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OF THE VARIOUS

PUBLIC OFFICERS AND INSTITUTIONS

FOR THE YEAR

1875.

VOLUME II.

AUGUSTA:
SPRAGUE, OWEN & NASH, PRINTERS TO THE STATE.
1875.

ANNUAL REPORTS

OF THE

TRUSTEES, PRESIDENT,

Farm Superintendent and Treasurer

OF THE

MAINE STATE COLLEGE OF AGRICULTURE

AND THE

MECHANIC ARTS.

1874.

PUBLISHED AGREEABLY TO A RESOLVE APPROVED FEBRUARY 25, 1871.

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1874.

TRUSTEES.

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HON. LYNDON OAK, Garland, *Secretary.*

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TRUSTEES' REPORT.

To the Governor and Council:

In obedience to the requirements of the law organizing the College of Agriculture and the Mechanic Arts, the Trustees respectfully submit their annual report, together with the reports of the President and Professors, of the Farm Superintendent, and of the Treasurer.

The citizens of the State, for whose benefit the college was established, and who are responsible for its support, will be glad to find in these reports unmistakable evidence of steady, normal and gratifying growth in numbers, usefulness and in the confidence of the people. The students gathered there represent every county in the State, showing that the institution is not one of merely local importance, but that the people of the whole State are vitally interested in its success.

The experience and careful study of several years, and the command of increased facilities, have enabled the Faculty to extend the range and improve the methods of instruction.

Prominent men, whose names are identified with the growth and prosperity of the State, are regarding the college with increasing confidence and favor, and look upon it as an almost indespensable educational agency. As a rule, only those who have but little knowledge of its practical workings, or who are expecting abnormal, impracticable or impossible results, express dissatisfaction and doubt.

Changes in the Board of Trustees.

Hon. Thomas S. Lang and Hon. Samuel F. Perley, having resigned their positions in the Board,—the former on account of an intended removal from the State, and the latter in consequence of failing health, their places have been filled by the appointment of Hon. S. T. Hincks and Hon. Caleb A. Chaplin.

The Faculty.

Lieut. W. S. Chaplin, a graduate of West Point, has been appointed Professor of Modern Languages and Mechanics, in place of Prof. Whittier, resigned. The Trustees are confident that Prof. Chaplin's accomplishments as a military officer, and his thorough qualifications for the service he was appointed to perform, will make him a valuable accession to the Faculty, and enable the institution to realize more fully one prominent idea of its establishment, viz: instruction in military tactics, and, incidentally, another idea of still greater importance—that of the physical training of the students. In providing for the education of the young, the value of an effective system of physical training cannot be over estimated, and military drill, within proper limits, is coming to be regarded as one of the most effective auxiliaries to this end. It has been introduced into many institutions within a few years solely with reference to its value in promoting physical health and vigor, elasticity of movement, and manliness of bearing.

The Faculty is now made up of able, earnest and hard-working men, each endeavoring to bring his department up to the highest standard of usefulness, and all working harmoniously together to promote the general welfare of the college. It is obviously just that the State should extend all reasonable aid and encouragement to them in the effort to bring the institution up to the standard of the best of its kind.

Course of Study.

While there has been no marked modification in the course of study during the year, efforts have been made to provide more fully for instruction in the department of agriculture. Contributing to this end, the chemical course has been somewhat changed, as shown by the report of Prof. Aubert.

Complying with the desire of the Trustees, Mr. Farrington, Farm Superintendent, has spent a portion of his time in giving theoretical, as well as practical instruction, in several branches of agricultural study, with good success.

To the popular apprehension, nothing appears more simple or easy than to provide for ample instruction in the department of agricultural study. A little investigation and experience would effectually dispel this fallacy. The dearth of text-books suited to the wants of this department, and the heavy expenditure required

to supply the facilities for illustration in its various branches, are serious obstacles. And then, there are but very few men in the whole country, who, by careful, patient and long continued investigation, have become eminent in this department of knowledge. Still, much has already been accomplished, and it is earnestly hoped that the good sense of the people will incline them to wait patiently for results that are the fruit only of toil and time, and to extend the aid and encouragement necessary to fuller success in the future.

Thoroughbred Stock.

The Trustees have expended eleven hundred and fifty-three dollars for the purchase of thoroughbred stock, a little less than the appropriation for this purpose. The college now has valuable representatives of the Shorthorn, Ayreshire and Jersey families.

Farm Buildings.

The barn begun last year has been completed, and furnishes an excellent substitute for the rough and rickety buildings, which, with the same name, have hitherto disfigured the farm. Occupying an elevated and central position, it commands a view of the whole farm, and is most conveniently situated for the in-gathering of the crops and the distribution of manure. No features of questionable utility have been put into the building for the sake of novelty. The aim has been to construct a compact, substantial and durable building, with large interior space for storage, and to secure convenient distribution of forage to the stock—the free admission of air and sunlight—adequate ventilation for each compartment, including the hay loft, cattle stalls, and manure and root cellars—to shut off from the hay the exhalations from the cattle, to promote the welfare and comfort of each animal, and to reduce the labor incident to the faithful care of the stock to a minimum.

The Trustees deem it proper here to acknowledge their indebtedness to the Hon. Samuel F. Perley, a former member of the Board, whose excellent judgment, mature experience and faithful effort entitle him to a large share of the credit for the excellence of the plans. They desire, also, to express their high appreciation of the value of his counsel in all matters pertaining to the interests of the college, and of his earnest efforts to promote its welfare.

They deeply regret that the condition of his health compelled him to retire from the Board.

The present farm house is located at a very inconvenient distance from the new barn, and is much needed for purposes other than those for which it has hitherto been used. Considerations of convenience and economy require that a farm house should be constructed on a site selected for it near the new barn.

Apparatus.

The exact amount appropriated by the Legislature last winter for the purchase of apparatus has been expended for such articles as were most needed, and still the necessities of the college in this direction are very far from being supplied.

An examination of the subjoined reports will show that the value of the instruction in the several departments would be very largely increased by additional facilities for illustration. After allowing the college the free use of their private cabinets and apparatus, some of the professors have been forced to borrow instruments from other institutions. One of them has made frequent trips to a neighboring city with the members of his class, to give them opportunity to study the structure of various kinds of machinery. While these facts show an earnest endeavor to make instruction practical, thus realizing one of the distinctive ideas of the college, as well as the fidelity of the Faculty, they show, also, that these instructors are subjected to embarrasments from which they ought to be relieved.

A New Building Needed.

Larger rooms than any the college can now command are needed for class recitations, for the library and cabinet collections, for lectures and chapel services, and military drill. The rooms hitherto used for these purposes were designed for students' rooms, or such special uses as require but little space. The increase of students, of books, of cabinet collections and apparatus, renders the necessity for larger rooms imperative.

A building to meet these requirements should be of brick, and so constructed as to be practically fire proof, for the safe keeping of the valuable material that will be gathered in it. As a measure of economy, the Trustees recommend an appropriation sufficient to provide for the manufacture of the bricks that will be

required, on the college farm during next summer, so that the construction of the building may be commenced early the following season.

Wants of the College.

The more urgent necessities of the institution, as indicated in preceding pages, together with those that have not been mentioned, are as follows:

For the purchase of apparatus	$4,500
farm expenses, experiments and improvements	2,500
instruction, in addition to the revenue from the Congressional Fund	4,500
the payment of outstanding bills	3,000
contingent expenses	1,000
repairs and painting of buildings	1,000
building street and grading	800
furniture for students' rooms	200
building a farm house	5,000
making bricks, and other preparations for the construction of a building for recitation and lecture rooms, and rooms for library, cabinet collections, chapel services, &c	5,000
	$27,500

Conclusion.

