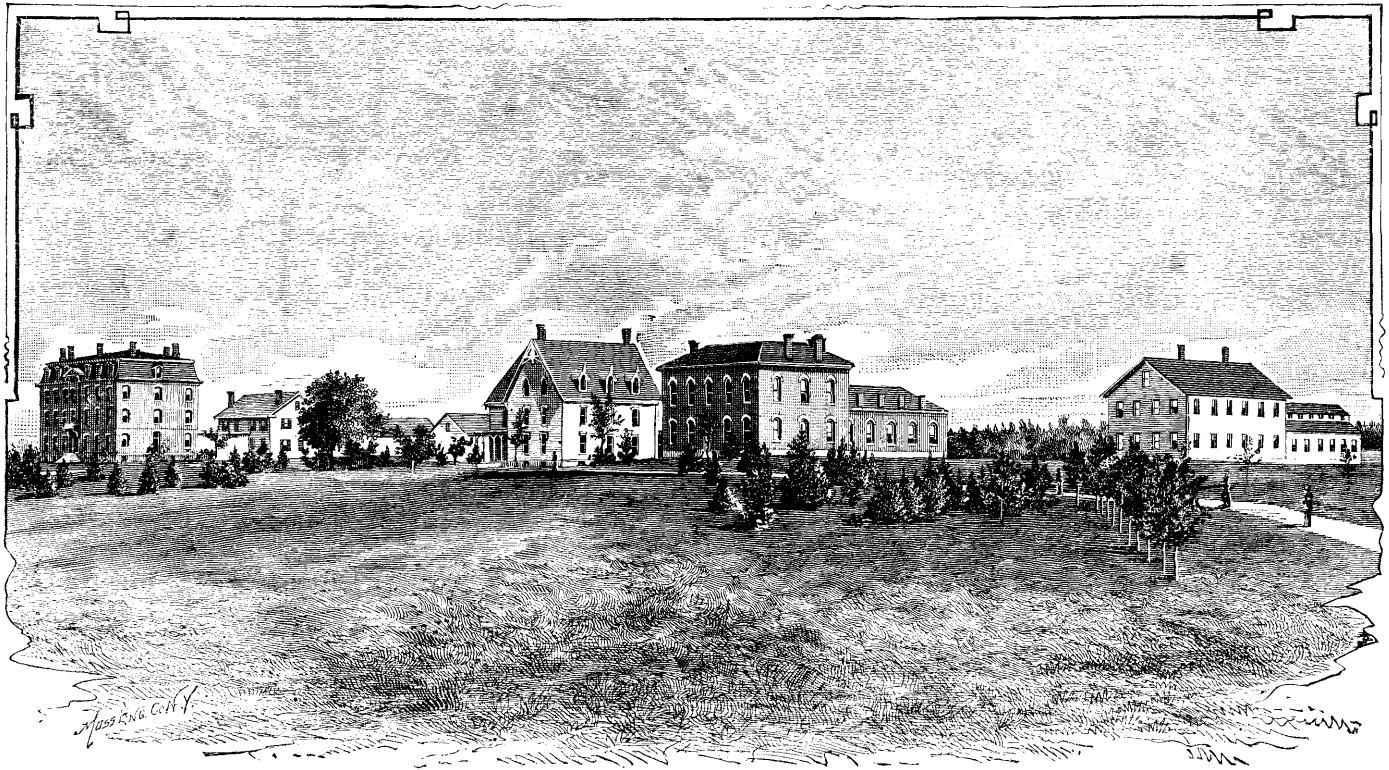

PRINCIPAL BUILDINGS OF THE MAINE STATE COLLEGE.

Brick Hall and Boarding-House. White Hall. Chemical Laboratory. Shop.

ANNUAL REPORTS

OF THE

Trustees, President, Farm Superintendent and Treasurer

OF THE

State College of Agriculture

AND THE MECHANIC ARTS,

Orono, Me., 1886.

Published agreeably to a Resolve approved February 25, 1871.

AUGUSTA:
SPRAGUE & SON, PRINTERS TO THE STATE.
1886.

TRUSTEES' REPORT.

To His Excellency, the Governor, and the Executive Council:

The Trustees of the State College respectfully submit their nineteenth annual report, together with the reports of the President and members of the Faculty, and of the Treasurer of the College.

BOARD OF TRUSTEES.

The Hon. Luther S. Moore of Limerick, whose term expired last April, declining further service, his son, Arthur L. Moore, B. S., of Limerick was appointed to fill the vacancy. Mr. Moore was a valuable and esteemed member of the Board.

The Board of Trustees, as constituted by the Legislative Act of 1867, embraced seven members. There are now nine members. The State Board of Agriculture is represented in the College Board by its Secretary, Hon. Z. A. Gilbert.

The Alumni of the College are represented by Wm. T. Haines, Esq., of Waterville and Arthur L. Moore, B. S., of Limerick.

CHANGES.

On the first of July, 1885, Lieut. Chas. L. Phillips, 2d Lieut. 4th United States Artillery, reported for duty at the College in compliance with orders from the War Department, and was assigned to the "Department of Military Science and Tactics." Agreeably to his recommendations, some modifications were made with the purpose of extending the course of theoretical instruction, and giving wider range to military practice and drill, thereby promoting the usefulness and

efficiency of the department. The Trustees were present at the military review and drill that occurred at the close of the summer term, and were much gratified to witness unmistakable indications of increased interest and efficiency. For a fuller statement of the changes above referred to, attention is respectfully invited to the report of Lieut. Phillips, which will be appended to this.

DEPARTMENT OF NATURAL HISTORY.

At the close of the summer term, in June last, Prof. C. H. Fernald, who had been instructor in the Department of Natural History for fifteen years, resigned his position to enter upon similar duties at the Massachusetts Agricultural College. The able and faithful service of Prof. Fernald through this long period had been held in high esteem by the Trustees and they accepted his resignation regretfully.

Temporary provision for instruction in this department was made by the employment of Prof. Francis L. Harvey, formerly of the Arkansas Industrial University. Coming to the College with endorsements exceptionally strong, and having discharged his duties through the fall term with marked success, the Trustees elected him to the chair of Natural History without hesitation.

Prof. Harvey's broad culture as a naturalist, his comprehensive grasp of the details of his department, and his habits of investigation cannot fail to make him greatly useful to the College and through the College to the State, if the State will provide him with reasonable facilities for effective work.

The facilities needed are described in Prof. Harvey's report, which will appear with this, and to which attention is respectfully invited. The State of Maine presents to the naturalist a large field for work, which has been but little cultivated.

BOARDING-HOUSE.

Upon the retirement of Mr. J. G. Johnson from the boarding-house in January, 1886, Mr. A. E. Spencer of Bradley was engaged to take his place. Mr. Spencer has conducted

the affairs of the house through two terms. His management, thus far, has been very creditable to himself and satisfactory to the Trustees and Officers of the College.

SHOP INSTRUCTION.

The work shops now afford to students opportunities for instruction and practice in vise-work, forge-work, carpentry and wood turning. The usefulness of the shops for practice has been greatly increased by a judicious application of the money appropriated by the Legislature of 1885 for finishing rooms in the shop-building, and furnishing them with necessary tools and equipments.

The Trustees were glad to find, at the date of their recent visit to the College, that there had been no abatement of interest in shop-practice, within the last year. The ability of the students who have availed themselves of the advantages of one or more courses in shop-practice to perform job-work at plumbing, carpentry, pipe-laying and various repairs for other departments of the College — for which they receive compensation—is an additional stimulus and element of interest in this department of instruction. The report of Mr. Flint, to which we invite attention, gives a fuller description of the methods employed in this department and suggests that a small additional expenditure of money can be made with much advantage.

FARM MANAGEMENT.

The present Farm Superintendent, Mr. Gowell, entered upon service for the College in April, 1882. There were, at that time, upon the College farm three parcels of land of 20, 10 and 12 acres, respectively, which, although diverse in character in some respects, were similar in the fact of barrenness and their disfiguration of the farm. These three parcels were early marked for treatment at such times as the regular and exacting work of the farm would permit. One after another they were cleared of rocks, stumps and bushes, drained,

ploughed, fertilized and sown to grain and grass seed. The first parcel of twenty acres, known as the Brick-Yard Field, has produced one heavy crop of oats and three good crops of hay, that of the third year being thirty-one tons. Parcel number two produced a remarkable growth of grass last summer; the number of tons is not given in the report. Parcel number three shows a good stand of grass and, having yielded a moderate crop of oats under unfavorable conditions, it promises a good crop of hay next year. Four years of Mr. Gowell's management have nearly doubled the crop of hay on the College farm.

The herd of cattle belonging to the College had been much reduced and was of but little relative value when Mr. Gowell assumed charge of the farm in 1882. He began early to increase the herd in numbers and improve it in quality. His good judgment enabled him to make good selections, and one animal after another was added to the herd by purchase or breeding until, at the opening of the autumn of 1885, it numbered ten Thoroughbred Short-Horns, thirty-eight Thoroughbred Jerseys and three Grades. Of the fifty-one animals, forty-eight were registered. It was a very valuable herd.

LOSS OF THE COLLEGE CATTLE.

Late in the autumn of 1885, disease appeared in the College herd of cattle.

The disease began to spread late in the winter following, and before the last of February many of the animals became affected. As soon as the character of the disease was known, the State Commissioners on Contagious Diseases of Cattle were notified. The Commissioners promptly appeared at the College farm, took the stock in charge, and ordered it quarantined. After the most careful examination, aided by the best attainable counsel, they decided that the only safe course to pursue was to exterminate the entire herd, which was accordingly done. To the College this was a severe misfortune. It cut off a source of income much needed by the farm, in addition to the serious loss involved. The State, however,

will find compensation by having had the attention of its citizens called to the character of a specific and contagious and destructive disease that has hitherto been but little recognized as such in this State. Its stock dealers will be more cautious in their purchases, more on the alert to detect the earliest symptoms of the malady, and more careful to guard against its spread. While tuberculosis has been but little known in Maine by its scientific name, it is safe to say there are few towns in the State where losses by this disease have not occurred, although it may have been called by the neighborhood doctor by some more familiar and generic name.

The report of Dr. Michener, who was sent to investigate the disease existing in the College herd, by the United States Commissioner of Agriculture, will be printed with that of the Farm Superintendent, and cannot fail to be read with much interest. His conclusions coincide with those previously expressed by our own able veterinary surgeon, Dr. Geo. H. Bailey of Portland.

Attention is also invited to the full and clear description of this disease in its different stages given in the report of Superintendent Gowell.

NEED OF A NEW BUILDING.

A building for the accommodation of the departments of Natural History and Agriculture, and for the proper disposition and preservation of the books of the library, has long been an urgent need of the College, a need which the new requirements of each passing year have intensified. The modern methods of study and investigation in these departments require the use of lecture rooms, of working laboratories supplied with tables and tools, and of adequate space for cabinets and cases, where the various objects of study and inspection can be so classified and arranged as to be easily accessible.

These departments of the College are in the hands of able, enthusiastic and hard-working men, who are making the best use of the means at their command. It is safe to say, how-

ever, that with such facilities for effective work as the proposed new building, furnished with the best modern appointments, would afford them, the value of their services would be doubled.

COLLEGE DISCIPLINE.

The usual regular and even flow of affairs at the College was interrupted during the Fall Term by an unusual disturbance. It was one of those disturbances which, in college parlance, is characterized by the innocent name of "hazing." Six students, confessing their complicity in the affair, were suspended, three of them for the remainder of the term (now closed) and three of them for the remainder of the current College year. In the absence of the confession made, the penalty would have been unconditional expulsion. Following the announcement of the punishment awarded to the offending six, a majority of all the students absented themselves from recitations, presumably to compel the Faculty to restore the offenders to the privileges of the Institution. The students so absenting themselves were summoned and asked the question, whether they intended to return to the regular work of the College, and those giving a negative answer were immediately suspended. They were subsequently allowed a reasonable time to re-consider the matter, reverse their decision and pledge future obedience to College authority, which, if done, the act of suspension would be re-called. All to whom this privilege applied, complied with the requirements before the expiration of the time allowed them, and resumed their relations to the College.

While entertaining no unkind feelings towards the students, the Trustees could not do otherwise than to give their entire approval of the action of the Faculty. The question that confronted its members was, shall we retain the disciplinary powers of the Institution, or surrender them to the students? Only one answer was possible. That answer was given without hesitation. It was the only answer that would have commanded the approval even of the offending students them-

selves. It was the only answer that would have satisfied the friends of the College, and the Institution comes from the ordeal healthier, stronger and better by virtue of the intelligent and decisive action of its Faculty.

It is proper to say in this connection that parents who commit their sons to the guardianship of the College have the right to demand that they shall be protected against the abuses, the humiliation, the liability to serious personal injury and possible fatal results, involved in the barbaric practice of hazing.

PROSPECTS AND NEEDS.

Notwithstanding the College has been subjected to the strain of occurrences of an unusual character during the year just ended, its prospects were never brighter than now. Its motto each year has been—broader work, more practical work, better work. It can be truthfully said that no year has passed in which its capabilities for better work have not transcended those of the year preceding. Indications point to a more rapid advance in usefulness in the future. All the departments of the Institution are in the hands of able men. Its students are gradually increasing in numbers. The value of the services of its graduates in various important departments of labor is meeting with very gratifying recognition. Its list of earnest friends is increasing. There are, however, urgent wants to be provided for. Prominent among these, is the building for the departments of Natural History and Agriculture, to which attention has been called. Such a building would be an element of permanent usefulness and growth. The welfare of the Agricultural Department demands provision for the purchase of cattle destroyed last spring.

The wants of the Institution for the next two years are itemized below:

For the purchase of cattle to take the place of those destroyed ..... $ 5000

" construction of a building for the departments of Natural History and Agriculture..... 18,000

For instruction above estimated receipts	$4000
" traveling expenses of Trustees	500
" insurance	600
" apparatus for the several departments	2500
For the construction of a tank from which to distribute water, and for drainage and sanitary purposes	1000
For contingent expenses, including repairs	750
For the completion of new barn	1000

LYNDON OAK,

President of the Board of Trustees.

PRESIDENT'S REPORT.

To the Trustees of the Maine State College of Agriculture and the Mechanic Arts.

GENTLEMEN:—In previous years a brief statistical statement regarding the College has been found of service by members of the Legislature seeking information as to its financial and other conditions. Believing that such a statement, at the present time, may serve a like useful purpose, I present herewith a condensed summary of statistical and other data, which, brought down to date, may be not only of specific value but of general interest.

STATISTICAL STATEMENT.

The endowment fund established by the National Government amounts to $131,300 and yields an annual revenue of $7,438.

By the munificence of the late Ex-Gov. Coburn, provision was made for increasing the endowment by $100,000.

The State appropriations have amounted to $212,618. The buildings are valued at $125,000; the apparatus at $15,000; the library at $7000; the farm, tools, stock, carriages, &c., at $18,000, making a total of $165,000. The amount from the State which has been devoted to instruction and current expenses has averaged approximately $3500 a year.

The number of graduates is 238; the number of non-graduates, 263. The latter class has pursued studies at the College through periods, ranging, in the individual cases, from

one term to three and a half years, averaging one and a half years. These numbers do not include the 103 students now catalogued in the College. It, therefore, appears that 604 different students have enjoyed or are now enjoying the advantages of the courses of instruction given at this Institution.

The number of graduates prior to June, 1886, was 222. Of these 11 have died, leaving 211 now living. An examination made in July, 1886, disclosed the fact that of the 211 graduates referred to (those of 1886 not being included) 18 are farmers and 11 are specialists in agriculture, viz: One Professor of Agriculture, 1 Director State Experiment Station, 5 Assistants in Experiment Stations, 1 Editor Agricultural Paper, 2 Veterinary Surgeons and 1 Botanist in United States Department of Agriculture; 38 are Civil Engineers, 22, Mechanical Engineers and 15 are engaged in manufactures. In other words, 14 per cent are engaged in agricultural pursuits, 18 per cent in Civil Engineering, 10 per cent in Mechanical Engineering and 7 per cent in manufactures, or, summarizing, 49 per cent are engaged in these four very important forms of industry. Of the 107 graduates remaining, 30 are teachers and 31 are engaged temporarily in miscellaneous callings. Many of these, it is reasonable to assume, will eventually be found engaged in the four classes of pursuits first named. Of the living graduates whose occupations are under notice, the number engaged in the so-called professions is 19, or 9 per cent, whereas 91 per cent are employed in other and varied industries. Of the living non-graduates whose occupations are known, 13 per cent are in the professions and 87 per cent in various industries.

FINANCIAL COMPARISON WITH THE AGRICULTURAL COLLEGES OF KANSAS AND MICHIGAN.

The Maine State College has in buildings, grounds, apparatus, stock, &c., $165,000. The Kansas State College has, in the same items, more than $200,000.[1] The Maine State College has an endowment from the National Government of

$131,300. The Kansas State College has, from the same source, an endowment fund of $500,000.

In my report of two years ago, a financial comparison was made with the Agricultural College of Michigan. Without repeating what was then said, it is worthy of notice that the method by which Michigan has built up a strong college and one in which the citizens of the State take a just pride, has been that of providing liberally for its growing wants, as attested by the fact that in 28 years, the State appropriated for the college the generous sum of $708,550 or, on an average, $25,305 a year. This was prior to 1885. If correctly informed, a like liberality has obtained toward the college since that date.

COMMENCEMENT AND DEGREES.

The fifteenth annual Commencement was observed between June 26th and July 1, 1886, with like manifestations of interest to those shown on similar occasions in previous years.

The exercises commenced on Saturday evening, June 26th, with the Sophomore Prize Declamations, at which the speaking was of high order. The first prize was assigned to Claude Lorraine Howes of Boston, Massachusetts, and the second prize, to Ralph Hemenway Marsh of Bradley, the committee of award making honorable mention of Albion Henry Buker of Rockland and Dudley Elmer Campbell of North Harpswell.

On Sunday evening, June 27th, occurred Baccalaureate services at which the discourse was given by the President of the College, on the subject of "Reserved Power."

At the Junior Exhibition on Monday evening, original essays were presented. The prize for excellence in composition was awarded to John Sumner Williams of Guilford, the author of the essay entitled "The Silent Majority," with honorable mention of Charles Ayers Mason of Bethel, the writer of "Is Our Civilization Perishable?" and Austin Dinsmore Houghton of Ft. Fairfield, the writer of "Intelligence of the Honey Bee."

Both the Sophomore and Junior prizes were the gift of Mrs. H. E. Prentiss of Bangor.

A prize by Hon. Samuel Libbey of Orono, offered for the best essay on an agricultural topic was awarded to Austin Dinsmore Houghton of Fort Fairfield.

Military exercises occurred at the College campus on the afternoon of Tuesday, June 29th, and the President's reception, the same evening.

The graduating parts by the Senior Class were given on Wednesday, June 30th. The titles of essays and the names of candidates receiving degrees are herewith submitted.

BACHELOR'S DEGREE IN COURSE.

Degree of Bachelor of Science.—Course in Chemistry: Ralph Kneeland Jones, Jr., Bangor; Warfare of Science: George Frederic Lull, Cambridge, Mass.; Pulp Manufacture: Sydney Smith Twombly, Enfield; National Aid to Education.

Degree of Bachelor of Civil Engineering: Bert John Allan, Dennysville; Life-Saving Service: Josiah Murch Ayer, Freedom; Phenomena of the Earth's Early History: George Fuller Black, Palermo; Sanitary Engineering: John Decker Blagden, Carmel; Destruction of Forests: Heywood Sanford French, Bangor; Tehuantepec Ship Railway: Edwin Dwight Graves, Orono; Engineering Works of the Present Day: Elmer Lenfert, Bradley; The Value of Our Forests: Willis Henry Merriam, Orono; Railroad Time Service: Arthur Dean Page, Orono; Engineering as a Profession: Irving Burton Ray, Harrington; Athletics in College.

Degree of Bachelor of Mechanical Engineering: George Greenleaf Barker, Rockland; Steam vs. Water Power: James Frederic Lockwood, Brewer; Accuracy in Measuring: Elmer Ellsworth Merritt, Houlton; Bimetallism.

MASTER'S DEGREE.

Civil Engineer.—Charles Adelbert Morse, Matfield Green, Kansas: Thesis: The Duties of a Division Engineer.

Master of Science. — Edward Holyoke Farrington, New Haven, Conn.; Thesis: The Kjeldahl Method of Determining Nitrogen in Organic Compounds.

HONORARY DEGREE.

Doctor of Philosophy.—Prof. Charles H. Fernald.

INSTRUCTION.

The resignation of Prof. C. H. Fernald, at the last Commencement, rendered necessary the choice of a successor. Prof. Frank L. Harvey, formerly of the Arkansas Industrial University, has filled the chair of Natural History during the term just closed with great acceptance. It is a matter for congratulation that the excellent quality of instruction heretofore given in this important department promises, under Prof. Harvey, to be fully maintained.

The class in Free-Hand Drawing this autumn has been taught successfully by Mr. D. W. Colby of Skowhegan, a member of the Senior Class.