How to establish a college and furnish it for effective work without the expenditure of considerable sums of money from time to time, is a problem that has never been satisfactorily solved. Especially is it true that schools designed to give scientific and practical instruction are expensive on account of the large amount of costly material required to equip them. While our State College constitutes no exception to this rule, it is, nevertheless, true, that expenditures in its behalf have been on a much smaller scale than those in behalf of collegiate institutions elsewhere. An individual of another State has contributed an amount for a college in this State larger by more than $50,000 than the aggregate of all the appropriations by the State of Maine for her own college. When, by the deliberate action of its Legislature, the State accepted the gift of lands from Congress, it accepted also the responsibility of establishing at least one college for the liberal and practical education of the industrial classes.

In this and accompanying reports will be found a faithful presentation of the condition of the college, number of students, methods of instruction and the success attending them, and the wants of the institution. When the youth of the college and its limited means are taken into consideration, the Trustees believe that the degree of vigor and prosperity it has attained will commend it to the intelligent judgment of the people as being eminently worthy the fostering care of the State.

Respectfully submitted.

ABNER COBURN, *President of Trustees.*

PRESIDENT'S REPORT.

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

In presenting the annual report of the condition of this college we rejoice that another year of prosperity has still further removed it from that state of its existence in which it might have been considered a doubtful experiment to the assurance of a permanent success.

The year past has not been marked by any essential changes in the methods of teaching previously pursued. What has heretofore been found effectual is retained, with only such modifications as may render our labor most effective for good. Each teacher has felt that the claims of his own department should be especially pressed upon the attention of the Trustees, and that it should be so enlarged as to be the most attractive and profitable to the students; but all acknowledge that the harmonious development of all the departments is alike necessary for the success of the institution and the best interest of those who graduate from the college.

Admission of Students.

The value of the instruction received by the students at college will depend largely on the natural abilities of those admitted and the thoroughness with which they have completed their preparatory studies. While the Faculty, therefore, naturally desire to elevate the standard of attainments necessary for admission, so that the students may be in a condition to enjoy all the advantages our course of instruction is designed to furnish, we are fully aware that the great majority seeking admission, and for whose benefit the institution was especially designed, would be excluded by any considerable increase in the conditions of admission or in the severity of examination. The college course commences at a point attainable by the sons of farmers and mechanics at our free

high schools; but the deficiencies in common English studies shown by the candidates on their examination for admission are such as to convince us that great improvements are needed in the system or methods of our common school instruction.

The Design of the College.

Many of the people of our State still think our institution is only a farm school, where the art of farming is taught, and that this is the sole end and aim of all our instruction. We have endeavored to correct this erroneous impression, and to show that our object is to give a liberal and practical education, especially adapted to prepare the student for industrial pursuits and for success in business employments. The studies usually taught in our best colleges, with the exception of the Greek and Latin languages, are taught at the Maine State College. We are fully persuaded that for purposes of discipline and knowledge, for formation and information of the mind, a thorough course of instruction in English literature, modern languages, and scientific studies, is to our graduates of more practical value than would be a finished classical training.

Students.

Since the opening of the college, there has been every year a constant increase in the number of the students. There are now a hundred and twenty-one, representing every county in the State.

If some of our students had not found desirable opportunities for boarding at the village, our rooms would have been insufficient for the number now in attendance.

The great pressure for room arising from the increase in the number of the students, is not felt so much in the dormitories and in the boarding house, as it is in the recitation rooms and in those used for general purposes by the students. Should the college continue to thrive and the number of students to increase, the want of a new dormitory may be obviated by allowing the students to board in private families in the village. In this way some of the injurious effects of massing large numbers of young people may be avoided. But we know of no expedient that will answer as a substitute for a new and commodious building, with better accommodations. Without it, the increasing numbers in the different classes must be crowded into insufficient rooms, alike deleterious to health and comfort.

Every term the problems attending the arrangement of the classes for recitations become more and more difficult of solution. We have not teaching force sufficient to allow of a division of the classes, nor rooms of sufficient size for them to meet all together. The lecture room will not much longer suffice for chapel services. The weighing room in the laboratory is not sufficient for the library, even if it were not needed for its own appropriate work. We need larger rooms for our cabinet of minerals, and collections in natural history. Cabinets and libraries, for obvious reasons, ought not to be used for recitation rooms.

Female Students.

The admission of ladies has been attended by none of the difficulties apprehended by some of our friends. No deleterious influence on their health has been exerted on account of their successful pursuit of a course of study primarily designed for the other sex. Conducting themselves with the strictest propriety, their presence in the class-room has had an influence over their associates by no means injurious.

The lady student who graduated at the last commencement sustained a rank in scholarship equal to any in her class. During her whole college course she never missed a recitation or any exercise on account of her health. The five ladies who are now pursuing their studies with us have suffered no injury to their health by their college life. The theory of a distinguished physician, which was derived from his personal observation and practice among the enervated victims of fashionable city life, is not applicable to the daughters of Maine who seek for admission to our institution.

Should there be an increased number of ladies, there will be need of some more definite arrangement for the female department. The few rooms suitable for their use will soon be insufficient. It may also be desirable to have some plan of manual labor, by which a portion of their expenses may be paid.

College Faculty.

There has been some change in the Faculty of Instruction during the year. Professor Chaplin takes charge of the department of modern languages and assists in the department of engineering—to him also is assigned the book-keeping and military instruction.

The President and the Professors find their time fully occupied in giving thorough instruction in all the wide variety of studies presented in our various courses with so many optional studies. The number of hours required each day for practical exercises by the students, under the superintendence of the teachers, render their labors still more protracted.

The harmony of feeling and general unanimity of opinion on all questions of policy and discipline have been maintained without interruption.

The reports herewith submitted will give an account of the several departments.

Commencement.

The Commencement, held on the 5th of August last, in the new Town Hall, was more largely attended than any previous occasion. The new, spacious and convenient building, was well filled by an interested audience. The Governer of the State, with four of his predecessors in that office, together with other distinguished citizens, were present on the occasion. The parts performed by the graduating class, the highly instructive address of Rev. Dr. Hill, and the music, were well appreciated by those present. The graduation of Miss Louise H. Ramsdell, the first lady that ever graduated from this college, added interest to the occasion. The degree of Bachelor of Science was conferred on Walter Balentine, William Gerrish, John J. Gurney, Rodney D. Hunter and Louise H. Ramsdell, who had completed the Elective Course; and the degree of Civil Engineer was conferred on William A. Allen.

To C. F. Durham and E. A. Work of the Junior class, was awarded the prize for excellence in composition, and to H. M. Easterbrooke of the Sophomore class, was awarded the prize for excellence in declamation. The prizes for the last three years are the donation of the President of your body, Hon. Abner Coburn.

Lectures.

Familiar lectures are delivered by the Professors in their respective departments, embodying a large amount of instruction that could not otherwise be furnished. For the facts are found in no one text-book, and are often derived from sources inaccessible to the students. The requisition made on the students to take notes of the lectures, and to reproduce on examination the substance of the information imparted, is a valuable discipline.

In addition to the regular lectures, a course on Veterinary Science was given during the last term by Prof. Law of Cornell University. These eminently scientific and practical lectures were of great value to the advanced students, especially to those in the agricultural course, as they gave a full account of the diseases of our domestic animals, noticing fully the causes, symptoms and treatment in each case.

Department of English Literature.

As our students, when they enter college, have not had the benefit of the discipline of several years' study of Greek and Latin, which is requisite to enter other colleges, they come but imperfectly prepared to enter upon the study of the English language. Many of them coming from the engrossing activities of industrial pursuits are little acquainted with books, and are unaccustomed to the correct use of language. The study of English grammar as usually pursued in our common schools affords little real knowledge of the language.

Students entering college with such imperfect preparation, find themselves pressed by the imperative demands made upon them in their scientific studies. Under these unfavorable circumstances they are to be taught facility and accuracy of expression, their taste is to be improved, and they are to be guided in the study of our English classics.

The first term, the Freshmen study rhetoric, with such exercises in the principles of English grammar and the analysis of sentences as is absolutely necessary. They are afterwards, through the whole college course, required to attend to regular exercises in composition and elocution.

The Sophomores, in their second term, commence the study of English literature, and continue it for two terms. More time could profitably be spent in critical examination of our best writers if other studies did not prevent. Instruction is also given in English and French history to the Junior and Sophomore classes, and to the Seniors in history of civilization.

Department of Mental and Moral Science.

The members of the Senior class who are not in the course of civil or mechanical engineering receive instruction in mental and moral science, while logic is an elective study. All the Seniors

are required to study political economy and the Constitution of the United States Lectures on the law of real estate and on international law are given to this class, who are required to take notes of the lectures and recite from these notes. These departments of literature and metaphysics are both under the charge of the President, who has also the supervision of the composition and declamation of the students.

If the time allowed for those studies was in any measure in proportion to their importance, no one teacher could give adequate attention to them all. But our students are constantly pressed by the demands for scientific studies and practical labor in the other departments, and the hurried instruction which a single teacher can give is all that they have time to receive.

In presenting the reports from the several departments of instruction, your attention is called to the repeated demand for more room. A new building is very much desired. Additional apparatus is demanded to meet the growing wants of increased numbers. The private cabinets, libraries and apparatus of the Faculty are all freely used by the classes without cost to the institution. It is but just to Prof. C. H. Fernald that his valuable cabinet and specimens should be insured against risk by fire while they are kept in the college buildings.

The citizens of Orono have shown their continued interest in the prosperity of the college by furnishing the reception room with a set of elegant furniture, from the proceeds of a public entertainment.

C. F. ALLEN, *President.*

DEPARTMENT OF MATHEMATICS AND PHYSICS.

President C. F. Allen:

No important changes have been made in this department since the publication of the last report. The recitations to which I have attended, have been algebra, geometry, trigonometry, analytical geometry, mechanics, (Peck's,) physics and astronomy. The recitation in calculus hitherto under my charge, was conducted by Professor Hamlin. In the mathematical studies, very satisfactory work has been done by the students of the several classes, and a good degree of proficiency attained.

The science of physics has been taught by the use of an advanced text-book, and by lectures illustrated as fully as the apparatus owned by the college would allow.

The subjects of sound and electricity were presented wholly by lectures of which the members of the class were required to take notes, and upon these notes to make recitations. By adopting this method, it is designed that the student shall become not only a good recitation scholar from text-books, but shall acquire facility in taking notes of lectures and getting entire command of even intricate subjects when presented orally. It is believed that this acquisition will prove exceedingly valuable to him in after life.

The need of adequate means of illustration in teaching any of the physical sciences is too obvious to require comment. From the pieces of apparatus indispensable to even a moderate development of the department of physics, I have selected as most essential for immediate use a Tyndall's Grove's Battery, an automatic electric lamp and lantern, and the minor pieces needful to make complete an electric projection apparatus. This apparatus, will, probably, have to be imported, and hence it is more than desirable that provision be made for it at an early day, that it may be secured in season for the class that will commence the study of physics at the opening of the Spring term.

In astronomy good work has been done in the class-room, and in the field such quality of work as the instruments at command would enable the class to do.

A Vertical Circle, to be made by Repsold of Hamburg, was ordered early in the summer. On account of the press of work in preparing instruments to be used for observing the Transit of Venus, the order could not at that time be accepted. It is gratifying to report that the order has recently been accepted, and the instrument promised in season for the next class in practical astronomy.

The only Sextant at command for the present class in astronomy, is one that has been kindly loaned for a time to the institution. A Prismatic Sextant should be added to the college stock of apparatus before the next class shall have occasion to use such an instrument.

To another want of the institution I desire to allude. It is not the want of a single department, but common to all the departments. I refer to the need of a building which may include chapel, library, engineering rooms, cabinet, rooms for the department of agriculture, physical laboratory, and rooms giving enlarged accommodations for recitations, and for other purposes. Such a building is much needed, and will, I trust, in the wisdom of the State, be provided at no distant day.

M. C. FERNALD.

DEPARTMENT OF ENGINEERING.

President C. F. Allen:

I.—CIVIL ENGINEERING. The course in Civil Engineering has not been changed since the last report, therefore there is little to be said except as to the urgent wants of the department. Last year money was asked for a plane-table, such as is used on the United States Coast Survey, but it was not found possible to pro- it. I borrowed an instrument for a few weeks from the Massachusetts Institute of Technology, through the kindness of President Runkle, and in that way the Senior class were enabled to get a little practice in the use of this instrument now so much employed in topographical surveys. I should not feel at liberty to ask for it again, and therefore it is absolutely necessary that the college should purchase a plane-table this year. For this

purpose three hundred dollars will be required. Many other pieces of apparatus are needed in this department, but as the department of mechanical engineering is so poorly supplied with working material, it is thought best to devote all funds but those absolutely necessary here to that department.

II.—Mechanical Engineering. This department is now in its second year, and there are at present eight Juniors and three Seniors taking the course.

The *method* of instruction followed in this course has been similar to that in civil engineering, the object being to give a thorough knowledge of the principles of machines, and at the same time to give sufficient practical work to fit those who graduate for immediate usefulness in the office or shop. For that end the students in this course are carried through standard books on the different subjects taught, and are at the same time required to do a great deal of drawing from sketches they themselves take of machines and machine details. During the summer term the present Senior class made weekly visits to Bangor to the various shops there. These students were each day required to take notes and make sketches of some process or machine, on which they were required to report in writing with whatever explanatory drawings were necessary. In this way they received much valuable information that it would be impossible for them to obtain in any other way.

In this connection I would acknowledge the kindness of the Bangor Foundry and Machine Company, and Hinkley, Egery & Co., in allowing the students to visit their works and in loaning drawings for copying. I would also acknowledge the donation from Hinkley, Egery & Co. of the model of a saw mill. Donations of this sort supply a want that can hardly be filled in any other way, and it is hoped that other firms will help the department by gifts of models, machines or parts of machines, and working drawings of any kind. It is, I think, only due to the students in this course to state that the drawing done by them is at least as good as any I have seen done by students in similar courses elsewhere.

Owing to the urgency of the needs in other departments last year, but a very small sum was appropriated for apparatus and working material in this department, and therefore the necessity for an appropriation this year is very great. The apparatus most

needed now is of the sort that will give the students work corresponding to the field work of the civil engineers, and for this object it is thought that the following pieces will serve the purpose best, viz: a small lathe, a small engine and boiler with an indicator, and a set of models and drawings. For this purpose almost any amount could be spent, but eight hundred dollars is the least that ought now to be appropriated. This department, which is one so evidently needing working material, has had in all but about three hundred dollars spent upon it, a sum which any one at all conversant with the cost of such apparatus will at once see is entirely inadequate.

In connection with both departments, I would urge the neces sity for larger and better contrived accommodations. The drawing room, though the best obtainable under the circumstances, is not well suited for its purpose, being dark on two sides, besides being now too small for the number of students working in it. In fact, I do not well see how, next term, we shall be able to provide accommodations for those who should work there. The number of recitation rooms is also insufficient; the lack of room during the last spring term was so great that I was obliged to hold two recitations standing up in the drawing room. More room is also needed to allow of the use of present and future apparatus to the best advantage. I would therefore recommend the erection of the building proposed last year at the earliest possible date.