Instructors in the other departments remain the same as when the last report was issued.

ADVANCE IN THE CONDITIONS OF ADMISSION PROPOSED.

Experience has shown that our students are under considerable pressure during the latter part of their course of study, either from inadequate preparation on admission or from accomplishing too little in the early part of the course, or perhaps more correctly from both causes.

This difficulty may be remedied by advancing the conditions of admission and by re-distributing the studies in the several courses with such minor modifications as experience has proved desirable. The several courses will thus be rendered more highly valuable. Looking to such modification, I would recommend that the conditions of admission be so advanced as to include after June, 1888, in addition to what is now required, all of Guyot's Physical Geography or an equivalent, Book-Keeping and Algebra from Quadratic Equations to Logarithms.

VARIOUS ITEMS.

The house formerly occupied by Prof. C. H. Fernald has been newly painted and will be occupied next term. Much needed repairs have been made on the roof of Brick Hall by which troublesome leaks about the chimneys have been stopped and several of the chimneys that had settled on their bases and were inclining above the roof have been built over. Repairs have also been made on the roof of the Laboratory. The so-called Frost House has been newly shingled and many minor repairs about the College buildings have been made.

The leasing of the Frost House to the Beta Theta Pi Society has proved not only a necessary arrangement from the increase in the number of students to be cared for, but also a satisfactory arrangement to all parties concerned.

The new water supply from the artesian well to the Boarding-House, to Brick Hall, White Hall and the Laboratory has been a matter of great convenience and of positive advantage on sanitary grounds. In quality the water is excellent. To insure a sufficient quantity for the driest portions of the year, it will be necessary to sink the well to greater depth. This water supply should be extended to other buildings and a more nearly perfect drainage system of the buildings should be established during the coming year. This accomplished, other desirable sanitary improvements about the buildings can be adopted.

FAVORS AND BENEFACTIONS.

The College is under renewed obligations to the Maine Central Railroad for free transportation, through the favor of the General Manager, Payson Tucker, Esq., for the Coburn Cadets to Bucksport and return, on occasion of their four days' encampment at Fort Knox, where the freedom of the Fort was granted by the proper United States officers. The stay at the Fort was a period of special military instruction.

Hon. Samuel Libbey of Orono offers a permanent annual prize for the best essay on an agricultural topic written by a student of the College.

Mrs. H. E. Prentiss of Bangor, who has given the prizes for the past two years for excellence in composition and declamation, has signified that she will continue these prizes during the remaining years of her life. Hereafter they will be known as the "Prentiss Prizes."

Nehemiah Kittridge, Esq., of Bangor, has generously placed under the control of the President and Treasurer of the College the sum of six hundred dollars to be used as a loan fund to meritorious students needing temporary aid. The loans are to be made under prescribed conditions, and as they are paid the money to be loaned again, and thus to constitute a perpetual fund for the purpose indicated. It is hoped that the generosity of Mr. Kittridge may be duplicated by other parties and that this loan fund, with the benefits it can confer, may be largely increased.

INVESTMENT OF THE COBURN BEQUEST.

I beg to invite attention to a suggestion which I have heard made many times within the past two years, relative to the investment of the Coburn Bequest. It is a matter in which every citizen of the State has an interest. It is in the interest of every citizen that this bequest be so placed that the income from it shall be certain, regular and permanent. For the national endowment the State Treasurer holds State of Maine bonds bearing interest at six per centum, which interest is paid semi-annually to the Treasurer of the College. The suggestion referred to is this, that it would be a fitting response to the munificence of Ex-Gov. Coburn for the State to receive the money bequeathed and to issue therefor a bond on long period bearing six per cent interest payable semi-annually to the College Treasurer. Thus the State would become essentially the custodian of the fund.

Inasmuch as the State makes provision for the needs of the Institution, this plan would be of no disadvantage to the State, but has in itself much to commend it, since every dollar received by the College as regular interest, subtracts that amount from the necessary appropriations.

BUILDING FOR THE DEPARTMENTS OF NATURAL HISTORY AND AGRICULTURE.

So fully has the necessity for this building been set forth in previous reports, that no occasion exists to present the subject at any considerable length. Plans for the building were carefully made two years ago, and the time that has since gone by has served to demonstrate more fully the great need of the facilities which such a structure can furnish and the detriment sustained by these departments by the absence of such facilities. As shown by the report of the Librarian, the books belonging to the College, now kept in the Chemical Laboratory, are deteriorating from exposures which in that building it is impossible to avoid. The proposed building, although not designed for a library building, will enable the Librarian to care for the books and render them serviceable in a much greater degree than is possible in their present limited and unsuitable quarters. The plans for the building and all other considerations relating to it will be fully presented to the legislative committee. The estimated cost of the building with the necessary cases, fixtures, heating apparatus, &c., is $18,000.

NEEDS.

First in order should be placed the building to which reference has been made. The other needs for the next two years, as nearly as I have been able to determine them, are the following: For instruction above estimated receipts, $4000; for travelling expenses of Trustees, $500; for insurance, $600; for apparatus for the several departments,—Civil Engineering, $400; Agriculture, $250; Mechanical Engineering, $350; Shop, $175; Chemistry, $350; Natural History, $500; Physics,

$375; Military Department as indicated in report of Lieut. Phillips, $100; aggregating, $2500; for building tank for water supply, perfecting the drainage system and other sanitary improvements, $1000; for miscellaneous items, including painting of shop, telephone, new plate of College buildings, repairs in Laboratory, &c. &c., $750.

These several sums, including that for the building, aggregate $27,350. It will be noticed that nearly two-thirds of this amount is for the building, which once constructed is a permanent addition to the College property and of constant utility; and that a large fraction of the remaining amount asked for, is for apparatus and the water supply system, which once obtained are also of permanent character and constant utility.

For the farm an exceptional need is presented resulting from calamity. In consequence of the development of Tuberculosis in the herd and the rapid spread of the disease by which nearly all the animals were speedily and seriously affected, its destruction was ordered by the State Commissioners on Contagious Diseases of Animals. This destruction involved a loss to the farm of $5000. Hard as it was to sacrifice this fine herd, it was the only course of safety toward the animal industry of the State. Any other course would have involved in the immediate future, much larger loss to the State, besides retaining the disease as a constant menace and source of loss to the animal interest.

The State Veterinarian regards the premises entirely disinfected and in condition to allow the building up of a new herd with safety. To make good the loss and provide for the re-establishment of the herd, the sum of $5000 will be required. To finish the Goddard barn, which has been moved to a position near the other principal barn and been put on a permanent foundation, the sum of $1000 will be needed, making the whole amount necessary for the farm, $6000.

CONCLUSION.

For further information relative to the farm, its products, management and experimental work, reference is made to the report of the Farm Superintendent as, likewise, for more detailed information relative to the different departments, reference is made to the reports of the several professors in charge.

During the past two years, or since the last legislative session, it has been a matter of encouragement that the College has had a healthy growth in point of numbers in attendance. Moreover, the progress made in study and in preparation for practical and efficient service on the part of students, has been of satisfactory character.

My acknowledgments are due those associated with me in instruction and government for constant courtesy and consideration. With increasing experience of instructors and with growing facilities for instruction it is designed that the work done by the College from year to year shall be of higher and higher order; and that, in matters of government also, so far as the Faculty can insure the result, the Institution shall be worthy of the confidence, the support and the patronage of the people of the State.

Respectfully submitted,

M. C. FERNALD, *President.*

Department of Modern Languages.

President Fernald:

During the past year I have given instruction in Political Economy, Constitutional Law, Logic, German, French, English Literature, English History and Rhetoric. I have also attended to the Sophomore Declamations and Freshman Themes. The progress made in these branches by the different classes has been, on the whole, satisfactory.

You will easily see by the number and range of the studies committed to my charge that any decided progress in this department is impossible, my entire time being necessarily devoted to routine work. Hitherto, for obvious reasons, I have not asked for any assistance, nor urged that re-arrangement in the academic features of the Institution, which I have deemed highly important, but now, in view of the proposed modification of the curriculum, I respectfully ask that the studies in my department be systematized, and that time commensurate with their importance be given to them, and also that an instructor be appointed to relieve me of some of my work of secondary importance that I may be able to make such use of my time that it will be of a greater benefit to the students and to the College than hitherto.

LIBRARY.

Since my last report there has been a good number of books and pamphlets added to the library, and, had we the means for caring for it, a large and useful library would be the work of but a few years. The accommodations at present are entirely inadequate and I think that the matter should

receive immediate attention. A library is everywhere recognized as an indispensable adjunct of educational institutions, but with us that adjunct, to say the least, is at its minimum of efficiency.

To keep our sets of periodicals complete, provide for the necessary binding, and secure a few of the more important publications of the day, two hundred dollars would be sufficient for the next two years.

Respectfully submitted.

A. E. ROGERS.

Department of Military Instruction.

MAINE STATE COLLEGE, ORONO, ME., November, 10, 1886.

To President M. C. Fernald:

SIR: I have the honor to submit the following report, relating to the Department of Military Science and Tactics, and covering the period since July 1st, 1885, when, in compliance with orders from the War Department, I reported for duty at this College. During this time several changes have been made, having for their objects both the increasing of the interest of the students and also the extending of the theoretical course of instruction, thereby promoting to some considerable extent the efficiency of the department. In this I have been very much assisted by the excellent condition in which I found the corps of cadets, due to the exertions of my predecessor, Lieut. Howe. The first change, made at the beginning of the Fall Term, 1885, was the division of the corps into two companies and the adoption of the full battalion organization. This change was warranted by the increased number of students and resulted, as was desired, in awakening a spirit of emulation between the two companies and a consequent increase of interest, two conditions which naturally lead to improvement in both the quantity and quality of the work done. A second change was made during the latter part of the Fall Term, 1885, whereby a course of theoretical instruction was introduced. The study of Tactics was made a part of the regular College Course requisite for graduation. Upton's United States Army Infantry Tactics was adopted as the

text-book to be used for this purpose. The members of the Senior and Junior classes studied this during the latter part of the Fall Term, 1885, and the first half of the Spring Term, 1886, with good results. During the present term an effort has been made to render this branch of the work of this department even more efficient by extending this instruction to include the Sophomore Class, dividing the subjects to be studied between these three classes, thus enabling them to spend more time upon each. This course, then, as at present arranged is pursued during the month of November of the Fall Term and the months of February, March and April of the Spring Term of each year, and embraces the instruction of the Sophomores in the Schools of the Soldier and Company, of the Juniors in the School of the Battalion and of the Seniors, by a course of lectures, in the general subject of Military Art and Science. Practical field instruction is given to all four classes during the remaining months of the College year. It is hoped and expected that by thus supplementing the practical by the theoretical, broader and so more valuable views of this subject may be imparted. Our field work has included, besides simple company and battalion tactics, instruction in camp, guard and marching duties and has been productive of good results. We have also had one month's exercise at Target Practice, but while fair progress was made in this, very good when the limited means at our command is considered, still it has not been what it should be nor what the importance of the subject demands. The two upper classes participating in this exercise, we have about forty men to provide for. The United States Government supplies annually 1000 rounds of ball-cartridges, which allows but twenty-five to each man, a quantity totally inadequate for the purpose. In order, therefore, that the degree of attention which its importance requires may be given this branch of the military art, I would recommend that the proper steps be taken to obtain from the State Government an allowance of at least 2000 rounds ball-cartridge yearly for the use of the cadets. In case the State

should grant us this allowance it would be necessary to make certain changes in our Range and incur some additional expense in order to use these allowances to the best advantage, and as it hardly seems just that these expenses should be averaged among the students, thus making all pay for what benefits only a part, I would further recommend that an appropriation of one hundred dollars ($100) be requested to meet these and other necessary expenses in this department during the ensuing two years.

Very respectfully,

Your obedient servant,

CHAS. L. PHILLIPS,

2d Lieut. 4th U. S. Artillery,

Prof. Mil. Science and Tactics.

Department of Civil Engineering.

President M. C. Fernald:

The following report concerning the Department of Civil Engineering is respectfully submitted:

The work of the department during the past year has been essentially as heretofore, and according to the explanatory statement found on pages 19, 20 and 21 of the catalogue. A few necessary changes have been made in text-books in order that the subjects taught might be brought down to the present time without the labor of giving so many notes. For Rankine's Applied Mechanics, has been substituted a text-book written by Professor Lanza, of the Massachusetts Institute of Technology, embodying all the latest information upon the strength of materials, etc. Several other changes in text-books are contemplated next term.

The department is well supplied with transits, compasses, plane table, levels, chains, tapes, etc., for the ordinary work of the engineer. But there is a large amount of apparatus still needed in the department before its equipment will be at all complete for instruction in the higher type of engineering work.

Two years ago the Legislature appropriated the sum of four hundred dollars to be expended for apparatus in this department. With it the following pieces of apparatus have been procured: One of Heller & Brightly's three-hundred-dollar plane tables, at a very liberal discount to us. The instrument was made to order with some special finish, and has proven itself perfect in every respect. Twenty-four new drawing tables have been placed in the drawing room, thus

supplying a long-felt need in this direction. A measuring tape and two sets of pins have been added to the apparatus for railroad surveys. Eight books on engineering subjects have been added to the library. Seventy-three dollars were devoted to the new water supply, as the appropriation for that purpose was insufficient and the condition of the water in the old well was such as to justify almost any sacrifice in the direction of apparatus. The gratifying results of the work done in this direction, I think, justifies the means.

Water supply and drainage should always go together, so that now we need a thorough system of drainage and sewage disposal. If the sewage is to be discharged into the river it can be done at a slight expense. There will be required 60 rods of vitrified earthen pipe of five-inch diameter, which will cost 17 cts. per foot, or $175.00. Digging the ditch for this amount of pipe, laying in cement and refilling will cost about $1.50 per rod, or $90.00.

There should be, at least, three water-closets at the Dormitory and one urinal; one closet and a urinal at White Hall and a closet at the Laboratory. The closets will cost, with all necessary fixtures for flushing, etc., about $15.00 each, or in all $75.00. The urinals will cost about $10.00 each, or in all $20. This gives a total of $360.00. But a suitable room will have to be fitted up in the cellar of the Dormitory for the closets; so that $400.00 will be needed for the completion of the work.

In teaching so practical and progressive a profession as that of the civil engineer, where the field has become so greatly extended, that even if a man can devote his whole time to its practice he stands no chance of rising to eminence in the profession unless he chooses some specialty and confines himself to it, the nearer the teacher confines himself to the best present practice, the safer and more useful will his instruction be.

Now when one man is obliged to cover, the elements at least, of the whole field, if he happens to be well qualified in a few departments of practice, he cannot be equally well

qualified in all, and there is necessarily, on his part, a want of knowledge as to just what instruction will be of the greatest value to the student, and an inability, in some directions, to point out, in the best manner, the proper relation of the theory which he teaches, to the practice which is to come in after years.

In a rich institution, this difficulty is overcome by employing so many teachers, that each may be a recognized specialist in the branches he is to teach, and thoroughly posted in all the departments of its practice. The only way in which it can be, partially, overcome in a poor institution, is by employing men, directly connected with the practice of the different branches of the profession, to deliver lectures before the students from time to time, as they become qualified by class-room work, to profit by them. The services of such men, eminently qualified to give such instruction, can be had with no other cost to the Institution, than their actual expenses. A small appropriation, annually for this purpose, would be of the greatest value to the course in civil engineering. To make the necessary additions to the apparatus of this department, and to keep that which we have in proper shape will require $400.00 for the next two years.

I wish to acknowledge here, the receipt of a section, with the fish plates and bolts, of the new steel rail used on the Maine Central Railroad, together with an angle block from the old bridge at Orono, and a rail with the chairs from the old Veazie road; from W. A. Allen, Chief Engineer of the Maine Central road.

Such fixtures, although they are very common things, are useful in instruction, and I trust more of the same sort will come in the future.

At the last commencement there were ten graduates from this department. The following is a list of their names, and the subjects of their theses:

Josiah M. Ayer, John D. Blagden, J. B. Allan and I. B. Ray prepared theses on the bridge across the Stillwater

River at Orono. Geo. F. Black and Arthur D. Page took for the subject of their theses the new bridge across the Kennebec River at Augusta. E. D. Graves and H. S. French computed the volume of water flowing down the Stillwater River, at low water, and W. H. Merriam and Elmer Lenfest prepared designs for wooden Howe truss bridges.

G. H. HAMLIN,
Professor of Civil Engineering.

Department of Mechanical Engineering.

President Fernald:

The work in this department the past year has been similar in character to that of the previous year, and but few changes have been made.

A short course of instruction in wood-turning was given the Senior Class in Mechanics during the Spring Term, and it is intended to make this feature still more prominent in the future, if arrangements can be made for the necessary time.

For further particulars concerning the shop work, I will refer to the report of Mr. Flint.

The class-room and drawing-room work in mechanical engineering has progressed favorably, and more work has been done than in previous years, on account of the better accommodations. The work in drawing especially, compares well with any that I have observed elsewhere.

In the class-room I feel the need of more apparatus for illustrating lectures, as every year of additional experience in teaching, shows me the importance of object illustration. Another case for models and drawings is needed, and a desk for the storage under lock and key of valuable papers, drawings and books. I also ask that water may be introduced to the shop from the wind-mill supply, and that sinks and other conveniences for washing may be afforded. I would call special attention to two of the items mentioned in Mr. Flint's report, *i. e.* the ventilating fan for the forge-shop, and the feed-water heater for the boiler. The former is needed as a sanitary precaution, and the latter on the score of economy. There is no doubt that a suitable feed-water heater would

save from 10 per cent to 15 per cent of the fuel burned under the boiler. The estimate of the tools wanted for the shop is a reasonable one, and includes only what seems necessary to the proper carrying out of our present course of instruction.

During the past year we have received from Whitely, Fassler & Kelly of Springfield, Ohio, a model of the peculiar epicyclic gearing used in the Champion Mower. The Armington & Sims Engine Company of Providence, R. I., and the Ball Engine Company of Erie, Pa., have presented us with photographs of their engines, which are framed and hung up in the drawing room.

I am glad to notice that all of the three students who graduated from this course last June, have already good situations as draughtsmen and engineers.

Respectfully submitted.

C. H. BENJAMIN.

Report of Shop Work.

President Fernald:

During the past two years my duties have not varied much from what they have been heretofore. Two classes have completed the course in wood work with satisfactory results. The course has been enlarged so that wood turning is now taught and students take unusual interest in the work.

In addition to the regular course quite an amount of job work has been done for other departments of the College and the Experiment Station. Quite a variety of articles has been made which it is not worth while to give in detail. For this extra work students have received compensation in proportion to the quality of the work done. One student was employed for the whole vacation last winter and another for a part of it to do carpenter work and plumbing about the buildings.

Two classes have done the required amount of work in the forge-shop and vise-shop in a creditable manner. By means of the pipe tools bought two years ago all plumbing has been done without outside help; this includes laying all the pipe for the new water supply.

Whenever any money has been received for work done in the shop, it has been used to buy a few tools which were very much needed in the wood-shop.

The forge-shop is sadly in need of an exhaust fan to carry away the smoke and gas rising from the fires. At times it is almost impossible to remain in the forge-room without suffocating, and some means should surely be provided to remedy this difficulty.

A great saving in fuel would be made if a feed-water heater were attached to the boiler so that it would be supplied with hot water instead of cold. As now arranged cold water is pumped directly into the boiler, which must cause a great deal of unnecessary wear and tear near the place where it enters.

All kinds of edge tools have to be ground by hand and on the same stone. A stone which is used to grind cold chisels on is not in fit shape to grind plane irons on. If a small emery wheel were provided, this trouble would be done away with, and a tool would be added to the shop which would be useful in very many ways.

The above machinery could be bought, together with the necessary shafting, belting, etc., and placed in position for $200. I must earnestly recommend that the amount be appropriated for the purposes named.

In addition to the shop work I have taken charge of the classes in descriptive geometry, solid geometry, advanced algebra, and mechanical drawing. Free-hand drawing has passed out of my hands as I was otherwise occupied at the hour devoted to that exercise. Last year it was taught by A. D. Page of the Senior Class and D. W. Colby of the Senior Class has taught it this year. Both men have discharged their duties in a very satisfactory manner.

Very respectfully submitted.

WALTER FLINT.

Department of Chemistry.

President M. C. Fernald:

During the past two years no very important changes have been made in the course of study in this department.

For the class in General Chemistry, Remsen's Introduction to the Study of Chemistry has been used as a text-book in the place of Roscoe's Elementary Lessons in Chemistry; the change has, on the whole, been beneficial to the class, Prof. Remsen's book being clearer and more easily understood by beginners. Prof. Caldwell's excellent Handbook of Agricultural Chemical Analysis being out of print, it became necessary to substitute in its place Frankland's Agricultural Chemical Analysis.

The Seniors, after finishing the second volume of Naquet's Principes de Chimie, have pursued a short course in purely theoretical Chemistry, the text-books used being Tilden's Chemical Philosophy last year, and Remsen's Theoretical Chemistry this year. With the above exceptions the list of text-books is the same as that given in my last report.

The Spring Term of each year has been devoted to Advanced Chemistry for the Junior Class, and Laboratory Practice for the Seniors and Sophomores in the forenoon. The afternoons of the term were devoted to Laboratory Work for the Seniors and Juniors in Chemistry and Agriculture. During the forenoon of the Fall Term I have held recitations in General Chemistry for the Sophomores, in Advanced Chemistry for the Juniors and Seniors. The Laboratory has been open every afternoon for the Juniors and Seniors in Quantitative Analysis. Besides regular students, a few special students have availed themselves of our Laboratory facilities.

The following students, after having passed satisfactory examinations and presented proper theses, graduated at the

Commencement, June, 1885: Mr. H. L. Fernald, Mr. G. L. Hanscom.

At the Commencement, June, 1886: Mr. R. K. Jones, Jr., Mr. G. F. Lull and Mr. S. S. Twombly.

The following additions have been made to our stock of apparatus: Two short-beam chemical balances, one Bausch and Lomb Model Microscope Stand, with eye pieces, objectives, micrometers, etc., one Wild's Polaristrobometer, Gooch crucible, graduated glassware, a series of slides of starches and textiles, and numerous smaller pieces of apparatus. Thirty dollars were also contributed from the chemical appropriation to the College water works fund. The apparatus bought by me has been most serviceable and has been of great help to our students in their practical work.

There is still much to be done before our Laboratory can be looked upon as being well equipped with the modern appliances for chemical manipulation. A small boiler with water baths, steam oven and distilling apparatus is a necessity for convenient and rapid work. A good student's spectroscope should be added to our stock of useful instruments as soon as possible. Apparatus for elementary gas analysis and a number of small pieces of glassware for special analyses form part of every fairly well equipped Laboratory.

A sum of three hundred dollars will not more than cover the cost of the pieces of apparatus which should be added during the coming two years.

Before closing I must again reiterate what I have so often said before. We need more room; the Laboratory can hardly hold our present classes; new tables must be provided and the Laboratory enlarged, or some rooms now occupied by other departments should be vacated. I trust we may soon have a new building, which by offering accommodations to some of the departments will relieve the pressure for more room in the older buildings.

Respectfully submitted.

A. B. AUBERT,

Professor of Chemistry.

Department of Natural History.

President M. C. Fernald:

DEAR SIR:—I herewith submit a report of the Department of Natural History for the term ending November 19th, 1886.

To complete work begun by another is always difficult, but especially so in the sciences, where the subject matter has a wide range and such a diversity of opinion exists regarding methods of work. My eyes and ears have been closed to previous methods in the department, believing it better to follow my own views at the risk of innovations. To what extent my efforts have been successful you are aware.

The locality being new to me much of my time has been employed out of recitations in collecting material for illustration.

There were scarcely any specimens of the cryptograms in the cabinet, but fresh material to illustrate all the groups has been found near Orono. Another year I shall know where to get specimens without much research. While collecting for class use, nearly 150 species were secured for the permanent herbarium. The subjects taught have been made as practical as possible by requiring students to dissect and classify specimens and prepare slides to be examined by the compound microscope. In Comparative Anatomy students have classified specimens so far as time admitted and dissections of types of all the classes of vertebrates were made to illustrate the differences and similarities. The same specimens were used to illustrate the principles of Physiology to the Freshman Class. The laboratory work which the new scheme

of study proposes for the students in Natural History will make the work more thorough and practical. It is to be hoped that a new laboratory can be built, as the facilities for work and means of caring for collections are very meagre. The laboratory and museum are tools of the naturalist and without them work is much crippled. At present, laboratory work has to be done in the recitation-room with great inconvenience and waste of valuable time. To do a high order of scientific work, facilities for classifying and arranging specimens and for laboratory practice are absolutely essential. I found many of the zoological specimens boxed or unclassified and unavailable for present use. A great amount of work will be necessary to put the collections in shape, and I have done as much as my time would admit. Many of the specimens being without tickets showing habitat, locality, collector, etc., are of little value to a museum.

No funds for the department were available for general purposes, but a special fund of $50 for displaying a collection from the Smithsonian Institution has been used to purchase jars and material to put it in shape.

As soon as possible, desirable specimens from this region will be collected and exchanged for others. Some specimens have already been obtained in this way and arrangements made for others. This region seems rich in objects of nature and good exchanges can be readily obtained. Some few specimens have been added this term by donations from students and others.

Though somewhat discouraged at first, my work has been pleasant and my interest in it has daily increased. This region offers an interesting field of inquiry which I shall take pleasure in developing.

I desire to state that the students have been courteous, studious, and in the main successful in their studies.

RECOMMENDATIONS.

I would recommend that laboratory students in Natural History be required to deposit a fee necessary to pay for material used and apparatus.

That an effort be made to secure the collection of birds and mammals offered for $100 by Mr. James H. Osgood of Houlton, Maine.

APPROPRIATIONS.

The following appropriations are required to keep the department up to its present efficiency and add a few needed pieces of apparatus.

Physiology—Chemicals and apparatus for experiments	$ 50 00
Entomology—Pins, cork, boxes, labels, disinfectants, etc	25 00
General Zoology—Museum jars, bottles, alcohol, trays, labels, etc	100 00
Botany—Genus covers, mounting paper, boxes, labels, etc	25 00
Microscopy—Slides, cells, reagents, labels, etc	25 00
Mineralogy—Apparatus, reagents, specimens, etc	50 00
Geology—Instruments, maps, charts and specimens	50 00
Freight and express charges on purchases and exchanges,	25 00
Special books for library	50 00
Total	$400 00

Respectfully submitted.

FRANCIS L. HARVEY,

Professor Natural History.

Department of Agriculture.

President M. C. Fernald:

In the development of the Course in Agriculture, one of the objects has been to give to the students of this course an education which shall not only make them familiar with the scientific facts and theories bearing on agricultural topics, but also to enable them to understand the scientific investigations which are being carried out in the interest of agriculture, and make such application of the results as may be of use in their own practice. I believe as good degree of success has attended our efforts in this direction as could be expected with the limited resources at our command. But for the accomplishment of the object above mentioned more room is needed, both by this department and the Department of Natural History, for storing and properly exhibiting working material.

One of the graduates of this Institution, who is rapidly making a national reputation in his chosen line of work, said "the one thing most needed at the Maine State College is a good working cabinet." I am aware that the speaker had in mind a natural history cabinet or museum. The natural history studies, however, form an important part of the agricultural course. Much of the material that would properly be placed in such a museum would also be available in the work of the instructor of agriculture; but in addition to such a cabinet, a collection of the various farm products such as the different varieties of the cereals, both in the grain and sheaf, and samples of the products into which they are manufactured is desirable. A hall is also needed for the permanent exhibition of farm implements and machinery.

From conversations held with various manufacturers and dealers, in this and other States, I feel confident that a large hall could be filled without expense to the College. Such an exhibition could not fail to be of great value to the students and to the large number of farmers who visit the College each year.

As soon as practicable, it is to be hoped that provision will be made by the Trustees for giving more thorough instruction in horticulture, a branch of agriculture of great importance in this State and one which should receive more attention in this Institution.

The loss of the farm stock through tuberculosis was a severe blow to the department and I trust that steps will be taken as soon as practicable to replace it.

For supplying books of reference, apparatus and appliances for instruction for the immediate use of the department in maintaining its present efficiency, two hundred and fifty dollars are needed.

Respectfully submitted.

WALTER BALENTINE.

Farm Superintendent's Report.

To the Trustees of the Maine College of Agriculture and Mechanic Arts:

GENTLEMEN :—I herewith present an account of farm transactions for the year ending November 30, 1886.

FARM STATEMENTS.

APPRAISAL OF PROPERTY BY TRUSTEES NOVEMBER 30, 1885.

Live stock	$4,744 00	
Crops	2,450 00	
		$7,194 00

APPRAISAL OF PROPERTY BY TRUSTEES NOVEMBER 30, 1886.

Live stock	$ 719 00	
Crops	1,743 00	
		$2,462 00

Cash receipts for the year ending November 30, 1886	$4,536 10
Cash expenditures for the year ending November 30, 1886	4,278 92
Liabilities November 30, 1885	6,195 36
Liabilities November 30, 1886	6,395 39
Cash due from various parties	1,044 22
Implements purchased during the year, less 20 per cent off for wear	42 75
Blasting and clearing rocks from land and removal of old stone walls	83 50

FINANCIAL STANDING OF FARM NOVEMBER 30, 1885.

CREDIT.

Appraisal of live stock and crops	$7,194 00	
Cash on hand	496 29	
Cash due from various parties	561 00	
	$8,251 29	

DEBIT.

Liabilities	$6,195 36	
Credit balance		$2,055 93

FINANCIAL STANDING OF FARM NOVEMBER 30, 1886.

CREDIT.

Appraisal of live stock and crops	$2,462 00	
Cash on hand	257 18	
Cash due from various parties	1,044 22	
	$3,763 40	

DEBIT.

Liabilities	$6,395 39	
Debit balance		$2,631 99
Loss for the year		$4,687 92

The heavy loss is accounted for by the disaster to the stock, reference to which is made further on in this report.

In the annual appraisals credit is not claimed for the machinery, implements and fixtures of the farm, or the furnishings of any of the farm buildings. Additions to the machinery have been made from year to year and the farm is well equipped for most operations.

The areas of crops and their yields were as follows:

Grass, 109 acres	207 tons.
Oats, 12 "	500 bushels.
Barley plots	20 "
Turnips, $\frac{3}{8}$ acre	130 "

Potatoes and other vegetables in small quantities on experimental plots.

The leading crop of the farm—grass—was very good, yielding nearly two tons per acre, over the entire area cropped.

This was the first season that the newer portion of the farm, which had been cleared and brought into a productive condition, yielded a crop of grass. It was nearly all of choice quality and harvested in fine condition. Land that had been seeded over two years bore mostly clean Timothy and Redtop. Upon the seeding of two years ago, considerable Alsike clover remained with the grasses, while all the field stocked down last year was covered with a heavy growth of Alsike clover.

The field of twelve acres upon which oats were grown lies directly in front of the farm buildings, and was noticed in my report of last year as having been reclaimed by draining, the removal of stones, and the application of manure. Early in May last, it was sown with oats and grass-seed. Although the work of drainage was sufficiently extended to serve the purpose of grass growing, the young oats on some parts of the field were injured by the heavy and protracted rain that immediately followed their seeding, with the result of a diminished crop. The stand of grass and clover plants upon the entire lot is very satisfactory.

In handling this field, it was designed to put it in such condition that it might not be necessary to break the sod upon it again, but continue it as a permanent grass field by top dressing when necessary.

After the sod becomes firm and compact, if this field can be enclosed by a wire fence and used as a park and pasture for the stock during that part of the season when not too wet, it will furnish a fine opportunity for showing the animals to visitors, as the field declines towards the center and is entirely surrounded by the highway and College roads.

I wish to call your attention to the account with the tract of twenty acres known as the "brick-yard" field. In the fall of 1882 its renovation was undertaken. Much of it was then wet and bushy, and the whole in an unproductive condition,

yielding less than three-fourths of a ton per acre, of an inferior quality of hay. It was cleaned, plowed and ditched, and in May following, thoroughly worked and fertilized with ashes and superphosphate, and seeded to oats and grass. The ashes employed were from spent tan-bark. Fourteen hundred bushels were applied to fourteen acres in connection with five hundred pounds of superphosphate per acre, and upon each of the remaining six acres, six hundred pounds of superphosphate were applied alone.

The crop of oats in 1883 was eight hundred and ten bushels. Crops in 1884, were thirty-eight tons of hay and twenty-one bushels of barley. Crop in 1885, twenty-three tons of hay. Crop in 1886, thirty-one tons of hay. During the past two years the crops upon that part of the field that received ashes and superphosphate have been very much better than upon that portion that received superphosphate only. Previous to that time the difference in yields had not been perceptible.

The entire expenditure upon the field and its crops for the four years is $988.17. The cash value of the crops for the same years amounts to $1438.95. Its condition is now very much higher than it was in 1882, the average yield of hay upon it this year being something over one and one-half tons per acre. The six acres fertilized with phosphate alone are in an exhausted condition, but the fourteen acres where ashes and phosphate were used will probably yield several profitable crops yet. The result of the treatment of this field is satisfactory, as it shows the practicability of employing purchased fertilizers in the renovation of worn lands when a supply of cattle manure is not at command for that purpose.

In accordance with previous plans, the re-construction of the long barn has been carried forward. When work was commenced upon it, it was found to be impracticable to move it standing, consequently it was taken down and the necessary changes made in its framing. The flat roof, which was considerably decayed, was replaced by one corresponding in pitch and finish with that of the large stock barn with which

this building is connected. So far as the work has gone, it has been done with a view to permanency. The building requires clapboarding, sash and glass, painting, inside finish, and pointing of the basement walls.

The plans and operations of the farm have been seriously interfered with by the calamity that occurred to the herd of cattle. It is believed important that a statement relative to the matter, giving all the information attainable concerning it, be made in this connection.

Late in the fall of 1885, the seven-year-old Jersey cow, "Betsy" was troubled with a slight, husky cough which gradually increased in severity until she became emaciated and her recovery doubtful. She was slaughtered the last of January and a post morten examination revealed a badly diseased condition of the lungs, well defined tubercles in advanced stages of development being abundant.

About this time three other animals, viz: the Jersey-Ayrshire "Pet" and the Jerseys "Princess Alba" and "Crummie," were affected with slight husky coughs, which in the absence of the experience with Betsy would not have caused serious anxiety. They were immediately removed to the "White" barns some sixty rods distant and cared for there. In the treatment of these animals, those remedies recommended by the standard works on veterinary science were employed but with no preceptible advantage.

The last of February the most of the animals in the herd commenced coughing almost simultaneously. The cough varied in its frequency in different individuals. In the earlier stages, the cough was occasional, low, and husky. All of them looked and felt well. The hair was lively, eyes were bright and spirits good as shown by their disposition to play when turned from their stalls to water. The appetite was good and the milk flow not diminished. As the disease advanced the cough became more frequent and somewhat harsher but never loud or seemingly painful. In no instance were there foul nostrils or anything coughed up. The void-

ings were somewhat dryer and darker colored than from animals in perfect health. The urine was not perceptibly affected, either in quantity or color.

The temperature was slightly higher than usual, and after exertion, the breathing was considerably quickened. Pet had failed more than any other. Her milk flow was lessened and she moved with evident effort. Both "Pet" and "Princess Alice" bloated at different times late in the disease, and were relieved of gas by puncturing. Others bloated slightly. In a few instances the appetite for food was lessened and the flow of milk reduced.

Pet was slaughtered February 21st. Her lungs were found filled with bunches of varying sizes. The lower parts of the lungs were hard, cheesy, somewhat enlarged and very yellow. We were now confident that the disease was tuberculosis and the "Commission on Contagious Diseases of Cattle" was immediately notified of the presence of the disease. The Commission visited the herd March 6th, pronounced the disease tuberculosis and ordered a quarantine of the entire herd.

The herd was again visited by the Commissioners March 12th when Princess Alba and Princess Alice were slaughtered. The lungs of both were found affected.

In response to the united request of Governor Robie and the State Cattle Commissioners, the Department of Agriculture directed the Assistant Veterinarian, Dr. Michener of New York, to visit the diseased cattle, which he did in conjunction with Dr. Bailey and Mr. Gilbert of the State Commission, April 21st.

An examination was made and out of the herd numbering fifty-one animals before any losses, only four were found, which were pronounced to all appearances, clear of the disease. The Commissioners ordered the entire herd of animals killed and buried, which was done during the two following days, April 22d and 23d.

When I came to the farm in 1882, there was a Short-Horn cow here that had a cough. With liberal feeding she appar-

ently recovered, and after doing good work for nearly two years, she failed, became emaciated, and was destroyed. No cough was noticeable during her last sickness.

In 1884, another young Short-Horn cow had a slight cough, but recovered from it. Refusing to breed, she became fat and was sold for beef, but upon slaughtering, her lungs were found badly affected. The meat being rejected, the matter was thus called to our attention. At another time, three young heifers and a young bull were troubled with stiff necks and a tendency to carry their heads on one side. The attention of a practicing veterinary surgeon was called to these animals. He thought the trouble might have arisen from feeding over a rather high manger. Upon his recommendation iodine was used upon the necks and throats of the animals, and the manger lowered. Two of the animals partially recovered, and two died. None of them coughed. This was in the winter of 1884–85.

Mr. Henry Boardman of Bangor states that on November 25, 1876, he bought a cow at the farm, and had her slaughtered in a few weeks, and found her full of tubercles, not only on the lungs, liver and heart, but also on the plates and ribs.

Mr. Henry Davis of Stillwater states that in 1880 he purchased a beef cow at the College farm, and upon slaughtering her, found her lungs badly decayed.

These facts which have recently come to our knowledge admit of explanation by the later developments, although they were not understood at the time of their occurrence, and seem to indicate that tuberculosis had been present in the herd for several years. Granting this assumption to be correct, why it progressed slowly for so long a time and finally developed with violence last winter is not easily explained.

The herd numbered fifty-one animals before its destruction. Forty-eight of them were registered thoroughbreds, and the remaining three were cross-bred Jersey-Ayrshires. Of the

forty-six thoroughbreds, ten were Short-Horns, seventeen were "Maine State Jerseys," and twenty-one were "American Cattle Club Jerseys."

These animals, or the stock from which they were bred, had mostly been selected in different localities where desirable specimens could be found, and placed here within the last five years.

The aim had been to secure the best animals obtainable, and as the result of this selection and breeding the herd had attained a very high degree of excellence. Had it been put upon the market last winter, before the presence of the disease came to our knowledge, the sum of five thousand dollars could easily have been realized from its sale.

The following reports of Dr. Michener will be read with interest in this connection.

269 W. 38TH STREET, NEW YORK,
April 29, 1886.

To His Excellency, Frederick Robie, Esq., Governor of Maine:

DEAR SIR:—Pursuant to an order from Hon. Norman J. Colman, United States Commissioner of Agriculture, I started on the 19th instant, for Orono, Maine, to advise with your State Veterinarian, Dr. Geo. H. Bailey, as to what disposition should be made of the cattle belonging to the State College farm. Arriving there before the State authorities I had ample time to study carefully the history and surroundings of the herd.

From G. M. Gowell, Superintendent of the farm, I learned that for the past eight or ten years there occurred an occasional death among the cattle, and as nearly as I could judge from his description these animals were affected with the same disease that prevailed at this examination.

The trouble was evidently a pulmonary one, a more or less persistent cough, irregular or hurried breathing and emaciation being witnessed in all.

I was first led to examine the hygienic surroundings. The barn is a large one and has ample room for the stock. It is well lighted and thoroughly ventilated; the air being surprisingly pure as I entered the building early in the morning. The stalls are kept very

clean, as the animals themselves show. The manure is thrown in the basement, but a free current of air prevents any appreciable odor from rising to the stable. The feeding is judicious in every sense, and the food, both grain and hay, is of the best quality.

From the history of previous cases, and upon examining a few of the cattle that presented the most marked symptoms, I was able to diagnose the disease as tuberculosis beyond any reasonable doubt.

Upon the arrival of the State authorities it was decided to destroy some of the worst cases for post-mortem purposes. The animals thus selected were some that State Veterinarian Bailey had previously examined and placed by themselves in the horse barn. I will refer to some of them by name and give the lesions presented. Cow *Pansy* presented numerous miliary tubercles throughout the left lung, and in the right were masses of tubercular deposits of various sizes, situated chiefly near the apex of the lung. These masses had become cheesy or calcareous.

Hyacinth presented smaller aggregations of grayish white nodules throughout the substance or both lungs.

Flossy—Both lungs affected; in the right lung near its centre was noticed a large abcess, due to softening and breaking down of tubercular deposits. The left humero-radial or elbow joint was considerably enlarged and had given rise to lameness during the past few months. The knee joint of the same leg was first involved, but now appeared healthy. The synovial membrane and extremities of the humerus and radius were in a diseased condition, but presented no calcareous deposits or appearances of rheumatoid arthritis. The prepectoral and brachial lymphatic glands were found to contain much cheesy and calcareous matter.

Cows *Edith*, *Crummie*, *Mildred*, *Blanche*, and others showed extensive granulations on the costal and pulmonary pleuræ, which in some instances firmly united the lungs to the ribs.

Helen Hart, in addition to similar lesions of the thoracic organs, revealed well-developed tubercles in the udder. Some of these had broken down and their contents was discharged into the milk sinuses, and tainted the milk—a fact that had been observed by those in charge for some days.

It does not appear necessary for me to detail the lesions found in individual cases beyond this, except to remark that other organs of the body were frequently involved—liver, intestines, etc. The *calves* presented mostly diseased conditions of lymphatic glands and

intestines; diarrhœa and other digestive disorders being here most marked.

Out of the forty-seven (47) head destroyed, *all* (four or five calves were not examined, but were killed because of being the offspring of diseased dams, and having occupied the infected barn,) presented symptoms which, as you are probably aware, were accurately interpreted in every instance, even where but very small and deep-seated portions of lung tissue were involved.