I wish here to mention that in the work of the year I have been ably and faithfully assisted by Prof. Hamlin, and during the past term by Prof. Chaplin, who has had charge of the Junior class in mechanism and has also given instruction in drawing.

Respectfully. W. A. Pike.

DEPARTMENT OF NATURAL HISTORY.

President C. F. Allen:

The methods of instruction pursued in this department during the past year have been the same as those mentioned in my last report, so far as time and appliances would permit.

The Freshmen received instruction in physical geography the first term, and began the study of botany at the middle of the second term, continuing it through the third term, and a part of the first term of the Sophomore year, after which the same class studied the "Elements of Agriculture" till the close of the term.

Instruction was given to the Juniors during the first term in human anatomy, physiology and hygiene, and in zoölogy to the agricultural and elective students during the second term of the Junior year; and in entomology and comparative anatomy in the two terms following. The Seniors received instruction in determinative mineralogy in the second term, and in geology during the third term.

There is imperative need of more room for the working of this department. At present we have but one small room for cabinet, store-room, dissecting room, and general work-room in botany, as well as in comparative anatomy; and, at the same time, it has to be occupied by students every hour for recitations. A botanical work-room and herbarium, a cabinet, and working laboratory in zoölogical studies, are necessary for the increased number of students now requiring instruction in this department.

There is also an absolute and immediate want of models for illustration in teaching comparative anatomy. I have thus far supplied nearly all the materials and specimens used in this department from my own private cabinet, for which no charge has been made; but since my collections are quite deficient in representatives of higher animals especially, I would earnestly recommend that an appropriation be made for this department.

The estimated cost of the necessary apparatus is $1,000.

C. H. Fernald.

DEPARTMENT OF CHEMISTRY.

President C. F. Allen:

I was appointed Professor of Chemistry towards the end of the year 1873, and entered upon my duties February 5th, 1874.

At that time there were thirty-six members of the Sophomore class who wished to take analytical chemistry. The laboratory being arranged to accommodate only thirty-two at one time, it was found necessary to divide them into two sections, which practiced every alternate day. In the afternoon some students of the Senior and Junior classes occupied the laboratory for the purpose of practice in quantitative analysis.

During the Summer term the instruction was much the same as that of the previous one. The class being somewhat reduced in numbers, it became practicable to admit them into the laboratory every day.

At the Trustee meeting, last Commencement, a course in chemistry was proposed for their approval. The course embraced drill in qualitative and quantitative analysis, besides instruction in inorganic, organic and theoretical chemistry. It has now been in operation for one term, and it is to be hoped that it may prove successful. Thus far the class has consisted of six students, who have, on the whole, given satisfaction. I have held recitations in agricultural chemistry and metallurgy in the forenoon, and my afternoon has been occupied by students of the chemical, agricultural and elective courses, who take quantitative analysis.

The agricultural and chemical students increase the number of students taking quantitative analysis greatly, it therefore becomes necessary to purchase more apparatus fitted for such purposes—($500) five hundred dollars will be needful to this end. As no chemical course can be complete without practice in assaying, it therefore becomes necessary to add ($300) three hundred dollars to the above sum for the purchase of an assay furnace, balance, etc.; making in all ($800) eight hundred dollars needed by the chemical department.

I would, in concluding, state that I have had under my charge a class of students who were reading German. As they had read some plays, it was thought best to adopt a popular scientific work on Heat, a part of which they have read and translated this term. A more extended course in German would be desirable.

The building the chemical department now occupies is well fitted for its purposes, but we suffer greatly for want of room which is necessarily taken up by other departments. The erection of a new and spacious college building seems imperative.

Respectfully submitted.

ALFRED B. AUBERT.

DEPARTMENT OF MODERN LANGUAGES.

President C. F. Allen:

I have the honor to submit the following report concerning the instruction given by me since August 27th, 1874.

I have taught in modern languages only the Junior class in French. Their instruction for two previous terms has been under another professor, and probably the change in teachers, and consequently in methods of instruction, has made them more backward than they otherwise would have been. I think this term has been well improved by them, and that their progress has been as great as could be expected. I venture to suggest that the course in modern languages is neither as extensive nor as generally taken by the students as it ought to be. At present they are unable to acquire more than the rudiments of French and German, and are probably able to read scientific treatises in either language by the aid of the dictionary when they graduate. Such a knowledge is of little value during their stay here and is soon forgotten after they graduate. As the course is now arranged, the engineering students are unable to take German. In view of the many valuable works on engineering written in that language this seems to be a great loss for them. Many books are greatly needed in the library for the use of this department. I mention the following as the most necessary: a large German and English Dictionary, and a German, English and French Technical Dictionary.

MILITARY INSTRUCTION. Early in the term a change was made in this department by which fifteen minutes every day (from 7.45 to 8 A. M.) and an hour on Thursday afternoon, were devoted to drill. It was intended to spend the morning exercise in "setting up" and the afternoon in the evolutions of the squad and company. I think it is hardly time to pronounce on the benefits arising from this method of drill, but it is evident enough to warrant a further trial of the method. The students have been uniformly obedient and soldierly, and have done all that could reasonably be expected to make the drill pleasant and profitable. The Cadets are armed with the muzzle-loading Springfield rifles. The government has adopted for the army a breech-loading rifle and consequently a system of tactics very different from that formerly used. The purpose of the government in prescribing military studies at the agricultural colleges must have been to procure a large number of young men who, in case of war, would be able to instruct others in the simpler military exercises and the manual of arms. It would be manifestly of no use to instruct the Cadets in the manual of a weapon no longer recognized by tactics or regulations. I think the Trustees will see the necessity of making an effort to secure the improved arms. There ought to be provided a room for storing the arms and accoutrements and for drilling in bad weather. At a small cost a portion of the barn back of the boarding-house might be fitted up as a gymnasium and drill room. I understand that the room could be spared by the farm department.

MECHANICS. I have taught one class in the "Elements of Mechanism." Their progress has been satisfactory. I have assisted in the instruction in drawing, in which the progress will be properly reported by the Professor of Engineering.

The Professor of Chemistry was kind enough to take the class in German and allow me to instruct a class in general chemistry. The text-book in use seems to be rather too purely scientific. But it is very difficult to find a book which studied only one term can give a good general idea of chemistry.

W. S. CHAPLIN.

DEPARTMENT OF AGRICULTURE.

President C. F. Allen:

In compliance with the request of the Trustees, I have during the term time of the year given one hour each day to class-room instruction in agricultural studies. The topics considered, have been, farm implements, mechanical cultivation of the soil, farm drainage, dairy farming, stock breeding, and sheep husbandry. The devotion of one hour each day to such instruction, should in any case imply previous preparation. Those who have had the opportunity of giving years of study to the special work of fitting themselves for such duties, even when aided by the best of text-books on the studies pursued, find such preparation profitable, and even necessary.

It has been impossible to obtain satisfactory works designed as text-books on any of the subjects which have come under my instruction. Information on some of the studies could only be gathered here and there, from books and papers, and from my own experence and that of others, as opportunity offered or could be obtained. The very limited aid that has been available in the way of books, and the still more limited time at my disposal on account of other necessary labors, have caused me much embarrassment, and have also, I fear, served to detract from the value of the instruction given. Notwithstanding these drawbacks, which seem to have been unavoidable, the employment has been a very pleasant one to me, and not wholly unprofitable, I trust, to those instructed.

It is very desirable that something be provided in this department for the purpose of illustrating the subjects taught in the class-room. We need, when upon the subjects of farm implements and mechanical cultivation of the soil, a "collection of farm implements of the most ancient and modern manufacture—models which shall show the principles of their construction, and the various steps of progress in the several departments, and embody the best ideas of the best farmers and mechanics of modern times." It will also be of much service, if in the line of "labor-

saving machinery for the farm, we can be supplied with models to enable the teachers to present clearly the object of their construction and use, the principles involved, and to direct attention to desirable improvements."