The uniformity of these symptoms and pathological lesions must prove to all thinking minds (whether little or *nothing* is known of the appearances of the disease in question) that there existed in each individual member of the herd one and the same disease.

That this disease is both hereditary and contagious seems also patent from the facts that calves scarcely one month old were plainly affected, and that those animals recently bought and placed with the diseased cattle show upon post-mortem examination the initial lesions of this malady.

In answer to those who contend that this disease was caused by improper feeding, or lack of sufficient ventilation and exercise, it is only necessary to remind you that tuberculosis, like small pox and similar diseases, is a specific malady, one that can *only* be spread by coming in contact in some way with its special and determined infecting agent.

The assertions that cotton-seed meal had anything to do with the origin or spread of this disease are simply ridiculous.

Taking into consideration, then, the facts that a very large proportion of the herd (all we might almost say) were affected with a disease communicable not only from animal to animal, but from animal to man; that in the future, death after death would occur yearly; that scarcely by any possibility could calves be raised from any of these cows that would reach maturity free from this pestilence; that animals purchased elsewhere and placed with this herd would (as past experience proves) soon become diseased; and that the barn itself is now infected, and must be left vacant for a considerable period; parts of it (floors, etc.) removed and burned, and a thorough and repeated disinfection be resorted to,—it becomes apparent to all, I think, that the only safe and proper course to pursue was the one advised, *i. e.*: the slaughter of the entire herd.

Some of the meat might have been used as food had it not been for the prejudice that was so generally felt against it. For some

time it has been impossible to sell even the butter from these cows and I was assured by every one likely to know, that under no circumstances could a pound of the meat be disposed of now, or even months later.

The swine on the farm, that had been fed largely on the milk of these cows, were examined, and one pig nearly a year old was killed and carefully examined, but no traces of the tuberculosis could be detected. The butcher who kills the pigs raised on the farm states that in some instances the liver has appeared diseased. In conclusion I can only recommend that when other animals are purchased that care be taken to buy from herds where this disease has never existed, and that each animal be examined at the time of purchase by your State Veterinarian.

Very respectfully,

CH. B. MICHENER, V. S.,
Inspector Bureau of Animal Industry.

I fully concur with the above report.

GEO. H. BAILEY, D. V. S.,
Commissioner for Maine on Contagious Diseases of Animals.

The buildings have been disinfected through the agency of carbolic acid, sulphuric acid, copperas solution, and fumes of burning sulphur. Those parts of the floors upon which animals stood were removed and replaced by new material.

The quarantine was raised by the following communication November 18, 1886.

PORTLAND, Nov. 18, 1886.

To the Trustees of the Maine State College of Agriculture and Mechanic Arts:

This is to certify that on November 10th I visited Orono to inspect the buildings that had contained the Jersey herd destroyed by order of the Cattle Commissioners, and find that all the recommendations and requirements prescribed by Dr. Michener and myself have been faithfully complied with, and believe the buildings to be in a safe condition to introduce new stock, as it is possible to make them through the agency of disinfectants and thorough ventilation. The means adopted meet my entire approval.

GEO. H. BAILEY, D. V. S.,
State Veterinary Surgeon.

The breeding of Shropshire sheep and Chester White pigs and their distribution by sale has been continued as in past years.

Experimental work has been interfered with by the loss of the stock, particularly experiment number 17 wherein two Short-Horn steers had been fed from birth, to thirteen and sixteen months of age, respectively. It is hoped we may soon be in condition to repeat and carry on a similar experiment to completion.

Experiment No. 13—Continued.

The question:—Can profitable crops be grown continuously by use of commercial fertilizers, but without aid from animal manure,—presses itself forward for examination.

A field of five and one-half acres of uniform clay loam soil, underlaid by compact clay subsoil, offered opportunities for this experiment upon plots sufficiently large to show their products and costs, in actual field culture.

Previous to 1882, this field had been in grass many years, and was much reduced in fertility. It was used in 1882 and 1883 as a fertilizer test field, with the plots running in an opposite direction to those of the present plan, and cropped with beans each year.

In 1884, it was divided into nine plots, each one of which contained one-half acre or more, and received the kind and quantity of fertilizing material as indicated in the accompanying plan. The field was sown to barley, using two and one-half bushels of seed per acre, and seeded to Timothy and Red clover.

Owing to the severe winter of 1884–5, the grass was not in condition to produce a full crop at the harvest of 1885. Some plots were damaged more than others. More seed was sown in the spring of 1885 and a good stand secured over the whole field for the harvest of 1886. There has been much more clover upon plot 2 (ashes) and plot 7 (potash) than upon any others. Attention is called to the yields of plot

number 7 (potash). The small amount of potash, 200 pounds, costing five dollars, is having a good effect.

Plot.	Fertilizer Per Acre in 1884.	Cost of Fertilizer per Acre in 1884.	Yield of Barley per Acre in 1884.	Yield of Hay per Acre in 1885.	Yield of Hay per Acre in 1886.
No. 1.	Bradley's X. L. Superphosphate, 500 lbs.	$10.00	37 bush.	2316 lbs.	3524 lbs.
No. 2.	Unleached Ashes from mixed wood, 75 bushels.	15.00	38.8 "	3520 "	3992 "
No. 3.	Rockland Lime, 12 casks.	12.50	22.5 "	2288 "	2872 "
No. 4.	Raw Bone, 500 lbs.	9.50	27.8 "	1185 "	2920 "
No. 5.	Dissolved Bone, 500 lbs.	10.00	25.2 "	2275 "	2252 "
No. 6.	Nothing.	-	22.5 "	2352 "	2185 "
No. 7.	Muriate of Potash, 200 lbs.	5.00	31.5 "	2828 "	3008 "
No. 8.	Sulphate of Ammonia, 200 lbs.	9.00	18.0 "	2208 "	2595 "
No. 9.	Bradley's X. L. Superphosphate, 500 lbs.	10.00	38.2 "	2336 "	2721 "

No fertilizers were applied in 1885 or 1886.

Each plot will be supplied as often as is thought necessary with the same kind of fertilizing material that it has already received.

The experiment offers opportunities for the study of other questions besides the leading one.

First: The comparison of raw bone with dissolved bone.

Second: Are the results of ashes upon this soil to be attributed to the lime, or potash which they contain? The products from the lime plot and the potash plot must settle this point.

Third: What will be the plant-producing capacity of the unmanured plot, after a series of years? or, will a clay soil become entirely exhuasted of its fertility when subjected to thorough mechanical working, and crop rotation?

Just as this report is being closed, there is received at the farm, a choicely-bred Jersey bull calf, a present from Houghton Farm, Mountainville, N. Y. It was sent entirely without solicitation, and in recognition of the disaster attending our stock-breeding interests. This bull is from one of the most valuable lines of Jersey blood known, being a grandson of the noted cow Eurotus. Our thanks for the favor are most earnestly tendered.

Respectfully,

G. M. GOWELL.

TREASURER'S REPORT.

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

GENTLEMEN: Your Treasurer herewith submits his annual report of the receipts and disbursements for the College the past year.

RECEIPTS.

GENERAL.	
Balance on hand December 4, 1885	$3,194 48
State appropriation	4,050 00
Tuition of students	2,665 00
ENDOWMENT.	
Interest on State bonds	7,098 00
" city of Bangor bonds	180 00
" from Hallowell Savings Bank	76 87
" " Augusta " "	132 82
	17,397 17

DISBURSEMENTS.

GENERAL.	
M. C. Fernald, for periodicals	48 65
Albert White, for insurance	62 50
M. C. Fernald, to pay advertising	50 00
M. C. Fernald, " boarding-house bills	700 00
M. C. Fernald, " water supply bills	250 00
M. C. Fernald, " for apparatus	400 00
M. C. Fernald, " " gravel for sidewalks	50 00
G. M. Gowell, " " removing and repairing barn	738 00
Z. A. Gilbert, Trustee expense	21 20
A. L. Moore, " "	37 75
A. M. Robinson, " "	20 00
Lyndon Oak, " "	27 50
R. B. Shepherd, " "	12 00
C. W. Keyes, " "	26 80
E. E. Parkhurst, " "	54 00
W. T. Haines, " "	19 75
ENDOWMENT.	
G. M. Gowell, Farm Superintendent, salary	1,000 00
Salaries of the Faculty	11,875 00
Balance on hand December 2, 1886	2,004 02
	17,397 17

SUMMARY.

Cash on hand last report	$ 3,194 48
Total receipts for the year	14,202 73
Total payments for the year	15,393 15
Cash on hand December 2, 1886	2,004 02
ENDOWMENT FUND.	
6 per cent State of Maine bonds	118,300 00
6 " City of Bangor "	3,000 00
6 " Hallowell C. and S. Academy bonds	4,000 00
Deposit in Augusta Savings Bank	2,000 00
" Hallowell " "	1,000 00
Loaned to College farm	1,000 00
Cash in the Treasury	2,000 00

J. FRED WEBSTER, *Treasurer.*

ORONO, December 3, 1886.

Having examined the foregoing account of the Treasurer, I find the same properly vouched and correctly cast.

By direction of the Trustees.

A. M. ROBINSON.

SUMMARY OF

METEOROLOGICAL OBSERVATIONS,

TAKEN AT THE

MAINE STATE COLLEGE of AGRICULTURE and the MECHANIC ARTS,

Latitude, 44° 54′ 2″ N. Longitude, 68° 40′ 11″ W.

From January, 1869, to January, 1887.

BY PRESIDENT FERNALD.

Height of instruments above the level of the sea, 134 feet until June, 1879, and 129 feet since that date.

Explanations, Deductions and Remarks.

The hours of observation are the same as those formerly adopted by the Smithsonian Institution, viz: 7 A. M. and 2 P. M., and 9 P. M., local time.

The figures in the columns headed "Force or pressure of vapor," show the height at which a column of mercury is maintained by the weight of the moisture of the air.

The warmest day of the year 1886 was July 7th, when the mean temperature was 78°.0, and the coldest day was January 12th, when the mean temperature was 15°.3 below zero.

The highest temperature (92°.5) recorded during the year was on the 7th of July, and the lowest temperature (26°.5 below zero) on the 12th of January.

The range of temperature between the two extremes is 119°.0, which is greater by 4°.5 than the average range between the extremes for the last eighteen years.

The warmest day within the period covered by the tables was August 7th, 1876, when the mean temperature was 85°.3, and the coldest day January 8th, 1878, when the mean temperature was 17°.2 below zero. The highest temperature (96°.7) occurred on August 6th, 1876, and the lowest temperature (35°.6 below zero) on January 8th, 1875.

A comparison, as regards temperature, of the several months of 1886, with the mean temperature of corresponding months for eighteen years, is given below:

Months.	Mean temperature from 1869 to 1886 inclusive.	Mean temperature for 1886.	
January	15°.43	17°.98	2°.55 warmer.
February	18°.98	18°.32	0°.66 colder.
March	26°.81	26°.89	0°.08 warmer.
April	40°.04	48°.66	3°.62 "
May	52°.29	53°.43	1°.14 "
June	62°.34	61°.57	0°.77 colder.
July	67°.51	67°.09	0°.42 "
August	65°.80	65°.55	0°.25 "
September	57°.47	56° 24	1°.23 "
October	47°.25	45°.50	1°.75 "
November	33°.45	37°.05	3°.60 warmer.
December	20°.75	18°.08	2°.67 colder.

The year 1886 (mean temperature 42°.61) averaged 0°.35 warmer than the mean temperature of the eighteen years under notice.

The earliest autumnal frost was on the morning of September 14th, followed by others on September 19th, 21st, 22d and 23d, the last being destructive to vegetation.

The principal thunder storms of the season were on May 5th and 20th, June 3d, 11th and 26th, July 3d, 19th and 22d, August 11th, September 19th and 29th, and November 6th and 7th.

The rainfall and melted snow of 1886 amounted to 48.04 inches, a quantity larger by 3.77 inches than the average for eighteen years; the snowfall was 136.5 inches, a quantity greater by 42.67 inches than the average for the same period.

The number of days in 1886 on which the sky was at least eight-tenths covered with clouds was 101, or 28 per cent of the whole number. The number of days on which at least .01 of an inch of rain or snow fell, was 130, or 36 per cent of the whole number; the number of days, therefore, without any considerable quantity of rain or snow, was 235, or 64 per cent of the whole number.

During the months of April, May, June, July, August and September the prevailing wind was S. W. and S.; during the other months of the year, N. W. and W. Heavy winds prevailed on January 7th, February 20th, 26th, 27th and 28th, March 1st, June 18th, October 16th, November 7th, 14th, 15th and 26th, and December 2d and 16th, the wind of March 1st and November 7th rising to a strong gale.

The prevailing wind for the eighteen years, from 1869 to 1886, inclusive, was from the north-west and west. The relative direction and force of the wind for this period are indicated approximately by the following numbers: N. W. and W., 4; S. W and S., 3; S. E. and E., 1; N. E. and N., 2.

The principal auroras of 1886 were on the evenings of March 26th and 28th, April 11th and 20th, June 29th, September 20th, 29th and 30th, October 1st, 18th and 28th, and November 2d; the aurora of June 29th being especially brilliant from broad streamers extending to the zenith.

The principal lunar halos were on February 18th, April 12th, June 12th, November 8th and December 11th, and the most marked solar halos on August 16th and December 30th.

The barometer indicated the greatest pressure in the month of February, and the least in the same month. The range between the two extremes was 2.175 inches. The least mean pressure was during March, and the greatest during October, when the average height of the mercury in the barometer, at an elevation of 129 feet above the sea level, was 30.053 inches. The mean humidity of the air for the year was .78.

SUMMARY BY MONTHS—1886.

Months.	Thermometer in the Open Air.											Rain and Snow.		Cl'ds	Winds.				Barometer.			Relative humidity or fraction of saturation.		
	Mean of warmest day.		Mean of coldest day.		Highest temperature.		Lowest temperature.		Mean of maximum temperatures.	Mean of minimum temperatures.	Mean of three daily observations.	Amount of rain or melted snow—inches.	Amount of snow—inches.	Mean percentage of cloudiness.	Per cent of direction and force.				Barometer height reduced to freezing point of water.					
	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.							N. W. and W.	S. W. and S.	S. E. and E.	N. E. and N.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
		°		°		°		°	°	°	°													
January	5	45.9	12	-15.3	5	47.7	12	-26.5	27.46	7.85	17.98	6.64	37.0	.64	.49	.05	.19	.27	30.718	28.826	29.932	100	58	90
February	13	44.6	5	-10.5	9	50.2	5	-20.8	26.88	8.65	18.32	5.42	32.0	.57	.53	.16	.14	.17	30.731	28.556	29.840	100	55	87
March	31	43.2	1	-10.0	26	46.5	10	-18.7	36.55	17.33	26.89	2.87	22.0	.51	.58	.17	.08	.17	30.583	29.079	29.746	100	38	76
April	23	60.7	7	29.0	23	76.2	4	19.3	53.81	33.67	43.66	1.80	1.0	.40	.25	.40	.07	.28	30.493	29.566	30.028	100	10	67
May	30	63.3	15	45.7	23	78.3	2	34.6	63.67	43.49	53.43	4.67	–	.55	.22	.46	.20	.12	30.206	29.255	29.796	100	23	72
June	22	68.9	14	57.1	22	83.0	5	46.5	72.32	52.49	61.57	2.74	–	.50	.30	.62	.02	.06	30.177	29.274	29.841	100	34	73
July	7	78.0	23	60.5	7	92.5	12	51.2	77.31	58.95	67.09	1.05	–	.49	.39	.46	.12	.03	30.078	29.481	29.826	100	33	73
August	27	76.3	17	57.8	27	90.5	18	43.2	76.49	56.22	65.55	2.27	–	.48	.29	.58	.06	.07	30.248	29.344	29.812	100	38	75
September	8	72.9	22	41.9	8	87.8	23	30.8	65.95	46.41	56.24	4.11	–	.52	.36	.43	.10	.11	30.415	29.632	30.017	100	35	79
October	9	58.3	24	33.5	9	75.0	17	21.2	56.31	34.86	45.50	1.42	–	.45	.44	.33	.07	.16	30.522	29.530	30.053	100	30	75
November	6	51.8	27	23.7	1	58.1	27	14.5	42.98	29.61	37.05	8.67	6.0	.65	.47	.31	.12	.10	30.252	29.144	29.820	100	50	79
December	23	41.1	30	- 9.4	24	47.4	30	-15.0	26.63	9.33	18.08	6.38	38.5	.58	.52	.21	.01	.26	30.521	29.114	29.966	100	46	86
	J'ly		Jan.		J'ly		Jan.																	
Year	7	78.0	12	-15.3	7	26.5	12	-26.5	52.20	33.24	42.61	48.04	136.5	.53	.40	35	.10	.15	30.731	28.556	29.889	100	10	78

SUMMARY BY YEARS—From 1869 to 1886, Inclusive.

Year	Temperature in the Open Air.										Rain and Snow.		Clds.	Winds.				Barometer.			Force or pressure of vapor in inches.			Relative humidity or fraction of saturation.		
	Mean of hottest day.		Mean of coldest day.		Highest temperature		Lowest temperature		Mean of maximum temperatures	Mean of minimum temperatures.	Mean of three daily observations.	Amount of rain or melted snow in gauge—inches.	Depth of snow—inches.	Mean percentage of cloudiness.	Per cent of direction.				Barometer height reduced to freezing point.								
	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.							N. W. and W.	S. W. and S.	S. E. and E.	N. E. and N.	Maximum.	Minimum.	Mean.	Maximum	Minimum.	Mean.	Maximum.	Minimum.	Mean.
		°		°		°		°	°	°	°																
1869,	July 11	74.2	Jan. 22	-3.8	July 11	87.2	Mar. 6	-22.0	50.01	33.37	41.77	44.72	84.92	.55	.41	.29	.14	.16	30.519	28.858	29.780	.826	.005	.250	100	25	76
1870,	July 24	82 8	Jan. 14	-9.7	July 24	94.0	Feb. 4	-17.0	53.02	35.45	44.26	40.98	78.75	.50	.35	33	10	.22	30.578	28.902	29.791	.878	.016	.279	100	13	74
1871,	May 30	76 0	Jan. 23	-14.9	May 30	88.6	Jan. 23	-20.6	50.44	33.33	41.92	41.63	80.50	.50	.42	.33	.10	.15	30 585	29.000	29.795	.956	.006	.244	100	17	75
1872,	July 16	79.5	Dec. 25	-11.8	June 30	90.6	Dec 25	-23 0	50.02	33.22	41.60	48.54	113.00	.53	.37	.28	.13	.22	30.446	28.712	29.700	.793	.011	.258	100	23	77
1873,	July 30	75.5	Jan. 30	4.9	July 26	92.0	Jan. 30	-26.5	49.93	31.28	40.93	40.78	124.00	.49	.38	.30	.10	.22	30.680	28.423	29.794	.778	.009	.232	100	20	74
1874,	July 15	76.3	Jan. 26	-15.5	July 15	86.3	Feb. 2	-26.0	50.18	32.21	41 35	44.94	132.00	.52	.37	.36	.08	.19	30.719	28 981	29.825	.794	.009	.240	100	19	76
1875,	Aug. 29	74 8	Nov 30	- 9.8	Aug. 29	87.8	Dec 20	- 23.0	48.49	30 11	39.58	41 94	93 80	.50	.40	.30	.09	.15	30.550	28.939	29 814	.844	.014	.239	100	24	76
1876,	Aug. 7	85.3	Feb. 24	13.4	Aug. 6	96.7	Dec 26	-21.5	50.74	32.32	42.03	52.37	123.00	.49	43	.30	.08	.19	30.783	28.458	29.808	.935	.014	.250	100	21	76
1877,	Aug. 24	75 1	Jan 25	11.3	June 1	89 0	Jan. 26	-32.5	52.45	33.63	43.39	40.17	66.50	.52	.34	.30	.12	24	30 494	28.888	29.837	.762	.009	.269	100	19	76
1878,	June 30	81.9	Jan. 8	-17.2	June 30	93.5	Jan. 8	-35.6	52.07	35.38	44.34	48 57	59.50	.56	.33	.33	.13	.21	30.554	28 794	29.790	.872	.009	.280	100	20	78
1879,	July 16	77 8	Dec. 21	11.7	Aug 2	88.0	Dec 27	-26 0	50.10	31.67	41.62	46.73	112.00	.51	.38	.37	.07	.18	30.638	28.537	29 851	.843	.012	.258	100	15	75
1880,	July 10	82.3	Feb. 2	-4.4	July 10	94.8	Jan. 14	-15.4	52.05	33.50	43.85	33.81	69.00	.50	.39	.23	.18	.20	30.644	29.090	29 874	.790	.015	.269	100	23	75
1881,	Aug. 5	78.1	Feb. 2	- 9.1	Aug. 5	91.0	Jan. 2	-18.2	52.11	34 98	43.87	42 80	54 50	.54	.45	.18	.14	.23	30.647	28.919	29 86	.891	.019	.281	100	21	77
1882,	Aug. 6	80.7	Jan. 24	-10.0	Aug. 5	92.0	Jan. 25	-22.4	50.76	33.10	42.54	41.26	110.00	.49	.46	.18	.12	.24	30.724	29.121	29.885	.819	.016	.261	100	24	75
1883,	July 6	75.1	Dec 23	-13.1	July 7	85.6	Jan. 6	-25.0	50.04	31.79	40.72	40.60	53 00	.48	41	.30	13	.16	30 641	28.750	29 904	.860	.015	.259	100	18	78
1884,	Aug 18	77.2	Dec 20	10.4	Aug. 18	86.0	Jan. 28	-29.0	51 57	33.23	42.85	44.95	90.00	.56	.35	.33	.14	.18	30.716	28.768	29.875	-	-	-	100	16	81
1885,	July 25	76.4	Jan 22	-11 5	July 25	89 2	Jan. 31	-22.3	50.54	32.30	41.37	52.99	108.00	.49	41	.32	.11	.16	30.608	28.800	29.849	-	-	-	100	24	79
1886,	July 7	78.0	Jan 12	15 3	July 7	92.5	Jan 12	-26 5	52.20	33.24	42.61	48.04	136.50	.53	.40	.35	.10	.15	30.731	28.556	29.889	-	-	-	100	10	78
	1876.		1878.		1876.		1878.					Mn.	Mean.														
18 yrs	Aug. 7	85.3	Jan. 8	17.2	Aug. 6	96.7	Jan 8	-35.6	50.93	33.62	42.27	44.27	93.83	.52	.40	.29	11	.20	30 783	28.423	29.834	-	-	-	100	10	76

APPENDIX.

CATALOGUE

OF THE

Maine State College of Agriculture and Mechanic Arts.

ORONO, MAINE, 1886–87.

TRUSTEES.

HON. LYNDON OAK, GARLAND, *President.*
HON. A. M. ROBINSON, DOVER.
HON. DANIEL H. THING, MT. VERNON.
CAPT. CHARLES W. KEYES, FARMINGTON.
WM. T. HAINES, ESQ., WATERVILLE, *Secretary.*
HON. E. E. PARKHURST, PRESQUE ISLE.
GEN. R. B. SHEPHERD, SKOWHEGAN.
ARTHUR L. MOORE, B. S., LIMERICK.
HON. Z. A. GILBERT, EAST TURNER,
Secretary of Maine Board of Agriculture, *ex-officio.*

TREASURER:

J. FRED WEBSTER, ORONO.

EXECUTIVE COMMITTEE:

HON. LYNDON OAK.
HON. A. M. ROBINSON.
WM. T. HAINES, ESQ.

EXAMINING COMMITTEE:

HIS EXCELLENCY JOSEPH R. BODWELL.
REV. CHARLES F. ALLEN, D. D.
GEN. CHARLES HAMLIN.

FACULTY.

MERRITT C. FERNALD, A. M., PH. D., PRESIDENT,
and Professor of Physics and Mental and Moral Science.

ALFRED B. AUBERT, B. S.,
Professor of Chemistry, and Secretary of the Faculty.

FRANCIS L. HARVEY, M. S.,
Professor of Natural History.

GEORGE H. HAMLIN, C. E.,
Professor of Civil Engineering, and Librarian.

ALLEN E. ROGERS, A. M.,
Professor of Modern Languages, Logic and Political Economy.

WALTER BALENTINE, M. S.,
Professor of Agriculture.

CHARLES H. BENJAMIN, M. E.,
Professor of Mechanical Engineering, and Registrar.

LIEUT. CHARLES L. PHILLIPS, 4th U. S. ARTILLERY,
Professor of Military Science and Tactics.

WALTER FLINT, M. E.,
Instructor in Shop-Work.

GILBERT M. GOWELL,
Farm Superintendent.

AARON E. SPENCER,
Steward.

STUDENTS.

SENIOR CLASS.

Burleigh, John Henry,	Vassalboro'.
Cilley, Luis Vernet Prince,	Rockland.
Clark, Bert Elmer,	West Tremont.
Clark, Irving Mason,	Bethel.
Colby, David Wilder,	Skowhegan.
Coffin, Edward Voranus,	Harrington.
Hicks, Alice Albur,	Hampden.
Houghton, Austin Dinsmore,	Fort Fairfield.
Kirkpatrick, Fred Hudson,	Bangor.
Lazell, James Draper,	Rockland.
Mason, Charles Ayers,	Bethel.
McNally, Henry Allen,	Fort Fairfield.
Merrill, Fenton,	Orono.
Saunders, Addison Roberts,	Hanover.
Sears, Cassius Almon,	Fort Kent.
Stevens, Charles Hildreth,	Fort Fairfield.
Trask, Frank Ellsworth,	Bethel.
Vose, Charles Thatcher,	Milltown, N. B.
Webb, Howard Scott,	Skowhegan.
Williams, John Sumner,	Guilford.

JUNIOR CLASS.

Andrews, Hiram Bertrand,	Cape Elizabeth.
Bachelder, George Stetson,	Exeter Mills.
Blanchard, Charles DeWitt,	Oldtown.
Boardman, John Russell,	Augusta.
Brick, Francis Stephen,	Biddeford.
Buker, Albion Henry,	Rockland.
Butler, Harry,	Hampden.
Campbell, Dudley Elmer,	North Harpswell.
Eastman, Fred Langdon,	East Hiram.
Elwell, Edward Henry, Jr.,	Deering.
Hancock, Willie Jerome,	Saco.
Hatch, John Wood,	Presque Isle.
Howes, Claude Lorraine,	Boston, Mass.
Leavitt, Hannah Ellis,	Norridgewock.
Lincoln, Harry Foster,	Dennysville.
Lord, Thomas George,	Skowhegan.
Marsh, Ralph Hemenway,	Bradley.
Miller, Seymore Farrington,	Burlington.
Philbrook, William,	Shelburne, N. H.
Rogers, Seymour Everett,	Stetson.
Ruth, Alfred Smith,	Linneus.
Seabury, George Edwin,	Fort Fairfield.
Small, Frank Llewellyn,	Freeport.
Smith, Frank Adelbert,	East Corinth.
Sturtevant, Charles Fremont,	Bowdoinham.
Wilson, Nathaniel Estes,	Orono.

SOPHOMORE CLASS.

Briggs, Fred Percy,	Hudson.
Clark, Benjamin Randall.	North Lubec.
Coffin, Alphonso John,	Harrington.
Cushman, Charles Granville,	North Bridgton.
Edgerly, Joseph Willard,	Princeton.
Ferguson, Jeremiah Sweetzer,	Searsport.
Freeman, George Gifford,	Cherryfield.
Gay, George Melville,	Damariscotta.
Gould, Charles Benjamin,	Orono.
Haggett, Eben Raymond,	Newcastle.
Leavitt, Nellie Louise,	Norridgewock.
Lewis, John Winchcombe,	Milton Mills, N. H.
Littlefield, John Elmer,	Brewer.
Matthews, Maude Arnold,	Stillwater.
Reed, John,	Benton.
Reed, Nellie Waterhouse,	Stillwater.
Sargent, William Henry,	Brewer Village.
Stevens, Fred,	Gouldsboro'.
Tripp, Norman,	Unity.
Vickery, Gilbert Scovil,	Bangor.
Wilson, Mottie Frank,	Orono.

FRESHMAN CLASS.

Abbott, Asa Frost,	Upton.
Andrews, Frank Orris,	Rockland.
Bartlett, Frank Theodore,	Norway.
Blackington, Ralph Harvey,	Rockland.
Cargill, Carroll David,	Livermore Falls.
Clark, Hugo,	Lincoln.
Dillingham, Charles Albert,	Oldtown.
Dow, Fred Todd,	Gorham.
Drew, Albert Wilson,	Canaan.
Dunton, Harris Drummond,	Boothbay.
Farrington, Horace Parker,	Cape Elizabeth.
Heath, Everett Fenno,	Bangor.
Hodgdon, George Washington,	Rumford.
Jones, Leon Houston,	Rockland.
Kelley, Edward Havener,	Belfast.
Kenniston, Irving Chase,	Boothbay.
Lyford, Albert Lewis,	Corinna.
Morey, Elmer Lake,	Colombo, Ceylon.
Morrill, Edmund Needham,	Deering.
Owen, John Wesley, Jr.,	Saco.
Peirce, Varna John,	Hudson.
Peirce, William Bridgham,	Hudson.
Pierce, William Barron,	Springvale.
Reed, Fullerton Paul,	Boothbay.
Rowell, Herbert,	Solon.
Sawyer, Frank Wade,	Milford.
Swan, Clarence Buzzell,	Oldtown.
Wallace, Chester Jay,	Jackson.
Webber, Gilman Hodgdon,	East Boothbay.
White, Ambrose Harding,	Bucksport.
Wight, Ralph Holbrook,	Belfast.

SPECIAL COURSE.

Collins, Frank Percy,	Fort Fairfield.
Folsom, Arthur Melville,	Oldtown.
Marsh, Alfonso Frank,	Bradley.
Sargent, Abram Woodard,	Bangor.
Webb, Fred Hamlin,	Skowhegan.

SUMMARY.

Seniors,	20	Freshmen,	31
Juniors,	26	Special,	5
Sophomores,	21		
		Total,	103

PRIZES FOR 1886.

Prentiss Prize, for best Junior Essay, awarded to John S. Williams of Guilford.

Prentiss Prize, Sophomore Declamation, first rank, awarded to C. Lorraine Howes of Boston, Mass.

Prentiss Prize, Sophomore Declamation, second rank, awarded to Ralph H. Marsh of Bradley.

Libbey Prize, for best Agricultural Essay, awarded to Austin D. Houghton of Fort Fairfield.

MILITARY DEPARTMENT.

COBURN CADETS.

Field and Staff—

Second Lieutenant CHARLES L. PHILLIPS, 4th U. S. Artillery, Commanding.

Cadet D. W. COLBY, Lieutenant and Adjutant.

Cadet E. V. COFFIN, Lieutenant and Quartermaster.

Cadet H. BUTLER, Sergeant Major.

	Co. A.	Co. B.
Captain	L. V. P. Cilley	J. H. Burleigh.
1st Lieutenant	C. T. Vose	J. S. Williams.
2d "	H. A. McNally	H. S. Webb.
3d "	B. E. Clark	F. E. Trask.
1st Sergeant	A. H. Buker	C. L. Howes.
2d "	William Philbrook	G. S. Bachelder.
3d "	D. E. Campbell	S. F. Miller.
4th "	E. H. Elwell, Jr	C. D. Blanchard.
1st Corporal	J. Reed	C. G. Cushman.
2d "	A. J. Coffin	J. W. Edgerly.
3d "	F. P. Briggs	G. S. Vickery.

DESIGN OF THE INSTITUTION.

It is the design of the Maine State College of Agriculture and the Mechanic Arts to give, at a moderate cost, the advantages of a thorough, liberal and practical education. It seeks to do this by means of approved methods of instruction, and especially by making prominent the system of practically applying in the drawing-room, in the laboratory, in the shop and in the field, the lessons of the class-room. It thus endeavors to make its courses of high practical value.

By the act of Congress granting public lands for the endowment and maintenance of such colleges, it is provided that the leading object of such an institution shall be, "without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts."

While the courses of study fully meet this requisition, and are especially adapted to prepare the student for agricultural and mechanical pursuits, it is designed that they shall be also sufficiently comprehensive, and of such a character, as to secure the discipline of mind and practical experience necessary for entering upon other callings or professions.

CONDITIONS OF ADMISSION.

Candidates for admission to the Freshman Class must be not less than fifteen years of age, and must pass a satisfactory examination in Arithmetic, Geography, English Grammar (especial attention should be given to Orthography, Punctuation and Capitals), History of the United States, Algebra as far as Quadratic Equations, and Plane Geometry.

After June 1st, 1888, the conditions of admission will include, in addition to the above requirements, Physical Geography, Book-Keeping and Algebra to Logarithms.

Although the knowledge of Latin is not required as a condition of admission, yet the study of this language is earnestly recommended to all who intend to enter this Institution.

Candidates for advanced standing must sustain a satisfactory examination in the preparatory branches, and in all the studies previously pursued by the class they propose to enter.

Satisfactory testimonials of good moral character and industrious habits will be rigidly exacted. They should be presented on the day of examination.

The day after Commencement which is the last Wednesday of June, and the day of the beginning of the first term, are the appointed times for the examination of candidates at the College.

Arrangements have been made by which applicants accommodated by the plan may pass examination for admission without incurring the expense of coming to Orono. The gentlemen named below have been appointed examiners for the sections of the State in which they severally reside:

C. P. Allen, B. S.,	Presque Isle.
H. M. Estabrooke, B. S.,	Gorham.
E. S. Danforth, B. S., S. W. Gould, B. S.	Skowhegan.
O. C. Farrington, B. S.,	North Bridgton.
Henry K. White, A. M.,	Newcastle.
Charles A. Black, A. M.,	East Machias.
Rev. W. R. Cross,	Milltown, N. B.
W. R. Howard, B. S.,	Bethel.
I. C. Phillips, A. B.,	Wilton.
Hon. N. A. Luce,	Augusta.
W. R. Whittle, A. B.,	Ellsworth.
W. E. Sargent, A. M.,	Freeport.

Examiners will indicate to parties applying, the time and special place of examination. Arrangements have also been made with the Seminary at Bucksport, by which students from that institution may be admitted to the College on certificate of qualification by the Principal, Rev. A. F. Chase.

All candidates, wherever they may arrange to be examined, should make early application to the President of the College. Applications will be recorded and regarded in the order of their reception.

COURSES OF INSTRUCTION.

Five full courses are provided, viz: A course in Agriculture, in Civil Engineering, in Mechanical Engineering, in Chemistry, and in Science and Literature.

The studies of the several courses are essentially common for the first year, and are valuable not only in themselves, but also as

furnishing a necessary basis for the more technical studies and the practical instruction of the succeeding years.

Physical Geography, taught in the first term of the Freshman year, serves as a suitable introduction to Geology, which is taken up later in each of the courses. Physiology serves as an introduction to Comparative Anatomy, and Algebra, Geometry and Trigonometry are needful preliminaries to the higher mathematics and the practical applications required in Surveying, Engineering proper and Astronomy. Botany, Chemistry and Physics are highly important branches, common to all the assigned courses, and hence taken by all the students who are candidates for degrees.

Rhetoric, French and English Literature form the early part of the line of studies which later includes German, Logic, History of Civilization, United States Constitution, Political Economy, and Mental and Moral Science, branches, several of which relate not more to literary culture than to social and civil relations, and to the proper preparation for the rights and duties of citizenship.

Composition and Declamation are regular exercises in all the courses throughout the four years. For the characteristic features of each course reference is made to the explanatory statements following the several schemes of study.

SPECIAL COURSES.

Students may be received for less time than that required for a full course, and they may select from the studies of any class such branches as they are qualified to pursue successfully. Students in Special Courses are not entitled to degrees, but may receive certificates of proficiency.

DEGREES.

The full course in Civil Engineering entitles to the Degree of Bachelor of Civil Engineering; the full course in Mechanical Engineering, to the Degree of Bachelor of Mechanical Engineering; the full course in Agriculture, Chemistry, or Science and Literature, to the Degree of Bachelor of Science.

Three years after graduation, on presentation of a satisfactory thesis with the necessary drawings, and proof of professional work or study, the Bachelors of Civil Engineering may receive the Degree of Civil Engineer; the Bachelors of Mechanical Engineering, the Degree of Mechanical Engineer; the Bachelors of Science, the Degree of Master of Science.

COURSE IN AGRICULTURE.

FIRST YEAR.

First Term.	*Second Term.*
Physical Geography.	Rhetoric and Botany
Physiology.	Algebra and Geometry.
Algebra.	French.
P. M. Labor on Farm.	P. M. Book-Keeping and Labor on Farm.

SECOND YEAR.

First Term.	*Second Term.*
Botany.	Descriptive Astronomy and Surveying or (L) History of England.
General Chemistry.	Physics.
French.	Qualitative Chemistry.
Trigonometry.	P. M. Mechanical Drawing.
P. M. Free-Hand Drawing.	Field Work and Forge Work.

THIRD YEAR.

First Term.	*Second Term.*
Agricultural Engineering, including Farm Implements. Farm Drainage and Mechanical Cultivation of the Soil, Physics.	Agricultural Chemistry, Landscape Gardening, Horticulture and Arboriculture.
Agricultural Chemistry.	Zoology and Entomology.
English and American Literature.	German.
German.	P. M. Laboratory Work and Experimental Farming or *Analysis of English Authors.
P. M. Laboratory Work or *Analysis of English Authors and Translations from the French.	

FOURTH YEAR.

First Term.	*Second Term.*
Stock Breeding and Veterinary Science.	Cultivation of Cereals, Care and Feeding of Animals, Dairy Farming and Sheep Husbandry.
Comparative Anatomy.	Mineralogy and Geology.
History of Civilization.	U. S. Constitution and Political Economy.
Logic.	Mental and Moral Science.
P. M. Experimental Farming and Agricultural Botany or *Translations from German.	

*To be taken in Course in Science and Literature in place of study preceding.

EXPLANATORY STATEMENTS.

This course is designed to fit young men to follow Agriculture as a profession with success, as well as as to prepare them for the intelligent performance of the duties of citizenship.

To this end, the curriculum of studies is largely scientific and technical, not omitting, however, those branches that have been referred to as pertaining to social and civil relations.

The instruction in Agriculture is given largely by lectures, and embraces subjects of great practical importance to the farmer, which are briefly explained under the following heads:

Agricultural Engineering.—Combined with recitations in mechanics from a text-book, lectures are given on the principles of construction and use of farm implements, illustrated by charts to the extent possible, on the construction of roads, culverts and masonry, and on soil physics, or the relations of the soil to heat and moisture, the mechanical conditions of the soil best adapted to plant growth, and the objects to be gained by cultivation.

Agricultural Chemistry. — Under this head are considered the various methods of retaining and increasing the fertility of the soil, the sources, composition and methods of valuation of commercial and farm manures, together with the principles governing their treatment and application, the composition of cattle foods, their changes and uses in the animal system, and the value and economic use of the various kinds of fodders.

Landscape Gardening. — The object of this study is to furnish correct ideas of the manner of laying out and beautifying grounds. This subject is followed by lectures on Horticulture and Arboriculture.

Cultivation of Cereals.—Lectures are given upon the best methods of cultivating the principal farm crops.

Dairy Farming.—This embraces the chemical and physical properties of milk, and the principles and practical operations that underlie its production and manufacture into butter and cheese.

Sheep Husbandry.—The characteristics and comparative merits of our different breeds of sheep are discussed, also their adaptability to different conditions and uses.

Botany. — Following recitations and practical work in Botany, lectures are given upon fungi injurious to the farmer.

Chemistry.—One term is devoted to General Chemistry, two terms to Agricultural Chemistry, one-half term to Organic Chemistry, and

the afternoons of several terms are devoted to laboratory practice, including analyses of farm products.

Zoology and Entomology.—In Zoology, the larger groups of the animal kingdom are taken up and described in lectures which are illustrated by means of diagrams, models, or the objects themselves, and the students are required to make critical studies of typical animals of each group. Such laboratory practice is regarded an indispensable training for the more advanced study of the higher animals, and also forms the basis of the study of Historical Geology.

The studies in Entomology are conducted in a similar manner. After a general review of the orders has been given, illustrated by such common insects as are familiar to all, the beneficial and injurious are taken up more in detail, their round of life described, together with the injuries they do to the products of the farmer, the gardener and the fruit raiser, as well as to our forests and building materials, and the best known means of keeping them in check. For the purpose of making the instruction as practical and impressive as may be, many of the injurious insects are carried through their transformations in the class-room, where each student can note the various changes from day to day, and learn to recognize these insect enemies in any stage of their existence; and each member of the class is required to devote some time in field-collecting, and in observing the habits and work of insects in nature.

The subject of Bee-Keeping is taken up quite at length; the different kinds of bees in a swarm, their habits, anatomy, and the mode of collecting the different products are all described and illustrated by means of elaborate models, while artificial swarming, the mode of hybridizing a swarm, and the advantages of the same, with the most approved methods now in use for the care and management of bees, are also fully described.

Comparative Anatomy.—Under Comparative Anatomy are taken up the anatomy and physiology of our domestic animals, together with a brief outline of our wild animals, so far as time permits. This is followed by instruction in Stock Breeding and Veterinary Science.

Mineralogy and Geology.—A preliminary course of lectures is given on Mineralogy, followed by laboratory practice in the determination of minerals, and in Lithology, special attention being called to gypsum, limestone, and such other minerals as are of direct importance to the students of Agriculture.

The instruction in Geology is by means of illustrated lectures and excursions, critical attention being given to the origin and formation of soils.

Law.—A course of lectures is given to the Senior Class on International and Rural Law.

Throughout the course, the endeavor is made to inculcate established principles in agricultural science, and to illustrate and enforce them to the full extent admitted by the appliances of the laboratory and the farm. So far as possible, students are associated with whatever experimental work is carried on, that they may be better fitted to continue such work in after life.