While pursuing the subject of stock breeding, reference is made to the stock upon the farm for illustration. The several breeds of cattle owned by the college afford excellent opportunity for testing and applying the theories taught in books. In addition to these educational facilities, "we need a large collection of diagrams, paintings and sketches, which can be quickly and easily used by the teacher, to display the comparative faults and excellencies of different breeds and kinds of domestic animals, the various stages of change and development from the original type to present forms and qualities, and to show minutely the points which it is the desire of the breeders to obtain."

The use of such diagrams would greatly enhance the value of the instruction given, and more than compensate the cost.

J. R. FARRINGTON.

LIBRARY.

President C. F. Allen:

The college library during the past year has been under my charge. When I entered upon my duties as librarian there were in the library 1,733 volumes. At the present time there are 2,052 volumes, showing an increase of 219 volumes. Of these, 64 volumes were purchased with the remainder of the one thousand dollars ($1,000) given to the library by Ex-Governor Coburn. By the will of the late Hon. C. B. Abbot, 130 volumes have come into the possession of the library. Twelve volumes have been sent to the library by Senator Hamlin and 13 volumes by Mr. S. L. Boardman. The room now occupied by the library is entirely unfit for such a purpose, and a new one should be provided.

In conclusion, allow me to remind you of the great importance to a school like this of a technical library, pertaining directly to those subjects upon which instruction is given, and that although

each Professor has labored to supply the library with books demanded by his own department, yet on account of the limited amount of money available, and the great expense of such books, there are not to be found in the library two hundred volumes of a purely technical character. I do not doubt that it will be your pleasure to make such appropriation for the library this year as will tend to make it answer more fully than heretofore the just demands of the college.

Since writing the above we are gratified to learn that Hon. Mr. Coburn has added another $500 to his generous donations to the library.

G. H. HAMLIN.

FARM SUPERINTENDENT'S REPORT.

The experiments conducted under my care, have for the most part, been the continuation of such as have heretofore been reported year by year, viz: Feeding swine with cooked and uncooked meal, to ascertain the respective values of such food; the use of different fertilizers in the cultivation of potatoes, and of Lane's improved sugar beets for stock; and the application of various manures as a top dressing for grass land. We have also tried different modes of planting potatoes,—such as using for seed tubers of different sizes, cutting them into two or more pieces, allowing an unequal number of stalks to grow in the hills, planting the potatoes at different depths and distances, and in hills of various forms and dimensions.

The use of a machine for sowing grain in drills, which was kindly loaned us by J. S. Grant, Esq., of Sidney, furnished the means for comparing the product from wheat sown broadcast by hand, with the product from wheat sown in drills with a machine. Other experiments were commenced, from which, owing to circumstances beyond control, no satisfactory results were obtained.

The experimental feeding of swine to ascertain the comparative values of cooked and uncooked meal in the production of pork, has now been continued for five successive years, with results not always exactly the same, yet uniformly pointing in one direction. The percentage of gain has been without exception in favor of uncooked meal. We own none of the modern inventions for cooking or steaming food for domestic animals, and have in consequence been subjected to no little inconvenience and extra expense in carrying out the details of the experiment; yet the endeavor has been, by performing the work with faithful exactness and care, to obtain results that are reliable. These results squarely oppose themselves to the generally received estimate of the profitableness of cooking meal for swine. They are not in accordance with many published essays upon the subject, and

considerable doubt has been expressed as to their reliability. We can only assure those who doubt, that the cooked meal fed has been *thoroughly* cooked, and the amount given has been accurately weighed. The swine have been faithfully and impartially cared for, and the results noted and recorded. It is designed to continue the experiment, that we may test yet more thoroughly the value of our conclusions. If future trials shall furnish additional evidence that a given amount of pork can be produced more cheaply by feeding with uncooked meal, it will be a result of great value to pork producers, and will tend to materially lessen the drudgery and expense of the usual method of feeding swine. It is much to be desired that our facilities for prosecuting such labors be greatly improved and enlarged, so that our experiments in this direction shall not be confined to swine alone, but may be extended, to test the value of cooked or steamed food for the growth of young stock, the fattening of cattle, and the production of milk.

Experiment in feeding swine with cooked and uncooked meal, to ascertain the relative values of such food for the production of pork.

Three pigs were selected, representing a cross of two improved breeds, being three-fourths White Chester, one-fourth Suffolk. They were from different litters, of nearly the same age, and at the time of commencing the experiment, July 8th, weighed as follows: No. 1, 38 lbs., No. 2, 43 lbs., No. 3, 47 lbs. They were kept in separate and adjoining pens, with each of which a small open yard was connected. Corn meal, either cooked or uncooked, with occasionally a quantity of weeds or grass, was the only food given during the twenty weeks of the experiment. The meal for each pig was weighed out and prepared every morning, care being taken to prepare for each one the full amount it would consume. The accompanying tables show that for the first period of four weeks, Nos. 1 and 2 were fed with raw meal and No. 3 was fed with cooked meal, and during the second period of four weeks Nos. 1 and 2 received cooked meal, while No. 3 received raw meal. This method of alternating the kind of food given, although open to some objection on account of the sudden and complete change which is made in the character of the food at the end of each period of four weeks, yet affords the best opportunity for

comparing the effect produced by the two kinds of food upon the same pigs at different times, and also upon the different pigs at the same time. And although it is very probable some loss did result from such marked changes in the character of the food, yet it is thought the four weeks allowed to each period was a sufficient time for the digestive organs to become accustomed to the change and do good work under the new conditions. Had there been no change made in the kind of food throughout the whole time of the experiment, no doubt a larger growth would have resulted; but the varying conditions of constitution and health which exist in all animals, might have caused results with which the kind of food given had little or nothing to do, and poor health, or other cause could under this practice be plausably urged as the reason why the unsuccessful method of feeding failed to give the best results. By the course of feeding pursued, the pigs were equally and impartially treated, and the influence of cooked meal and of meal not cooked, upon each case, may be exactly noted and compared.

	No. of pig.	Raw or cooked meal.	No. lbs. meal fed per week.	Cost of food consumed.	Pounds of gain in weight during each week.	Cost per pound of increase in live weight.
			lbs. oz.	cents.		cents.
End of first week	1	Raw.	15 4	30.5	4½	6.8
	2	Raw.	16 8	33.0	4½	7.3
	3	Cooked.	16 8	33.0	5	6.7
End of second week	1	Raw.	19 12	39.5	4½	8.8
	2	Raw.	21 12	43.5	3½	12.4
	3	Cooked.	21 12	43.5	5	8.7
End of third week	1	Raw.	17 8	35.0	5	7.0
	2	Raw.	21 4	42 5	9	4.7
	3	Cooked.	21 4	42.5	10	4.3
End of fourth week	1	Raw.	12 0	24.0	2	12.0
	2	Raw.	18 4	36.5	½	73.0
	3	Cooked.	18 4	36.5	4	9.0
End of fifth week	1	Cooked.	18 4	36.5	6½	5.6
	2	Cooked.	21 8	43.0	6	7.2
	3	Raw.	21 8	43.0	6	7.2
End of sixth week	1	Cooked.	14 12	29.5	3½	8.4
	2	Cooked	18 0	36.0	5½	6,5
	3	Raw,	18 0	36.0	4½	8.0
End of seventh week	1	Cooked.	15 0	30 0	3½	8.6
	2	Cooked.	18 8	37.0	5	7.4
	3	Raw.	18 8	37.0	4	9.3
End of eighth week	1	Cooked.	17 8	35 0	4	8.8
	2	Cooked.	21 0	42 0	5	8.4
	3	Raw.	21 0	42.0	6	7.0
End of ninth week	1	Raw.	18 4	36.5	4	9.1
	2	Raw.	21 4	42.5	5	8.5
	3	Cooked.	21 4	42.5	6½	6.5

	No. of pig.	Raw or cooked meal.	No. lbs. meal fed per week.	Cost of food consumed.	Pounds of gain in weight during each week.	Cost per pound of increase in live weight.
			lbs. oz.	cents.		cents.
End of tenth week	1	Raw.	20 12	41 5	8	5.2
	2	Raw.	24 4	48.5	8	6.1
	3	Cooked.	24 4	48 5	8½	5.7
End of eleventh week	1	Raw.	22 12	45.5	5	9.1
	2	Raw.	26 4	52.5	6½	8.1
	3	Cooked.	26 4	52.5	6	8.8
End of twelfth week	1	Raw.	24 0	48 0	4½	10.7
	2	Raw.	27 12	55.5	7½	7.4
	3	Cooked.	27 12	55.5	3½	15.9
End of thirteenth week	1	Cooked.	24 8	49.0	3	16.3
	2	Cooked.	28 0	56 0	1½	37 3
	3	Raw.	28 0	56 0	7	8 0
End of fourteenth week	1	Cooked.	24 8	49 0	9½	5.2
	2	Cooked.	28 0	56.0	7½	7.5
	3	Raw.	28 0	56.0	5	11.2
End of fifteenth week	1	Cooked.	23 0	46.0	5½	8.4
	2	Cooked.	28 0	56 0	12	4.5
	3	Raw.	28 0	56.0	12	4.5
End of sixteenth week	1	Cooked.	16 0	32.0	loss ½	-
	2	Cooked.	28 0	56.0	1½	37.3
	3	Raw.	28 0	56 0	2	28.0
End of seventeenth week	1	Raw.	22 8	45.0	10	4.5
	2	Raw.	29 8	59.0	9	6.6
	3	Cooked.	29 8	59.0	9	6.6
End of eighteenth week	1	Raw.	26 0	52.0	2	26.0
	2	Raw.	32 12	65.5	6	12.6
	3	Cooked.	32 12	65.5	4	18.9
End of nineteenth week	1	Raw.	30 0	60 0	5½	10.9
	2	Raw.	36 12	73 5	7	10 5
	3	Cooked.	36 12	73.5	7½	9.8
End of twentieth week	1	Raw.	31 12	63 5	8	7.9
	2	Raw.	38 8	77.0	6½	11.8
	3	Cooked.	38 8	77.0	7	11.0

	No. of pig.	Raw or cooked meal.	No. lbs. meal fed in four weeks.	Cost of food consumed in four weeks.	Pounds of gain in weight in four weeks.	Cost per pound of increase in weight.
			lbs. oz.	cents.		cents.
During first period of 4 weeks	1	Raw.	64 8	129.0	16	8.1
	2	Raw.	77 12	155.5	17½	8.9
	3	Cooked.	77 12	155 5	24	6.5
During second period of 4 weeks.	1	Cooked.	65 8	131.0	17½	7.5
	2	Cooked.	79 0	158.0	21½	7.3
	3	Raw.	79 0	158.0	20½	7.7
During third period of 4 weeks	1	Raw.	85 12	171 5	21½	8.0
	2	Raw	99 8	199.0	27	3.4
	3	Cooked.	99 8	199.0	24½	8 1
During fourth period of 4 weeks	1	Cooked.	88 0	176.0	17½	10.1
	2	Cooked.	112 0	224.0	22½	10.0
	3	Raw.	112 0	224.0	26	8 6
During fifth period of 4 weeks	1	Raw.	110 4	220.5	25½	8 6
	2	Raw.	137 8	275 0	28½	9.6
	3	Cooked.	137 8	275.0	27½	10.0

Each pound of live weight produced by feeding raw meal to No. 1, cost 8.3 cents.
" " " " " No. 2, " 8.6 "
" " " " " No. 3, " 8.2 "
" " " " cooked meal to No. 1, cost 8.8 cents.
" " " " " No. 2, " 8.7 "
" " " " " No. 3, " 8.3 "

The average cost per pound of live weight produced by feeding raw meal is 8.4 "
" " " " cooked meal is 8.5 "

The average cost per pound of increase in live weight obtained by feeding raw meal, is to the average cost per pound obtained by feeding cooked meal as 100 to 101.2.

Live weight.	Dressed weight.	Less in weight.
No. 1, 129½ pounds	110½ pounds	19 pounds.
No. 2, 155 "	132½ "	22½ "
No. 3, 162 "	141 "	21 "

Experiment showing the effect of different fertilizers in the cultivation of Lane's Imperial Sugar Beet for cattle, conducted and reported by F. F. Phillips, class of 1877.

The soil in which the beets were sown is a light clay loam. The same variety of beets was grown on this plat last year, at which time no other fertilizer than manure from the cow stable was applied. The ground having been previously well pulverized and fairly and evenly dressed with cow manure, it was raked down and prepared for sowing, May 29th. The rows, one hundred and nine feet in length, were marked two and one-half feet apart, giving one square rod (nearly) to each row. The fertilizers were carefully weighed, and worked into the soil in the line of the several rows. Lines drawn at right angles with the rows and one foot apart, marked at the points of intersection the places in which the seeds were dropped and covered by hand. The first seven rows were sown May 29. A heavy fall of rain occurring the next day thoroughly saturated the ground, and the remaining eighteen rows were not sown until June 2. In each portion of the plat the beets came up in seven days from the time of planting.

The column of results shows a large yield from Nos. 1 and 19 to which no fertilizers were applied. An unoccupied space four feet wide was left between No. 1 and an adjoining plat of cabbages and allowed more ample feeding ground and more sunlight to the plants in this row, which will account for the greater yield. A dead furrow occurred between Nos. 19 and 20 and a double space (five feet) was left between the rows. The coarse and strawy manure from the adjoining rows was raked into this space and allowed to remain during the season; this, acting both as

fertilizer and mulch, doubtless had much effect on the product. The beets were thinned early in July, when the missing plants in each row were supplied from the surplus plants in the same row. The soil was kept light and free from weeds through the season by the frequent use of French's Cultivator. The beets were harvested October 23d and 26th, being cleaned and weighed as they were gathered from the row.

No. of row.	FERTILIZER. Names.	FERTILIZER. Weighed in pounds.	No. of plants missing at time of thinning	RESULT. Weight in pounds.
1	Nothing	–	5	243
2	Prepared Fish, (1)	2½	25	220½
3	Kainite, (3)	2½	15	226
4	Superphosphate, (14)	2½	8	225
5	Nothing	–	4	198½
6	Prepared Fish and Kainite	1¼ each.	19	227½
7	Kainite and Superphosphate	1¼ "	9	248⅝
8	Fish and Superphosphate	1¼ "	13	258½
9	Nothing	–	16	197½
10	Dry and ground Seaweed, (10)	2½	25	217½
11	Seaweed and prepared Fish	1¼ each.	13	204½
12	Seaweed and Superphosphate	1¼ "	12	230
13	Nothing	–	40	201½
14	Seaweed and Kainite	1¼ each.	41	241½
15	Nothing	–	45	175
16	Prepared Fish	2½	33	209½
17	Kainite	2½	30	221½
18	Superphosphate	2½	47	238½
19	Nothing	–	58	251½
20	Prepared Fish and Kainite	1¼ each.	36	284
21	Kainite and Superphosphate	1¼ "	45	217
22	Fish and Superphosphate	1¼ "	39	220
23	Nothing	– "	51	191
24	Dry and ground seaweed	2½	25	228
25	Seaweed and prepared Fish	1¼ each.	17	260

Experiment to test the value of different fertilizers when used in the cultivation of potatoes; conducted and reported by H. C. Townsend, class of 1877.