Those who complete this course receive instruction also in Mathematics, French, German, English Literature, Logic, United States Constitution, Political Economy, and Mental and Moral Philosophy, and on presenting satisfactory theses upon some agricultural topic, are entitled to the degree of Bachelor of Science.

The Course in Science and Literature includes French and German, the general, mathematical, and most of the scientific studies of the agricultural course. Instead of certain branches quite purely technical in the latter course, History, and English and American Literature are substituted.

In the special laws of the State, passed in 1872, it is provided that young ladies "who possess suitable qualifications for admission to the several classes may be admitted as students in the college."

In arranging the course in Science and Literature, reference has been had to this enactment. From this course, however, young men who desire it are not excluded, as, on the other hand, young ladies are not excluded from any of the other courses.

COURSE IN CIVIL ENGINEERING.

FIRST YEAR.

First Term.	*Second Term.*
Algebra.	Algebra and Geometry.
Physical Geography.	Rhetoric and Botany.
Physiology.	French.
P. M. Labor on Farm.	P. M. Book-Keeping and Labor on Farm.

SECOND YEAR.

First Term.	*Second Term.*
Trigonometry.	Descriptive Geometry.
General Chemistry.	Descriptive Astronomy and Surveying.
French.	Physics.
P. M. Free-Hand Drawing.	Qualitative Chemistry.
Mechanical Drawing.	P. M. Mechanical Drawing and Field Work.

THIRD YEAR.

First Term.	*Second Term.*
Henck's Field Book.	Mechanics.
Analytical Geometry.	Calculus.
Physics.	German.
German.	P. M. Isometric and Cabinet Projection and Perspective.
P. M. Field Work and Drawing.	

FOURTH YEAR.

First Term.	*Second Term.*
Civil Engineering.	Civil Engineering, Designs and Specifications.
Stereotomy.	Mineralogy and Geology.
Practical Astronomy.	Zoology.
Logic.	U. S. Constitution and Political Economy.
P. M. Topography and R. R. Surveying.	P. M. Analytical Chemistry, Designing and Thesis Work.

EXPLANATORY STATEMENTS.

The object of this course is to give the student a thorough knowledge of Higher Mathematics, Mechanics, Astronomy and Drawing, and, at the same time, a thorough drill in the use and care of the ordinary engineering instruments and in the application of the mathematical principles and rules, so that the graduates can at once be made useful in engineering work and be fitted, after a limited amount of experience in the field, to fill positions of importance and trust. The course is also arranged so as to afford, so far as can be, the education required to prepare the graduate for a responsible position among *men*, as well as among engineers.

In this course the work is identical with that of the other courses during the first year. During the fall term of the Sophomore year, students in this course work two hours each afternoon, in the drawing room, on free-hand and mechanical drawing. In the last term of this year, the subject of land surveying is taken up. The first eight weeks are devoted to tinting, shading, etc., in water colors, while the remaining twelve weeks are given to practical surveying. Besides an hour's recitation each day, the class is engaged two hours, either in the field or drawing room, becoming familiar with the use and care of instruments, putting into practice the problems found in the text-book, and making actual surveys.

In the first term of the Junior year, Henck's Field Book is used as a text-book, from which the student obtains methods of running railroad curves, putting in switches and turnouts, setting slope-stakes, and the calculation of earthwork. This is supplemented with examples worked by the student, and lectures on levelling, preliminary and final surveys and on the resistance to trains offered by grades and curves, together with the theory and construction of country roads, streets and pavements. These methods of the text-book, so far as possible, are applied in the field and the drawing room, each student in the course being required to work two hours, either in the field or drawing room, every day.

The subject of Applied Mechanics is taken up the last term of this year, in which the students receive a thorough training in the principles underlying construction, illustrated as far as possible by practical examples, in which these principles are applied. During this term, each student in the class works two hours each day in

the drawing room, where isometric, cabinet and perspective projection are taught by means of lectures and problems drawn by the students.

During the Senior year, Rankine's Civil Engineering is the text-book employed, though other works are used for reference. Besides these, much material is given in the form of lectures and notes on the blackboard.

In the first term of this year the principles of the strength of material are taken up, supplemented by information as to durability, preservation and fitness for special purposes. The principles of hydraulics, as applied in engineering, the theories of ties, struts, beams, foundations, retaining walls and arches, are fully treated.

Stone cutting is taken up this term, by lectures and practical problems, each student being required to make a complete set of working drawings of the most common forms of masonry arches.

Six weeks of this term are devoted to sanitary engineering; especial attention being given to ventilation, heating, purity of water supply and the proper drainage of houses and towns.

Also the subjects of topographical and railroad surveying are taken up this term and illustrated by a topographical survey of a portion of the College farm, and by the preliminary and final surveys for a railroad extending from the College grounds to some point on the E. & N. A. railroad, together with the drawings, calculations of earthwork and estimate of cost of building and equipping.

The first part of the last term of this year is devoted to the theory of roof and bridge trusses, lectures on the locomotive engine and a short course in Analytical Chemistry, while the greater part is given to the application of the principles already learned, to the designing and calculation of various kinds of engineering structures, and to making out estimates and specifications.

This, together with the preparation of a satisfactory thesis, completes the work in the course of Civil Engineering.

MINERALOGY AND GEOLOGY.

Mineralogy is taught by an introductory course of lectures, followed by laboratory practice in the determination of minerals and rocks, especial attention being given to their value for building purposes. This is immediately followed by a course of lectures in Geology, together with excursions for the purpose of studying the

rocks *in situ*, and also superficial deposits. Critical examinations are made in various railroad cuts, of the hardness, slaty structure, jointed structure, etc., as bearing upon the cost of excavation.

ASTRONOMY.

In the first part of the spring term, Descriptive Astronomy is taken by the students of the Sophomore Class, and Practical Astronomy during the larger part of the first term, Senior year.

The course in Astronomy is designed to enable students to determine with accuracy geographical positions. The principal instruments employed are chronometer, sextant, transit, and for work of precision, the Repsold vertical circle, an instrument made in Hamburg, Germany, in 1874, for this Institution. Practical instruction is given in the use of these instruments, and in the most approved methods of reducing observations for the determination of latitude and longitude.

DEGREES.

Students in this department secure the degree of Bachelor of Civil Engineering on graduating, with the full degree of Civil Engineer three years after, on presentation of a satisfactory thesis, with proof of professional work or study.

COURSE IN MECHANICAL ENGINEERING.

FIRST YEAR.

First Term.	*Second Term.*
Algebra.	Algebra and Geometry.
Physiology.	Rhetoric and Botany.
Physical Geography.	French.
P. M. Labor on Farm.	P. M. Book-Keeping and Labor on Farm.

SECOND YEAR.

First Term.	*Second Term.*
Trigonometry.	Descriptive Geometry.
French.	Free-Hand Drawing.
General Chemistry.	Descriptive Astronomy.
P. M. Carpentry.	Physics.
	Qualitative Chemistry.
	P. M. Mechanical Drawing and Forge Work.

THIRD YEAR.

First Term.	*Second Term.*
Kinematics.	Mechanics and Machine Design.
Analytical Geometry.	Calculus.
Vise Work, Physics.	Elements of Mechanism.
P. M. Machine Drawing.	Link and Valve Motions.
	P. M. Isometric and Cabinet Projection and Machine Drawing.

FOURTH YEAR.

First Term.	*Second Term.*
Steam Engineering.	Mineralogy and Geology.
Practical Astronomy.	Wood Turning.
Logic.	Steam Engineering.
P. M. Machine Drawing and Designing.	Hydraulic Engineering.
	U. S. Constitution and Political Economy.
	P. M. Machine Drawing, Designing and Thesis Work.

EXPLANATORY STATEMENTS.

It is the design of this course to give such a knowledge of Mathematics, Mechanics, Principles of Mechanism, Drawing and Manual Art as shall enable the student successfully to enter practical life as an engineer, with the same thorough education in subjects required to fit him for the general duties of life as is afforded by the other courses.

The first two years' work is identical with that of the students in Civil Engineering, except that carpentry and forge work are taken the second year in place of part of the drawing. In the Junior year, the first term is devoted to the geometry of machinery, showing the students how different motions may be obtained independently of the power required. Special attention is here given to the subject of gearing, and a full set of problems worked out, illustrating cases commonly occurring in practice. In the second term of this year the subject of the geometry of machinery is continued by lectures on other methods of transmitting motion, as by belts, cams, couplings, and links. Considerable time is given to the study and designing of the various valve and link motions used on the steam engine. During the same term instruction is given in mechanics and the laws of the strength of materials, the student being required to design machine details in accordance with those laws.

The first part of the first term, Senior year, is employed in studying the laws of the expansion of steam, and their influence upon the construction of steam engines and boilers, the subject being illustrated by experiments on the shop engine, with the aid of an indicator. During the remainder of the term, the students are engaged in designing engines and other machines, and in making detail drawings of the same, such as would be required to work from in the shop.

During the last term, Senior year, the study of steam engineering is continued in its application to compound engines, and the subject of hydraulic engineering is taken up briefly, by lectures on the storage of water for power and the theory and construction of modern water wheels.

TEXT-BOOKS AND BOOKS OF REFERENCE.

Weisbach,	Mechanics of Engineering.	Smith,	Steam Engine.
Goodeve,	Elements of Mechanism.	Smith,	Steam Boilers.
MacCord,	Kinematics.	Trowbridge,	Steam Boilers.
MacCord,	Slide Valve.	Zeuner,	Valve and Link Motions.
Van Buren,	Strength of Machinery.	Auchincloss,	Valve and Link Motions.
Knight,	Mechanical Dictionary.	Clark,	Manual.

SHOP WORK.

There are now three shops equipped according to the Russian system, and work in these is required of all students in this course. The first term of the Sophomore year, two hours of each day are devoted to work in carpentry, special attention being given to accuracy of workmanship.

During the second term of the same year, the student receives instruction in forge work, including the welding and tempering of steel. A course in vise work during the first term of the Junior year gives the student practice in the various methods of shaping and fitting metals by the use of the chisel, hack-saw and file. During their second term, the Junior students in this course take turns in running the shop engine, and are taught the rules of safety and economy in this branch of engineering. Instruction in wood-turning is given during the last term of the Senior year.

DRAWING.

The work in drawing commences with a course in Free-Hand and Elementary Mechanical Drawing, extending through the Sophomore year.

The first term of the Junior year, the student spends the time allotted to drawing in working out practical problems on the construction of gear teeth, cams, etc., and in elementary practice in line-shading and tinting.

The second term of this year is devoted to isometric projection, and the making of finished drawings in ink and in water colors. In the first term of the Senior year, the student prepares an original design of some machine, makes working drawings of its details on tracing cloth, and finally prepares copies by the blue-print process. The afternoon work of the spring term consists of making calculations for designs of engines and boilers, the construction of the necessary working drawings, and making thesis drawings.

The remarks under Course in Civil Engineering, with regard to Astronomy, Mineralogy and Geology, apply also to this course, and to them reference is made.

Theses are required of all students as a condition of graduation, and must be on some subject directly connected with Mechanical Engineering.

Students in this course receive the degree of Bachelor of Mechanical Engineering upon graduation, with full degree of Mechanical Engineer three years afterwards upon presentation of a satisfactory thesis and proof of professional work or study.

COURSE IN CHEMISTRY.

FIRST YEAR.

First Term.	*Second Term.*
Physical Geography.	Rhetoric and Botany.
Physiology.	Algebra and Geometry.
Algebra.	French.
P. M. Labor on Farm.	P. M. Book-Keeping and Labor on Farm.

SECOND YEAR.

First Term.	*Second Term.*
General Chemistry.	Qualitative Chemistry.
Botany.	Physics.
French.	Descrip. Astronomy and Surveying.
Trigonometry.	P. M. Mechanical Drawing and Field Work.
P. M. Free-Hand Drawing.	

THIRD YEAR.

First Term.	*Second Term.*
Chemistry.	Chemistry.
Physics.	Zoology and Entomology.
German.	German.
English and American Literature.	P. M. Laboratory Work.
P. M. Laboratory Work.	

FOURTH YEAR.

First Term.	*Second Term.*
Chemistry.	Chemistry.
Comparative Anatomy.	Mineralogy and Geology.
History of Civilization.	U. S. Constitution and Political Economy.
Logic.	
P. M. Laboratory Work.	P. M. Laboratory Work.

EXPLANATORY STATEMENTS.

This course aims to supply a want felt by students who wish to enter certain industries in which a somewhat extensive knowledge of Chemistry is important. The first two years are mainly like those of the other courses, Qualitative Analysis being, however, obligatory for these students in the second term of the Sophomore year.

During the Junior year, daily recitations are held in advanced Inorganic Chemistry. In the Senior year, advanced Organic Chemistry is taken up. The afternoons are devoted to Quantitative Chemical Analysis by the Junior and Senior students of the course. The work consists of the most useful gravimetric and volumetric methods, beginning with the simple estimations, which are followed by more complex analyses of alloys, minerals, fertilizers, farm products, &c. A short course in the assay of gold and silver is also given.

The class-room text-books used by this department are: Roscoe's Lessons in Elementary Chemistry and Naquet's Principes de Chimie. In the Laboratory are used: Craft's Qualitative Chemical Analysis, Fresenius' Quantitative Chemical Analysis, Caldwell's Agricultural Chemical Analysis, Wohler's Mineral Analysis, J. A. Wanklyn's Milk Analysis, Flint's Examination of Urine, and Rickett's Notes on Assaying.

Valuable books of reference are found in the library.

Students taking qualitative analysis must furnish a deposit of at least five dollars when they begin; those taking quantitative analysis are required to deposit at least seven dollars. Students taking the Course in Chemistry or an extended course in quantitative analysis are expected to provide themselves with a small platinum crucible.

The students, after passing all the required examinations and presenting satisfactory theses upon some chemical subject, graduate with the degree of Bachelor of Science.

Post graduate and special students can make arrangements with the Professor of Chemistry for an advanced or special course of laboratory work and recitations.

TABLE OF HOURS—First Term.

Local Time.	Seniors.	Juniors.	Sophomores.	Freshmen.
8.00 A. M.	Chapel Services.	Chapel Services.	Chapel Services.	Chapel Services.
8.15 A. M.	History of Civilization, I, IV, V. Civil Engineering, II.	Analytical Geometry, II, III. English and American Literature, I, IV, V.	General Chemistry.	Physical Geography.
9.10 A. M.	Stock Breeding and Veterinary Science, I. Advanced Chemistry, IV. Practical Astronomy, II, III, V. (F. of T)	German, I, II, IV, V. Kinematics, III.	Botany, I, IV, V.	Algebra.
10.05 A.M.	Stereotomy, II. (F. of T.) Sanitary Engineering, II. (L of T.) Comparative Anatomy, I, IV, V. Steam Engineering, III.	Farm Drainage and Mechanics, I. Physics, I, II, III, IV, V. (L. of T) Vise work, III. (F. of T.)	French.	
11.00 A.M.	Logic, I, II, III, IV, V.	Agricultural Chemistry, I. (Optional for V.) Vise work, III. Advanced Chemistry, IV. (Optional for V.) Field Book, Roads and Railroads, II.	Trigonometry.	Physiology.
P. M.	Laboratory and Farm Practice, I. Designing and Drawing, II, III. Topography and R. R. surveying, II. Laboratory work, IV. Translations from German, V. Military Exercises.	Laboratory work, I, IV. Field work and Drawing, II. Machine Drawing, III. Translations from French and English Literature, V. Military Exercises.	Free-hand Drawing, I, II, IV, V. Mechanical Drawing, II. Carpentry, III. Military Exercises.	Labor on Farm. Military Exercises.

Note.—Roman numerals refer to courses as follows: I, Agriculture; II, Civil Eng.; III, Mech Eng.; IV, Chemistry; V, Science and Lit.

TABLE OF HOURS—SECOND TERM.

LOCAL TIME.	SENIORS.	JUNIORS.	SOPHOMORES.	FRESHMEN.
8.00 A. M.	Chapel Services.	Chapel Services.	Chapel Services.	Chapel Services.
8.15 A. M.	Mineralogy and Geology.	Calculus, II, III. Agricultural Chemistry, I, (Optional for V.) Advanced Chemistry, IV. (Optional for V.)	Descriptive Astronomy. (F. of T.) Surveying, (L. of T.) I, II, IV, V. History of England, [L.] (L. of T.)	Rhetoric. (F. of T.)
9.10 A. M.	Mental and Moral Science, I, V Civil Engineering, II. (F. of T.) Lectures on Designs, Contracts and Specifications, II. (L. of T) Laboratory work, IV. Drawing and Wood-turning, III.	German, I, II, IV, V. Mechanics and Machine Design, III.	Qualitative Analysis. Free-hand Drawing, (F. of T.) III. Descriptive Geometry. (L. of T.) II, III.	Book-keeping. (F. of T.) Botany. (L. of T.)
10.05 A.M.	Cultivation of Cereals, Care and Feeding of Animals, etc., I. Laboratory work, IV. Zoology, II. Steam Engineering & Hydraulics, III.	Applied Mechanics, II. (F of T.) Graphic Statics, II. (L of T.) Zoology and Entomology, I, IV, V.	Qualitative Analysis. Descriptive Geometry, II, III.	French.
11.00 A.M.	U. S. Constitution and Political Economy, I, II, III, IV, V.	Zoology and Entomology, I, IV, V. Link and Valve Motions, III. (L. of T.) Elements of Mechanism, III. (F. of T.)	Physics.	Algebra and Geometry.
P. M.	Machine Drawing, Designing and Thesis work, III. Laboratory work, IV. II, (F. of T.) Chemistry, IV. Designing and Thesis work, II. Translations from German, V. Military Exercises.	Laboratory work and Garden Practice, I Isometric and Cabinet Projection, and Perspective, II, III. Laboratory work, IV. Translations from French, V. Military Exercises.	Mechanical Drawing. Forge work, III. Field work, I, II, IV, V. (L. of T.) Military Exercises.	Labor. Military Exercises.

LABOR.

It is a characteristic feature of the College, that it makes provision for labor, thus combining practice with theory, manual labor with scientific culture.

The maximum time of required labor is three hours a day for five days in the week.

The larger part of the labor is educational and for such labor no compensation in money is made. Students in the lowest class perform non-educational labor when required by the College and receive compensation, according to their industry, faithfulness and efficiency. The maximum price paid is ten cents an hour. In arranging for compensated labor, it should be understood that the College does not engage to furnish opportunities for such labor continuously, but rather as the farm and other interests require.

The students of the three upper classes carry on their principal labor in the laboratory, the drawing rooms, the workshops, or in the field, and for such labor they receive no pecuniary consideration, since it is of a purely educational character.

MILITARY INSTRUCTION.

Thorough instruction in Military Science is given by an officer detailed by the Secretary of War from the active list United States Army, and is continued throughout the entire course. All able-bodied male students receive instruction in the school of the soldier, company and battalion drill. Arms and equipments are furnished by the United States Government. The uniform, furnished by students, is a dark blue blouse similar to the regulation blouse of an army officer, but with State of Maine buttons and gilt braid on cuff, and for officers with chevrons and shoulder straps of red and gold; the pants of cadet gray with dark blue stripes, one and one-fourth inches wide, on outside seams; the cap blue with gold wreath ornament. The uniform is required to be worn during military exercises, and it is recommended that it be worn at recitations and at other class and general College exercises.

LOCATION.

The College has a pleasant and healthful location, between the villages of Orono and Stillwater, about a mile from each. Stillwater

River, a tributary of the Penobscot, flows in front of the buildings, forming the western boundary of the College farm, and adding much to the beauty of the surrounding scenery.

The Maine Central Railroad, over which trains pass many times each day, has a station at the village of Orono. The College is within nine miles of the city of Bangor, and is consequently easily accessible from all parts of the State.

FARM AND BUILDINGS.

The College farm contains three hundred and seventy acres of land, of high natural productiveness, and of great diversity of soil, and is therefore well adapted to the experimental purposes of the Institution.

White Hall, the building first erected, affords excellent accommodations for a limited number of students. The lower rooms of this building are appropriated to general and class purposes.

Brick Hall contains forty-eight rooms, and has connected with it a boarding-house for students. With these buildings, the Institution furnishes desirable accommodations for one hundred and twenty-five students.

The Laboratory contains two apparatus rooms, a lecture room, a cabinet, a library and weighing room, a recitation room, and rooms for analytical and other purposes, and is in all respects admirably adapted to the wants of the chemical and mineralogical departments.

The shop, built during the summer of 1883, is equipped for instruction in three departments of mechanical work, viz: filing, forging and working in wood.

APPARATUS.

The College is furnished with valuable apparatus for the departments of Physical Geography, Chemistry, Physics, Surveying, Civil Engineering and Mechanical Engineering, to which additions are made as the exigencies of the several departments require. Models have been made by instructors and students and others have been purchased that serve for purposes of instruction.

LIBRARY.

The library contains nearly five thousand volumes, a large part of which has been obtained through the generosity of the late Ex-

Governor Coburn. Valuable additions have also been made to it by other friends of the College, only a small number of the volumes having been purchased with money appropriated by the State. It is earnestly hoped that so important an auxiliary in the education of the student will not be disregarded by the people of the State, and that liberal contributions will be made to the library, not only of agricultural and scientific works, but also of those profitable to the general reader.

The following periodicals are supplied by the College to the library:

American Journal of Science and Art, Popular Science Monthly, National Live Stock Journal, American Agriculturist, Journal Royal Agricultural Society (England), Journal Franklin Institute, Eclectic Engineering Magazine, Century Magazine, Atlantic Monthly, Harper's Monthly Magazine, North American Review, Education, American Machinist, Science, American Naturalist, Botanical Gazette.

READING ROOM.

The reading room is supplied with a number of valuable newspapers and periodicals. Grateful acknowledgment is herewith made for the following papers, generously sent by the proprietors to the College:

American Cultivator, American Sentinel, Aroostook Republican, Gospel Banner, Home Farm, Kennebec Journal, Lewiston Journal, Maine Farmer, Maine Industrial Journal, New England Farmer, Oxford Democrat, Piscataquis Observer, Portland Transcript, Somerset Reporter, Whig and Courier (Daily and Weekly), Zion's Herald, Official Gazette U. S. Patent Office, Bangor Daily Commercial, Farmington Chronicle, Phillips Phonograph, Springvale Advocate, Mount Desert Herald, Maryland Farmer, Dexter Gazette, Eastport Sentinel, Bee Journal, American Garden, Manufacturer and Builder, Mirror and Farmer, Temperance Record, The Industrialist (Kansas).

The following papers are furnished by subscription, principally by the students:

American Machinist, Cultivator and Country Gentleman, Colby Echo, Bowdoin Orient, Scientific American, Scientific American Supplement, Eastern Argus (furnished by S. W. Gould), American Naturalist, Blackwood's Magazine, Lewiston Evening Journal, Journal of Education, Sanitary Engineer, Science, Popular Science News, Boston Journal, Washington Post, Boston Herald, Harper's Weekly.

CABINET.

The natural history collections of the College include about nine hundred named and mounted species of the flowering plants of Maine; a collection of sections of tropical species of wood presented by the Department of Agriculture at Washington, and a similar collection of the United States species from the Census Bureau.

The College also has a working collection of carefully selected forms representing the prominent groups of the animal kingdom; a large and valuable collection of Maine insects, carefully mounted and authentically named, and a fine collection of marine animals in alcohol, mostly from the coast of Maine, donated to the College by the United States Fish Commissioner. The above collections, together with charts, diagrams, skeletons, models, microscopes and other apparatus for illustrating the studies in natural history, are on exhibition in White Hall.

In the Laboratory are a good series of the more common minerals and ores supplemented by a collection presented by the National Museum; a collection of building stones from many of the Maine quarries, and a collection presented by the Smithsonian Institution, together with a series of microscopical sections of building stones, given by G. P. Merrill, M. S. In the same room is exhibited a series of typical fossils which illustrate the various geological horizons, together with a collection of Indian stone implements, and various curiosities presented by the friends of the Institution.

PUBLIC WORSHIP.

All students are required to attend daily prayers at the College, and public worship on the Sabbath at some one of the neighboring churches, unless excused by the President.

EXPENSES.

Tuition is thirty dollars a year, divided equally between the two terms. The cost of material and repair of tools for the course of instruction in the vise shop is ten dollars; in the forge shop, nine dollars; in the wood shop, four dollars.

Laboratory expenses are at cost of glass ware broken, injury to apparatus and chemicals used. A deposit of five dollars is required of students entering upon a term's work in Qualitative Analysis, and of seven dollars per term from students in Quantitative Analysis. Room rent is four dollars for the first term and five dollars for the second term of the college year.

Students residing too far from the College to *live* at home are required to room and board at the College, unless special permission to live elsewhere be granted by the President. Students receiving such permission pay room rent and fuel rent as though residing at the College.

Bedding and furniture must be supplied by the students, who also furnish their own lights. Tables, chairs, bedsteads, sinks and husk mattresses can be purchased at the College at moderate rates.

The price of board is two dollars and sixty cents per week; washing averages not more than sixty cents per dozen.

The warming by steam of single rooms (each suitable for two occupants) has averaged for the past six years about eleven dollars a room for each term. The expense of heating recitation rooms and rooms for general purposes has been about two dollars a term for each student, and the incidental expenses, including pay for the services of janitor, pay for bringing mail, for cleaning and renovating rooms, for general repairs, &c., have been about three dollars per term for each student.

From the items given, with an allowance of a few dollars a year for necessary text-books, quite an accurate estimate of needful expenses can be made.

The College term bills are payable, one-half at the commencement, and the remainder at or before the close of each term.

As security for the payment of College bills, a bond of one hundred and fifty dollars with satisfactory securities is required. A blank form of bond will be given with the ticket of admission.

MEANS OF DEFRAYING EXPENSES.

The terms are so arranged that the long vacation occurs in the winter, that students may have an opportunity to teach during that time. The summer vacation is in the haying season, when farm labor is most profitable. By availing themselves of the opportunities thus afforded, together with the allowance for labor on the

College farm, industrious and economical students can cancel the greater part of their College expenses.

SCHOLARSHIPS.

The trustees make provision for the establishment of free scholarships by the following action:

Voted, That any individual or society paying to the Treasurer a sum not less than seven hundred and fifty dollars, shall be entitled to one perpetual free scholarship in the College.

GRADUATES.

CLASS OF 1872.

Name and Occupation. *Residence.*

Benjamin F. Gould, C. E., Farmer..... San Juan, California
George E. Hammond, C. E., Civil Engineer,
Navy Yard, Portsmouth, N. H.
Edwin J. Haskell, B. S., Silk Manufacturer..... Saccarappa
Heddle Hilliard, C. E., Civil Engineer ..... Winn
Ebner D. Thomas, B. S., Civil Engineer.... Grand Rapids, Mich.
George O. Weston, B. S., Farmer ..... Norridgewock

CLASS OF 1873.

Russell W. Eaton, C. E., Cotton Mill Engineer.. Providence, R. I.
George H. Hamlin, C E., Professor..... State College, Orono
Fred W. Holt, C. E., Civil Engineer. G. S. R. R., St. George, N. B.
John M. Oak, B. S., Salesman ..... Bangor
Charles E. Reed, C. E., Farmer ..... Clinton
Frank Lamson Scribner, B. S., Ass't in Bot. Dep. of Ag.,
Washington, D. C.
Harvey B. Thayer, B. S., Druggist ..... Monson

CLASS OF 1874.

William A. Allen, C. E., Chief Engineer, M. C. R. R.... Portland
Walter Balentine, M. S., Professor of Agriculture,
State College, Orono
William H. Gerrish, B. S., M D., Physician .... Merrimac, Mass.
John I. Gurney, B. S., Farmer..... Dorchester, Mass.
David R. Hunter, B. S ..... Oakland, Cal.
Louise H. Ramsdell, B. S., (wife of Milton D. Noyes, Farmer,)
Atkinson

CLASS OF 1875.

Name and Occupation. *Residence.*

Solomon W. Bates, C. E., Solicitor of Patents.....Portland
Wilbur A. Bumps, C. E., M. D., Physician.....Dexter
Samuel H. Clapp, C. E., Teacher.....Danvers, Mass.
Lewis F. Coburn, C. E., Teacher.....Crescent City, Cal.
Charles W. Colesworthy, B. S .....Nevada
*Charles F. Durham, C. E , Teacher.....Crescent City, Cal.
Alfred M. Goodale, B. S., Supt. Cotton Mills ....Waltham, Mass.
Edson F. Hitchings, C. E., Teacher.....Warren, Mass.
Whitman H. Jordan, M. S., Director State Experiment Station, Orono
Edward D. Mayo, M. E., Mill Furnisher and Draughtsman. Minneapolis, Minn.
Albert E. Mitchell, M. E., Mechanical Engineer....Altoona, Penn.
Allen G. Mitchell, C. E., Civil Engineer, Pennsylvania Railroad, Cornellsville, Pa.
*Fred W. Moore, B. S., Teacher .....California
Luther W. Rogers, B. S., Merchant .....Waterville
Minott W. Sewall, M. E., Mechanical Engineer..Wilmington, Del.
George M. Shaw, C. E., Principal of Schools.....Oroville, Cal.
Wesley Webb, M. S., Editor Farm and Home .....Dover, Del.
*Edgar A. Work, C. E.....U. S. Military Academy

CLASS OF 1876.

Edmund Abbott, B. S., M. D., Physician .....Winterport
Charles P. Allen, B. S., Lawyer.. .....Presque Isle
Elbridge H. Beckler, C. E., Ass't Manager, U. P. R. R., Duluth, Minn.
Fred M. Bisbee, C. E., Civil Engineer..... ..... Dexter
Fred M. Blanding, B. S., Editor Maine Industrial Journal, Bangor
Charles M. Brainard, B. S., Lumberman . .....Skowhegan
*George H. Buker, B. S., Apothecary.....Presque Isle
Florence H. Cowan, B. S., Teacher ..... Orono
Oliver Crosby, M. E., Proprietor Machine Shop....St. Paul, Minn.
Vetal Cyr, B. S., Principal of Madawaska Training School, Fort Kent

*Deceased.

Name and Occupation. *Residence.*

James E. Dike, C. E., U. S. Deputy Surveyor,
Grand Forks, Dakota Ter.
*Willis O. Dike, B. S. ..... Gorham
Horace M. Estabrooke, M. S., Teacher, Normal School... Gorham
Arthur M. Farrington, B. S., Veterinary Inspector and Supt.
Quarantine Station, Garfield, N. J.
George O. Foss, C. E., Ass't Engineer, N. P. R. R.... Butte, Mon.
William T. Haines, B. S., L. L. B., Lawyer ..... Waterville
Henry F. Hamilton, B. S., D. D. S., Dentist,
124 Commonwealth Avenue, Boston
Newall P. Haskell, B. S., Farmer ..... Orono
Edward S. How, M. E., Book-Keeper..... Portland
Philip W. Hubbard, B. S., Apothecary..... Farmington
Samuel M. Jones, M. E., Engineer,
Corliss Engine Works, Providence, R. I.
Albert A. Lewis, B. S., Clergyman ..... Winterport
Herbert A. Long, M. E., Farmer..... Roque Island, Machias
Luther R. Lothrop, C. E. Draughtsman,
U. S. Surveyor General's office, St. Paul, Minn.
Nelson H. Martin, B. S., Teacher..... Ft. Fairfield
Charles E. Oak, M. E., Lumberman ..... Caribou
George D. Parks, C. E., Lawyer and Civil Engineer.... Brunswick
Hayward Pierce, B. S., West Waldo Granite Works..... Frankfort
Frank R. Reed, C. E., Carpenter..... Roxbury
Henry J. Reynolds, B. S., Druggist ..... Eastport
Charles W. Rogers, M. E., Machinist..... Charlestown, Mass.
William L. Stevens, M. E., Grain Dealer..... Minneapolis, Minn.
John H. Williams, B. S., Government Surveyor..... Dakota

CLASS OF 1877.

Alvah D. Blackington, C. E., Civil Engineer... ...Dunmore, Pa.
Robert B. Burns, C. E., Merchant..... Attica, Kansas
Eugene H. Dakin, B. S., Financial Agent, Industrial Journal,
Bangor
Edward F. Danforth, B. S., Lawyer ..... Skowhegan
Augustus J. Elkins, B. M. E., City Engineer, Fergus Falls, Minn.
Alicia T. Emery, B. S., Teacher..... Orono

*Deceased.

Name and Occupation. *Residence.*

Samuel W. Gould, B. S., Lawyer..... Skowhegan
*Joseph C. Lunt, B. C. E., Civil Engineer, Mex. C. R. R.,
El Paso, Texas
Fred F. Phillips, B. S., Lawyer ..... Bangor
*Samuel Shaw, B. M. E., Architectural Draughtsman, Boston, Mass.
Frank P. Stone, B. S., Farmer..... Livermore Falls
Thomas J. Stevens, B. M. E., Apothecary..... Portland
George E. Sturgis, B. C. E., Apothecary..... Portland, Oregon
Charles E. Town, B. C. E., Government Surveyor, Helena, Montana
James W. Weeks, B. M. E., Draughtsman.... Des Moines, Iowa
Nellie E. Weeks, B. S. (Mrs. Llewellyn Spencer)..... Orono
Ivan E. Webster, B. S., Lumberman..... West St. Paul, Minn.

CLASS OF 1878.

Emma Brown, B. S., Teacher, (Mrs. Charles Gilman)..... Enfield
Andrew J. Caldwell, B. M. E., Mech. Engineer..Brooklyn, N. Y.
Cecil C. Chamberlain, B. S., Merchant ..... Anoka, Minn.
George E. Fernald, B. C. E., Commercial Salesman, Waterloo, Iowa
James Heald, B. S., Surveyor..... Minneapolis, Minn.
John Locke, B. S. ..... Maine Central R. R., Portland
Frank J. Oakes, B. C. E., Draughtsman..... Brooklyn, N. Y.
John C. Patterson, B. C. E., Assistant Engineer,
St. P., M. & M. R. R., St. Paul, Minn.
Winfield E. Tripp, B. C. E., Commercial Salesman, Madison, Wis.
Edward C. Walker, B. S., Lawyer..... Lovell
Otis C. Webster, B. S., Druggist ..... Augusta

CLASS OF 1879.

Harry P. Bean, C. E., Ass't Engineer, N. B. R. R.,
Woodstock, N. B.
Edward J. Blake, C. E., Ass't Engineer, C. B. & Q. Railway,
Chicago, Ill.
Simon P. Crosby, B. S., Lawyer ..... St. Paul, Minn.
John D. Cutter, B. S., Physician, 336 West Washington St.,
Chicago, Ill.

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*Deceased.

Name and Occupation. *Residence.*

Wilbur F. Decker, B. M. E. ..... Minneapolis, Minn.
David A. Decrow, B. C. E., Draughtsman,
Holly Man'f'g Company, Lockport, New York
Willis E. Ferguson, B. S., Farmer. ..... San Gabriel, California
Charles W. Gibbs, C. E.. Resident Engineer, C. M. R. R.,
Colorado Springs, Col.
Annie M. Gould, B. S., Teacher, (Mrs. Loomis F. Goodale)
Prairie du Chien, Wis.
*Nellie M. Holt, B. S., Teacher ..... Orono
Frank E. Kidder, C. E., Architect ..... Boston, Mass.
Mark D. Libby, B. C. E., Civil Engineer .... Santa Fe, N. Mexico
Charles S. Loring, B. M. E., Machinist,
C. & S. Water Motor Co., Auburn
George P. Merrill, M. S., Curator, Nat. Museum, Washington, D. C.
John W. Meserve, B. M. E., Mech. Engineer, Cambridgeport, Mass.
Arthur L. Moore, B. S., Farmer..... Limerick
Charles A. Morse, C. E., Div. Engineer, A. T. & S. F. R. R.,
Topeka, Kansas
Fred D. Potter, B. M. E., Chief Engineer,
Edison Electric Light Co., 65 5th Avenue, New York
Alton J. Shaw, B. M. E., Draughtsman, B. & S. Man'f'g Co.,
Providence, R. I.
Percia A. Vinal, M. S., (Mrs. Albert White) ..... Orono
George O. Warren, B. S., Farmer. ..... Fryeburg
Herbert Webster, B. S., Express Messenger,
Bangor and St. John, N. B.

CLASS OF 1880.

Horace W. Atwood, B. S., Veterinary Surgeon.... Brockton, Mass.
James M. Bartlett, M. S., Analytical Chemist,
Experiment Station, Orono
Albert H. Brown, B. S., Coal Merchant ..... Oldtown
Marcia Davis, B. S., Clerk, Office Registry of Deeds,
West Bay City, Michigan
Fred B. Elliot, B. S., Farmer ..... Bowdoin

*Deceased.

Name and Occupation. *Residence.*

Sarah P. Farrington, B. S., (Mrs. George P. Merrill), Washington, D. C.
Charles W. Fernald, B. S., Merchant ..... Levant
Fred W. Fickett, B S., U. S. Signal Service ... Galveston, Texas
George W. Lufkin, B. C. E., Civil Engineer ..... Biddeford
Frank A. Mansfield, M. S., Clergyman .... National City, California
Annie A. Matthews, B. S., Teacher ..... Stillwater
Henry W. Murray, B. C. E., Teacher ..... Milton, California
Franklin R. Patten, C. E., Proprietor Steam Laundry ..... Bangor
Charles T. Pease, B. S., Civil Engineer ..... Denver, Colorado
James F. Purington, B. S., Farmer ..... Bowdoin

CLASS OF 1881.

Henry H. Andrews, M. E., Book-Keeper .... Fredericksburg, Va.
Henry W. Brown, M. S., Artist ..... Damariscotta
Clara L. Buck, B. S., (Mrs. Thomas W. Hine) ... Phœnix, Arizona
Fannie E. Colburn, B. S., (Mrs. Arthur L. Fernald), Omaha, Nebraska
Edward H. Farrington, M. S., Chemist, Agricultural Experiment Station, New Haven, Conn.
Oliver C. Farrington, B. S., Principal, Academy .... No. Bridgton
Charles H. Fogg, B. C. E., Div. Supt., Penn. R. R., Greensburg, Pa.
Aldana T. Ingalls, B. C. E., Division Engineer, C. & C. M. R. R., Wilmington, Ohio
Robert John Johnson, B. C. E., Civil Engineer .... St. Paul, Minn.
Clara A. Libby, B. S., Teacher ..... Augusta
Horace F. McIntire, B. M. E., Mill Business ..... Waldoborough
Charles L. Moor, B. C. E., Law Student ..... Portland
*Benjamin F. Murray, B. C. E. ..... Stillwater
Edwin W. Osborne, B. C. E., N. Pacific R. R. .... Brainard, Minn.
Oscar L. Pease, B. S., U. S. Signal Service ..... Phœnix, Arizona
Harold M. Plaisted, B. M. E., M. E. (Stevens Institute) Draughtsman, Chi., Mil. & St. Paul R R ..... Milwaukee, Wis.
Alice I. Ring, B. S. ..... Orono
Mary L. Ring, B. S., Teacher ..... Orono
*Roscoe L. Smith, B. S., Farmer ..... Lewiston

*Deceased.

Name and Occupation. *Residence.*

George Washington Sturtevant, B. C. E., Civil Engineer, St. Cloud, Minn.
Frank S. Wade, B. S., Physician ..... Richmond, Wis.
Walter A. White, B. C. E., Lumberman ..... Newport
John A. Wilson, B. S., Medical Student..... Orono
Levi A. Wyman, B. C. E., Lawyer..... Ellsworth

CLASS OF 1882.

Charles S. Bickford, B. S., Book-Keeper..... ..... Belfast
Jacob L. Boynton, B. S..... ..... Cambridgeport, Mass.
Charles W. Brown, B. M. E , Draughtsman, Patent Office, Washington, D. C.
Stephen J. Buzzell, B. C. E., Civil Engineer..... ..... Argyle
Oscar H. Dunton, B. M. E., Draughtsman, Corliss Engine Works, Providence, R. I.
Walter Flint, M. E., Instructor, State College.. ..... Orono
George R. Fuller, B. S., Law Student..... Portland
Charles C. Garland, B. S., 211½ Nicollet Avenue, Minneapolis, Minn.
Joseph F. Gould, B. S., Lawyer..... ..... Oldtown
Thomas W. Hine, B. S., Lawyer..... ..... Phœnix, Arizona
Will R. Howard, B. S., Principal, Academy..... Bethel
Alonzo L. Hurd, B. S., Rockford Watch Co ..... Rockford, Ill.
Alfred J. Keith, B. C. E., Ass't Engineer with Col. Waring, Newport, R. I.
Frank I. Kimball, C. E., Mining Engineer..... Greensburg, Pa.
James H. Patten, B. S., Physician ....Orland
Frederic M. Reed, B. M. E., Draughtsman, B. & S. Man'f'g. Co., Povidence, R. I.
Gleason C. Snow, B. S., Farmer..... North Orrington
Avery P. Starrett, B. S., Farmer..... ... Warren
Frank H. Todd, B. C. E., Civil Engineer ..... St. Cloud, Minn.
Eben C. Webster, B. S., Lumber Manufacturer..... .. Orono
Willard A. Wight, B. C. E., Supt. Gas Works .... Trinidad, Col.
Daniel C. Woodward, B. M. E., Draughtsman, B. & S. Man'f'g Co., Providence, R. I.

CLASS OF 1883.