The land on which these potatoes were planted, is a heavy, tenacious clay loam, lying nearly level. It was in very poor condition, having for several years produced only from five to ten hundred weight of white-weed per acre. This was plowed to the depth of six inches, in September of the previous year. No dressing besides the fertilizers given in the table was applied. Before planting the potatoes, the soil was made quite mellow by the diligent use of Nishwitz' Pulverizer and Shares' Harrow, and the furrows were made four inches deep with Chandler's Horse-Hoe. That the proper position of each hill of potatoes might be accurately marked, a wire of the requisite length was prepared, into

which at each space of eighteen inches was wound a piece of wood three inches long and one-half inch in diameter; with this lying along side the furrow it was easy to know in every case the precise spot for the fertilizer and the seed potatoe. The fertilizers were well mixed with the loose earth in the bottom of the furrow before the potatoes were dropped upon them. The rows were ninety feet long and three feet apart, each row containing one square rod; sixty hills, eighteen inches apart, were planted in each row. Selected Orono potatoes, weighing about four ounces apiece, were cut in halves and one piece planted in each hill, May 26th.

No. of row.	FERTILIZERS.	Pounds of Fertilizers.	Pounds of Potatoes.	Growth of Vine.
1	Nothing	–	60½	8
2	Prepared Fish (1)	5	76½	6
3	do do	2½	74½	6
4	Chloride of Potassium (2)	5	79	7
5	do do	2½	82½	6
6	Kainite (3)	5	105	5
7	Nothing	–	86	4
8	Kainite	2½	101½	4
9	Prepared Fish and Chloride of Potassium (each)	2½	91½	6
10	do do Kainite (each)	2½	90	6
11	Ground Feldspar, raw, (4)	5	55	4
12	do do do	2½	52	4
13	Nothing	–	45	4
14	Ground Feldspar, roasted, (5)	5	43	2
15	do do do	2½	41½	3
16	Ground Feldspar, raw, and Prepared Fish	5	40½	3
17	do do roasted do do	2½	40	3
18	Feldspathic Phosphate (6)	5	60	5
19	Nothing	–	47½	2
20	Feldspathic Phosphate	2½	88	4
21	do do and Prepared Fish (each)	2½	53	4
22	Ground Granite (7)	5	45	2
23	do do	2½	49	2
24	do do and Prepared Fish (each)	2½	46	3
25	Nothing	–	41½	1
26	(Results of no value.)	–	–	–
27	do do	–	–	–
28	Ground Raw Bone (8) and Kainite (each)	2½	65	2
29	do do Ashes (15) (each)	2½	59	2
30	Tobacco Fertilizer (9)	5	62½	4
31	Nothing	–	49	4
32	Tobacco Fertilizer	2½	54	5
33	Dried and Ground Seaweed (10)	5	77	4
34	do do do	2½	54½	4
35	Dissolved Bone (11)	5	76½	4
36	do do	2½	98	5
37	Fish	5	107	6
38	do	2½	81½	6
39	Nitrate of Soda (12)	5	98	9
40	do do	2½	102	10
41	Nitrate of Soda and Salt	5	89½	7
42	do do do	2½	75	6
43	Animal Dust (13)	5	87	6
44	do do	2½	71½	6

NOTES ON THE MANURES.

(1)—This was pressed herring chum, mingled with sulphuric acid sufficient to neutralize all the ammonia as fast as formed; allowed to heat and partially decompose. When used, it contained 35 per cent. water, and about 8 per cent. ammonia. Cost in Portland $30 per ton

(2)—Contained 80 per cent. of the salt. Cost in New York, 3¾ cents per lb.

(3)—Cost in New York $35 per ton. Contained 32 per cent. Sulphate of potash, 12 per cent. sulphate of Magnesia.

(4)—From Topsham—containing 16 per cent. potash. The rock is simply ground.

(5)—Same rock, roasted before grinding.

(6)—Consisting of equal proportions of ground feldspar, mineral phosphate, and sulphuric acid of 45°, B.

(7)—From Sangerville. Reported to have been used there with remarkable results.

(8)—Raw bone coarsely ground. Cost $55 per ton in Bangor.

(9)—Prepared by Cumberland Bone Company for use on Connecticut River. It differs from the bone superphosphate prepared by the same company, in that it contains a greater proportion of potash salts.

(10)—Prepared by L. Maddocks, Boothbay, Me. Price $40 per ton.

(11)—Prepared by Cumberland Bone Company. Cost in Portland $55 per ton.

(12)—Cost in Portland $80 per ton.

(13)—Prepared by Charles H. North & Co., Boston, Mass. Sent for trial.

(14)—Cumberland Superphosphate. Prepared by Cumberland Bone Company. Price in Portland, $55 per ton; and wherever superphosphate is elsewhere mentioned, unless otherwise specified, the article made and sold by the Cumberland Bone Company, Portland, is to be understood.

(15)—From equal proportions of second growth hard and soft wood. Usually sold at one shilling per bushel.

The following experiments, comprising divers ways of cutting and planting potatoes, were originated in connection with the Scientific Society of the Maine State College, in the hope that the methods proposed will be tested, not only by the students at the College farm, but also by practical men in other parts of the State; that by the comparison of results obtained under conditions widely differing from each other, definite conclusions may be reached, which shall be of real value to those who wish to practice the best methods of planting potatoes.

The potatoes used for seed are classed as follows: Large, those weighing seven to eight ounces; Medium, those weighing three to four ounces; Small, those weighing one to two ounces.

Where not otherwise stated, large potatoes are cut into four pieces, medium potatoes are cut into two pieces, and one piece dropped in a hill.

The first results given were obtained at the college farm by J. H. Williams, class of 1876; the second series of results is reported by G. O. Weston of Madison, Me., a graduate of the college, class of 1872, and a practical farmer.

These potatoes were planted on the college farm, in a dry, gravelly loam, broken up from grass the previous autumn. Eight

cords of stable manure to the acre were spread and harrowed in before planting. Owing to an unfortunate misunderstanding, a record of the weight of the different qualities of potatoes grown under the several conditions of the experiment was not kept. We are able to give only the aggregate amount in each case. The results reported by Mr. Weston are from potatoes "planted late, on a light loam, dressed with ten cords of manure per acre; because of the great pressure of other work they received but little attention."