Name and Occupation. *Residence.*

James H. Cain, B. S ..... Orono
Jonathan V. Cilley, B. C. E., Railroad Engineer,
Buenos Ayres, Arg. Rep., S. A.
Frank E. Emery, B. S., Superintendent Houghton Farm,
Mountainville, Orange Co., N. Y.
Arthur L. Fernald, B. S., Commercial Salesman, Omaha, Nebraska
Bartholomew P. Kelleher, B. S., Physican..... Orono
Lucius H. Merrill, B. S., Assistant, Experiment Station..... Orono
Jennie C. Michaels, B. S., Teacher..... Stillwater
Charles W. Mullen, B. C. E., Civil Engineer..... Holyoke, Mass.
Truman M. Patten, B. C. E., C. R. & M. R. R., Weyerhauser, Wis.
Harry W. Powers, B. S ..... Orono
Charles E. Putnam, B. C. E., Civil Engineer ..... Boston, Mass.
Lewis Robinson, Jr., B. M. E., Physician ..... Stetson
George A. Sutton, B. C. E., Merchant..... Abbott
Levi W. Taylor, B. S., Merchant..... Bangor

CLASS OF 1884.

George H. Allen, B. S..... Dennysville
*Will H. Burleigh, B. C. E ..... Vassalboro'
Mary F. Conroy, B. S., Assistant in Post Office..... Orono
Leslie W. Cutter, B. C. E., Contractor and Builder ..... Bangor
Hattie C. Fernald, B. S..... Orono
Elmer E. Hatch, B. S., Teacher ..... Lagrange
John E. Hill, B. C. E., U. S. Signal Service ..... Shreveport, La.
Joseph G. Kelley, B. C. E., Farmer and Surveyor .. Hancock Point
Edwin F. Ladd, B. S., Ass't Chemist, Experiment Station,
Geneva, N. Y.
Clarence S. Lunt, B. C. E., Local Editor, Whig and Courier, Bangor
Fred L. Stevens, B. S., Principal of High School..... Manchester
William Webber, B. M. E., Draughtsman, McCormick H. Works,
Chicago, Ill.

CLASS OF 1885.

George W. Chamberlain, B. S., Teacher ..... Berwick
Asher Dole, B. C. E..... Brewer

*Deceased.

Name and Occupation. *Residence.*

Frank O. Dutton, B. S., Teacher ..... Orono
Henry T. Fernald, B. S., Post Graduate in Biology,
Johns Hopkins University, Baltimore, Md.
Elmer O. Goodridge, B. M. E., Civil Engineer, N. P. R. R.,
Montana
George L. Hanscom, B. S., Teacher..... Rockland
James N. Hart, B. C. E., Principal, Grammar School. ... Machias
Frank E. Hull, B. C. E., Engineer ..... Rockland
Austin H. Keyes, B. C. E., Principal, High School... . Pembroke
William Morey, Jr., B. C. E., Signal Service... Washington, D. C.
Joseph P. Moulton, B. S., Farmer ..... Springvale
Leonard G. Paine, B. M. E., M. E., (Stevens Institute),
Draughtsman, B. & S. Man'f'g Co., Providence, R. I.
Elmer E. Pennell, B. M. E..... Saccarappa
Louis W. Riggs, B. M. E., Teacher, Greeley Institute, Cumberland
Fremont L. Russell, B. S., Vet. Surgeon ..... North Fayette

CLASS OF 1886.

Bert J. Allen, B. C. E., Teacher, Academy..... ... Hampden
Josiah M. Ayer, B. C. E..... Freedom
George G. Barker, B. M. E., Draughtsman ..... Chicago, Ill.
George F. Black, B. C. E., Civil Engineer, M. C. R. R., Waterville
John D. Blagden, B. C. E..... ... Carmel
Heywood S. French, B. C. E , Draughtsman..... Boston, Mass.
Edwin D. Graves, B. C. E., Civil Engineer, N. B. R. R.,
Woodstock, N. B.
Ralph K. Jones, B. S., Electric Lightning Station ..... Bangor
Elmer Lenfert, B. C. E.... ... . Bradley
James F. Lockwood, B. M. E., Electrical Engineer,
New York, N. Y.
George F. Lull, B. S..... Cambridge, Mass.
Willis H. Merriam, B. C. E., U. S. Signal Service,
Washington, D. C.
Elmer E. Merritt, B. M. E., Draughtsman ..... Chicago, Ill.
Arthur D. Page, B. C. E., Civil Engineer ..... Rockland
Irving B. Ray, B. C. E., U. S. Signal Service.. Washington, D. C.
Sydney S. Twombly, B. S., Ass't Chemist, Cornell University,
Ithaca, N. Y.

OFFICERS OF THE ASSOCIATE ALUMNI.

PRESIDENT.

PROF. G. H. HAMLIN, Orono.

SECRETARY.

PROF. W. BALENTINE, Orono.

TREASURER.

PROF. C. H. BENJAMIN, Orono.

NECROLOGIST.

E. M. BLANDING, Bangor.

CLASS SECRETARIES.

1872. E. J. HASKELL, Saccarappa.
1873. J. M. OAK, Bangor.
1874. W. BALENTINE, Orono.
1875. E. F. HITCHINGS, Warren, Mass.
1876. N. P. HASKELL, Orono.
1877. S. W. GOULD, Skowhegan.
1878. E. C. WALKER, Lovell.
1879. F. E. KIDDER, Boston, Mass.
1880. A. H. BROWN, Oldtown.
1881. A. T. INGALLS, Wilmington, Ohio.
1882. O. H. DUNTON, Providence, R. I.
1883. C. E. PUTNAM, Boston, Mass.
1884. G. H. ALLAN, Dennysville.
1885. H. T. FERNALD, Amherst, Mass.
1886. G. G. BARKER, Chicago, Ill.

NON-GRADUATES.

Average period of attendance, one and a half years.

Present residence not being known, the former residence is given.

Special students are marked in the classes with which they principally recited.

[Corrections for a revised list are solicited.]

CLASS OF 1872.

Name and Occupation.	*Residence.*
John T. Bowler, Register of Deeds	Bangor
William H. Cary, Jr	St. Paul, Minn.
Edward F. Fisher, Trader, Pressed Hay	Bangor
William H. George, Presbyterian Clergyman	Topeka, Kansas
William L. Harlow, Farmer	Buckfield
George L. Macomber	Durham
Charles C. Norton	Buffalo Meadows, Nevada
William B. Oleson, Clergyman	Honolulu, Sandwich Islands
Frank W. Rollins, Teacher	Stillwater, Minn.
Oren S. Sargent, Physician	Lawrence, Mass.
*Marcus P. Shorey	Oldtown
Benjamin F. Watson, Farmer	Levant

CLASS OF 1873.

William H. Claflin, Clerk or Merchant	Boston
Joseph E. P. Clark, Book Business	Minneapolis, Minn.
*John Jackson	Alfred
Samuel Lane, Insurance Agent	Houlton
William F. Lovejoy, Book-Keeper	Winn
Thomas P. Pease	Bridgton

*Deceased.

Name and Occupation.	*Residence.*
Clarence Pullen, Civil Engineer	Foxcroft
Frederic A. Ransom	Augusta

CLASS OF 1874.

Frank P. Burleigh	Springfield
*Mark E. Burnham	Garland
Louville Curtis	Bowdoinham
Roland Curtis, Physician	Bowdoinham
Samuel C. Moore	Cherryfield
Charles F. Osgood, Farmer	Garland
*William H. Reed	Springfield
George I. Trickey, Lawyer	Caribou
Manley H. Whitehouse	Orrington
Edward R. Wingate, Lumber Business	Cherryfield
William I. Wood, Lawyer	Corinna

CLASS OF 1875.

Gustavus Bellows, Farmer; Specialty, Fruit	Freedom
Leander H. Blossom, Farmer	Turner
John H. Carver, Merchant	Boston, Mass.
William B. Dole, Mechanic	Bangor
George N. Gage, Physician	E. Washington, N. H.
Benson H. Ham, Merchant	Charleston
Alton A. Jackson, Physician	E. Jefferson
Manley Jackson, Organ and Sewing Machine Business	Jefferson
Freeland Jones, Merchant and Surveyor	Caribou
Ora Oak	California
Sidney S. Soule, Farmer	Freeport
Louis C. Southard, Lawyer	North Easton, Mass.
*George W. Spratt, Merchant	Bangor
Charles H. Spring, Wool Grower	Buenos Ayres, Arg. Rep., S. A.

*Deceased.

CLASS OF 1876.

Name and Occupation.	*Residence.*
Francis H. Bacon, Architect.,	98 Washington Street, Boston, Mass.
Russell A. Carver	Dixfield
Frank P. Gurney, Farmer	Dover, Dakota
Frank A. Hazeltine, Farmer	Dexter
Eugene Hopkins	Oldtown
James W. Linnell, Farmer	Exeter
George J. Moody, Lawyer	Montesano, Wash. Ter.
Webster Mudgett	Albion
Edward B. Pillsbury, Telegrapher and Electrician	Boston, Mass.
Randall H. Rines, Merchant	Portland
Walter F. Robinson, Surveyor and Farmer	Hartford
Edward C. Shaw, in employ of Am. Watch Co.	Waltham, Mass.
Frank E. Southard, Lawyer	Augusta
Frank P. Whitaker, Physician	Hermon

CLASS OF 1877.

Charles F. Andrews	Biddeford
Fred S. Bunker	Cambridge
*Edson C. Chase	Stillwater
William W. Dow, Printer	Providence, R. I.
James T. Emery	Stillwater
Charles M. Freeman	Portland
Frank H. Goud, Clerk	Fort Fairfield
Austin I. Harvey, Physician	Carmel
Menzies F. Herring, Editor and Publisher	Dexter
Ardean Lovejoy	Orono
Fred B. Mallet, Lumbering Business	Minneapolis, Minn.
Fred L. Partridge	Stockton
Fred H. Pullen	Foxcroft
*Frank E. Reed	Springfield
Woodbury D. Roberts, Merchant	Cheney, Wyoming
Thomas B. Seavey, Clerk	Chicago, Ill.
Henry C. Townsend, Farmer	Fort Fairfield
Clara E. Webb, Teacher	Unity

*Deceased.

Name and Occupation.	*Residence.*
Fred S. Wiggin, Farmer	Presque Isle
William B. Whitney	Iowa

CLASS OF 1878.

Charles H. Benjamin, Professor Mech. Eng., M. S. C.	Orono
Eugene M. Berry	Sumner
*Nathaniel A. Crocker	W. Enfield
Charles C. Elwell, Ass't Engineer, W. & N. R. R.,	Wilmington, Del.
Howard H. Hartwell	Vinalhaven
John E. Haynes, Jeweller	Oldtown
Fred H. Hinckley, Clerk in U. S. Land Office	Eureka, Nev.
Richard S. Howe	Fryeburg
Carl S. Jameson, Boot and Shoe Dealer	Providence, R.I.
William S. Jameson, Dealer in Sugar Machinery,	Guadalajara, Mex.
Edgar H. Lancaster, Mechanic in R. R. Shop	Oldtown
*Alvra W. Leathers	Dover
James Lunt	Bangor
Herbert A. Mallett, Lumberman	Stillwater, Minn.
Silas N. Miller, Prospecting for Gold and Silver,	Fairplay, Colorado
Frank J. Perkins, Dry Goods Dealer	Oldtown
Charles F. Plumley, Merchant	Lincoln
John O. Richardson, Trader, Paints and Oil	Oldtown
A. Judson Small	No. Lubec
Albert H Stewart, Piano Regulator	Boston, Mass.
Edson Warriner, Watchmaker and Jeweller.	Fryeburg
Erastus G. Weeks, Merchant	Jefferson

CLASS OF 1879.

Daniel Allison	Linneus
Arthur P. Brown, Mechanic	Orono
Benjamin V. Carver, Machinist	Hartford, Conn.
Byron H. Cochrane	Woonsocket, R. I.
Fred A. Colburn, Clerk and Scaler	Stillwater, Minn.
James W. Cousens, Teacher	Stillwater
John A. Curtis, U. S. Deputy Surveyor	Phœnix, Arizona

*Deceased.

Name and Occupation. *Residence.*

George A. Dustin, Machinist and Trader . . . . . Dexter
Loomis F. Goodale, Civil Eng., Can. Pac. R. R., Winnipeg, Manitoba
Edwin A. Hawes, Mechanic. . . . . Ontario, Cal.
*Edwin C. Johnson . . . . . Gorham
Oliver S. Jones, Farmer. . . . . Corinna
Albert Y. Merrill, Lawyer, Judge of Probate . . . . . Aitkin, Minn.
Asa C. Morton. . . . . Bangor
Harry W. Peakes, Merchant. . . . . Charleston
David S. Plummer, Book-Keeper. . . . . Boston, Mass.
*Eugene G. Smith . . . . . Richmond
William N. Titus, Lawyer . . . . . Woburn, Mass.
Howard E. Webster, Lumberman . . . . . Orono
Arthur L. Wellington, Shipping Agent . . . . . Detroit, Mich.
Charles M. Wilson. . . . . San Francisco, Cal.

CLASS OF 1880.

Charles M. Allen, Teacher. . . . . Kingston, Penn.
Edward N. Atwood, Asst. Supt., Ker. Oil Works . . . . . Portland
Granville Austin, Clerk . . . . . Boston, Mass.
Sylvester A. Brown, Clerk. . . . . Boston, Mass.
Ada M. L. Buswell, Teacher . . . . . Minneapolis, Minn.
Charles E. Cheney, Farmer . . . . . W. Scarboro'
Woodbury F. Cleveland, Physician. . . . . Eastport
Samuel H. Dyer . . . . . Yarmouth
Osgood E. Fuller, Druggist. . . . . Albany, N. Y.
Harry H. Goodwin, Sec'y to Amer Consulate . . . . Anaberg, Saxony
John B. Horton, Book-Keeper . . . . . Sandusky, Ohio
Daniel S. Jones, Watchmaker and Jeweller . . . . . Fort Fairfield
Prescott Keyes, Jr., Farmer. . . . . Richmond
*Charles W. Nash . . . . . Addison
Willis L. Oak, Clerk. . . . . Presque Isle
Fred W. Powers, Farmer and Teacher . . . . . Fryeburg
Emily Ramsdell, Teacher. . . . . Atkinson

*Deceased.

Name and Occupation.	*Residence.*
Mortier C. Randall	Stillwater
William J. Rich, Chemist, Cambria Iron Co	Johnstown, Pa.
Charles S. Simpson, Civil Engineer and County Surveyor,	Florence, Wis.
Frank A. Spratt, Principal, Academy	Hampden
Daniel Webster, Clerk, Am. Exp. Co	Bangor

CLASS OF 1881.

Henry W. Adams, Lumberman	Wisconsin
*Lorin T. Boynton	Ashland
Charles P. Chandler, Machinist	New Gloucester
Elmer C. Chapin, Commercial Traveller	Bangor
*Frank P. Fessenden	South Bridgton
Archy S Gee, Clerk	Minneapolis, Minn.
George W. Holmes, Merchant	Norway
John F. Horne, Shoe Manufacturer	Auburn
Benjamin Johnson	Portland
Edward C. Luques	Biddeford
Charles S. Macomber, Lawyer	Carrollton, Iowa
Charles I. D. Nichols, Farmer	Hollis
James Martin Nowland, Farmer	Ashland
Charles C. Ross, Commercial Salesman	St. Stephens, N. B.
Clara Southard (Mrs. Hammond)	Lincoln Center
Charles P. Tidd, Tel. Operator	Higbee, Missouri
Harry P. Tidd	Forest Green, Missouri
William R. Tilden, Workman in Shoe Factory	Campello, Mass.
William A. Vinal, Scaler	Orono
William G. Wales	Monticello, Iowa
Frank B. Weeks, Government Quartermaster's Office,	San Francisco, Cal.
Flora Welch, Nurse	Boston, Mass.
George H. Wilson, Clerk, Gov. Storehouse	Maricopa, Arizona

*Deceased.

CLASS OF 1882.

Name and Occupation.	*Residence.*
Joseph B. Bartlett, Fruit Grower	San Gabriel, California
Charles C. Dunn, Farmer	Ashland
Charles W. Fenlason	Bridgewater
John I. Greenlaw, Merchant	N. Fryeburg
William H. Hatch	Lisbon
Wesley J. Jameson	Frankfort
Frederick A. Kenniston, Clerk	Waltham, Mass.
Frederick O. Kent	Bremen
Walter H. Nason, Physician	New York City
Atta L. Nutter, Teacher	Wilmington, N. C.
Parker J. Page	Orono
Harry K. Poole	Bremen
Louis C. Tilley, Farmer	Castle Hill

CLASS OF 1883.

George R. Currier, Teacher	E. Wilton
Arthur T. Drummond, Farmer	Sidney
William E. Emery, Medical Student	New York City
Norman F. Kelsea, Clerk	Brockton, Mass.
Edwin P. Kendall, Farmer and Miller	Bowdoinham
Henry W. Longfellow, Clerk	Machias
Charles S. Murray	Stillwater
George A. Rich	Attleboro', Mass.
Everett F. Rich, Clerk	Bangor
Ralph Starbird, Manufacturer	Boston, Mass.
Ralph R. Ulmer	Rockland
Frank C. Webster, Clerk, Am. Exp. Co.	Bangor
Frank G. Webster, Clerk	Orono
Lewis H. White, Physician	Lincoln Centre

CLASS OF 1884.

Edward S. Abbott, M. D., Physician	Bridgton
Edward M. Bailey, Merchant	Bangor

Name and Occupation.	*Residence.*
Joseph B. Bartlett	Nottingham, N. H.
William A. Berry, Sailor	Hampden
James A. Dunning, Clerk	Monson
Freeland Ellis, Clerk	Guilford
Eugene L. Folsom, Machinist	Stillwater
Evie M. Hamblen	Stillwater
Robert S. Leighton	Steuben
*Gilbert Longfellow, Jr	Machias
Cephas R. Moore, Trader	Anson
William R. Pattangall	Pembroke
Robert C. Patterson, Surveyor	Minneapolis, Minn.
Charles S. Pendleton, Farmer	Philbrook, Montana
Herbert L. Rich	Attleboro', Mass.
Flora M. Ricker (Mrs. P. J. Page)	Orono
Warren J. Ridley, Conductor, Street R. R	South Boston, Mass.
Elmer A. Savage	Minneapolis, Minn.
Mertie Sawyer	Hampden
Charles F. Smith	Belfast
*Horace G. Trueworthy	Orono
Jotham Whipple, Jr	Solon

CLASS OF 1885.

James W. Bishop, Farmer	Milo
Frederick H. Butler, Civil Engineer	Chicago, Ill.
Harry W. Davis, Banker	Buxton, Dakota
Fred W. Dickerson	Uxbridge, Mass.
Samuel W. Hill	Machias
Willard A. Libby	Denver, Col.
Charles L. Libby, Draughtsman	Bridgeport, Conn.
*Frank E. Manter	Milo
Dennis D. Merrill, Engineer, Steam Mill	Stillwater
Dudley W. Moor, Jr	Waterville
Carl H. Prince, Farmer	Turner
Elisha C. Vose, Signal Service	Milwaukee, Wis.
Charles S. Williams	Monhegan Island

*Deceased.

CLASS OF 1886.

Name and Occupation.	*Residence.*
Eugene C. Bartlett	Orono
John I. Chase, Clerk	Riverside, California
Charles H. Merriam	Orono
Harry E. Powers	Bowdoinham
Harold E. Trueworthy	Houlton

CLASS OF 1887.

Alton D. Adams, Elec. Light Co	Northampton, Mass.
John W. Allen	Presque Isle
Alice Benjamin	Oakland
Jennie L. Dority	Wells
Wm. J. Harris	Groton, Mass.
James S. Kennedy	Ludlow
William L. Perham	Paris
Wm. P. Sherburn	Dover
Frank L. Tucker	Norway
Charles W. Wentworth, Law Student	Portland
Rodney A. B. Young, Medical Student	Baltimore, Md.

CLASS OF 1888.

Charles W. Breed	Bangor
Frederick L. Burke	Boston, Mass.
James K. Chamberlain	Bangor
Frank P. Collins	Ft. Fairfield
Fred T. Drew	Orono
George K. Hagerthy	So. Hancock
Edwin B. Lord	Stillwater
Alphonso F. Marsh, School of Pharmacy	Boston, Mass.
Frank J. Page	Orono
Henry F. Perkins, Mechanic	Oakland
Nathan A. Ring	Orono
Clara Rogers	Hampden
Charles C. Rolfe, Teacher	Presque Isle
Joseph S. True, Farmer	New Gloucester

CLASS OF 1889.

George G. Fernald ..... Wilton
Temple Grosvenor..... Canterbury, N. B.
Lewis F. Johnson ..... La Grange
Frederick L. Thompson ..... Augusta

CALENDAR.

1887—Feb.	8.	Tuesday, Second Term commences.
June	23, 24.	Thursday and Friday, Examinations.
"	25.	Saturday, Prize Declamations by Sophomores.
"	26.	Sunday, Baccalaureate Address.
"	27.	Monday, Prize Essays by Juniors.
"	29.	Wednesday, Commencement.
"	30.	Thursday, Examination of Candidates for Admission.
		Vacation of five weeks.
Aug.	9.	Tuesday, Examination of Candidates for Admission.
		First Term commences.
Nov.	21, 22.	Monday and Tuesday, Examinations.
		Vacation of eleven weeks.
1888—Feb.	7.	Tuesday, Second Term commences.