Number of Experiment.	CONDITIONS OF EXPERIMENTS.	Reported by J. H. Williams	Reported by G. O. Weston,		
		Total lbs.	Large lbs.	Small lbs.	Total lbs.
1	Seed end. Butt end. — Potatoes divided through the center, and the product of the seed end and the butt end compared.	26 1/4 29 3/4	7 2/4 11 6/4	5 2/4 4 2/4	13 1/2 16 1/2
2	Large potatoes. Medium " Small " — Large, medium and small potatoes compared; the seed planted each year to be the product of potatoes of a like class.	33 3/4 30 3/4 20 1/4	7 1/4 7 1/4 2 1/2	3 3/4 3 3/4 2 3/4	11 11 5 1/4
3	Large " Medium " Small " — Large, medium and small potatoes compared; the seed to be selected from an ordinary pile of potatoes.	35 3/4 26 3/4 26 3/4	6 1/4 6 1/2 4 1/4	4 4 4	10 1/4 10 1/2 8 1/4
4	6 inches. 12 inches. 18 inches. 24 inches. — The products of large potatoes compared, when planted six, twelve, eighteen and twenty-four inches apart	13 2/4 24 1/4 15 1/4 25 1/4	6 1/4 8 1/4 6 3/4 5 1/4	5 1/4 4 4 3	11 1/2 12 1/4 10 1/4 8 1/4
5	Large potatoes. Medium " Small " — Equal weight per acre, of large, medium and small potatoes, planted at equal distances	24 3/4 24 3/4 27 3/4			
6	2 inches 4 inches. 6 inches. 8 inches. — Seed planted on the surface and covered to the depth of 2, 4, 6 and 8 inches.	18 2/4 25 1/4 26 2/4 25 2/4	4 1/4 8 2/4 6 2/4 7 1/4	3 3/4 4 1/4 4 2/4 5	8 13 11 1/2 12 1/4
7	2 inches. 4 inches. 6 inches. 8 inches. — Seed planted below the surface 2, 4, 6 and 8 inches, and covered to the same depth.	21 1/4 23 3/4 13 3/4 11 3/4	4 1/2 3 3/4 4 1/2 7 3/4	5 4 1/4 4 1/2 4	9 1/2 8 8 1/2 11 3/4
8	One piece. Two pieces. — Medium potatoes cut to two parts, and the product of one part in a hill, compared with the product of two parts in a hill.	24 1/4 24 3/4			
9	Whole potatoes Cut to two eyes. — Medium potatoes planted whole, compared with the same cut to two eyes, and one piece planted in each hill.	11 3/4 11 3/4			
10	Flat hills. Pointed hills. — The amount of potatoes produced by planting in flat hills, compared with the amount produced from pointed hills.	21 1/4 25 1/4	10 1/4 12 4/4	4 1/2 4 2/4	14 3/4 17
11	Small hills. Large hills. — The product of potatoes planted in small hills, compared with the product of potatoes planted in large hills.	18 2/4 20 2/4	8 3/4 11 1/4	3 3/4 5 1/4	12 1/2 16 1/2
12	One piece. Two pieces. — Large potatoes cut to two pieces; the product of one piece in a hill, compared with two pieces in a hill.	32 3/4 31 3/4			
13	Two stalks. Four stalks. Six stalks. — An equal number of eyes planted in each hill, and an unequal number of stalks allowed to grow.	21 3/4 20 3/4 21 3/4			

An experiment in the use of manures for top dressing grass lands, which was commenced last year at the suggestion of S. L. Boardman, Secretary of the Maine Board of Agriculture, was repeated this season. The manures were spread on the same plats, and in the same quantities as before. The manures first applied appeared to have little or no influence on the growth of the grass. A glance at the figures now given, will show a marked improvement in the results of this year. The experimental plats are each two rods square, containing 1-40 of an acre; they are staked out in two rows, four in a row, and are separated from each other by a strip of land four feet wide, which received no manure. These plats are situated near the easterly corner of the farm, in a level field of heavy undrained clay soil. I am told this field is one of the more recently cleared portions of the farm; it is in better condition than are the other unmanured fields, yielding on the average more than one ton of hay per acre.

In 1873, the manures were applied May 20th, and the grass was cut the second week of July.

In 1874, the manures were applied May 22d, the grass was cut July 29th. The following are the results:

Manure.	Rate per acre.	1873. Weight of hay.	1874. Weight of hay.
Cow manure	Five cords	63 lbs.	150 lbs.
Horse manure	Five cords	71 "	127 "
Fine old muck (*a*)	Five cords	83 "	148 "
Fine old muck and salt	Muck, five cords ... } Salt, three bushels.. }	73 "	121 "
Plaster	Two bushels	51 "	115 "
Wood ashes	Five bushels	81 "	97 "
Salt	Three bushels ...	87 "	92 "
Nothing		87 "	88 "

(*a*) From a bed of swamp muck four feet in depth. It had been exposed to the weather one year.

Among other experiments, we have compared wheat sown broadcast by hand, with wheat sown in drills by a machine. The trial field contained one hundred six and two-thirds square rods of moist, clay loam, sloping gently to the south-east. The land having been well manured and planted with hoed crops for five years, was in good condition. In September, 1873, after harvesting a good crop of corn fodder from the field, it was plowed six inches deep, and two cords of stable manure were spread on the furrows. In the spring, after the soil was made mellow with Nishwitz' Pulverizer and Share's Harrow, two cords of green

manure from the cow stables were spread evenly over the surface and harrowed in. The grain drill not being on hand as was expected, May 23d, one-half the piece was sown with Lost Nation wheat, at the rate of two and one-half bushels to the acre,—twenty-six and two-thirds quarts on fifty and one-third rods. May 29th the drill arrived, and was put into service the next day. With it wheat was sown on the remainder of the field, at the rate of one and one-fourth bushels to the acre, or thirteen and one-third quarts on fifty-three and one-third rods, just one-half the quantity sown broadcast.

This field, situated just opposite the farm house, on the road from the College buildings to Orono village, was under constant observation, and a point of much interest to all. The straight line of the wheat in drills, an unusual sight in this vicinity, drew the attention of passers by, and called forth many remarks and inquiries. The inequality of growth arising from the difference in time of sowing was marked at first, but gradually became less perceptible, and at harvest time it could not be told from the ripeness of the grain, which was sown the earlier.

Several conditions of the experiment make it imperfect. There was a difference of one week in the time of sowing the wheat; an unequal amount of seed was put on the two parts of the field; and the broadcast wheat was limed, while that sown with machine was not limed. With every variation in favor of it, the wheat sown by hand yielded only one-half bushel more than the drilled wheat.

The wheat was threshed by machine and carefully measured. The figures given are machine measure.

Thirteen and one-third quarts sown with grain drill on one-third of an acre, yielded thirteen and one-half bushels. Twenty-six and two-thirds quarts sown broadcast on one-third of an acre, yielded fourteen bushels. The product from the drilled wheat was at the rate of forty and one-half bushels to the acre. The product from the hand-sown wheat was at the rate of forty-two bushels to the acre. The additional one and one-fourth bushels of wheat sown broadcast, increased the crop one and one-half bushels to the acre.

Experiments to ascertain the best method of raising onions, and protecting them from insect enemies, have been in progress for two years, in care of students interested in this branch of agriculture. Fertilizers of different sorts are used to promote the growth of the crop, and various applications are made to prevent the destructive work of injurious insects. Valuable knowledge has

been gained, and good progress made, but full success is not yet attained. This season, a fine growth of tops and the absence of insect enemies, encouraged the hope of an abundant harvest. These hopes were doomed to disappointment; instead of the expected crop of onions, we gathered a bountiful harvest of scullions.

Other experiments conducted by students who give time and attention to them, are faithfully reported to me, and advice and direction sought as occasion requires. The more important of these are experiments to determine results of applying to grass land such chemical combinations as are found in the ash of the plants, in sufficient quantity to make up the ash of the grass grown on a given area. Experiments to make like determinations in growing potatoes. The application of commercial manures obtained from different sources to plats of grass land through a series of years, noting their effect upon the grass, and comparing the cost of the applications with the value of the increased yield of grass. Spreading upon equal areas of grass land home made and commercial manures of the same cost, to compare the results.

We do not claim that our experiments are always conducted in the most approved manner. Our means are very limited, and we are often compelled to improvise equipments of the most primitive sort; yet much of the data thus obtained is of genuine value. If the importance of these experiments were estimated only from the habits of careful observation and investigation which they compel, and the interest in agricultural pursuits which they foster and encourage in the students having them in charge, they would be found worth far more than the cost of them. If means can be furnished to continue these and other experiments until a series of results shall furnish sufficient data for reliable conclusions, it will become evident to the farmers of the State that the information thus obtained is of far greater value to them than is the comparatively small sum required for their prosecution.

Implements.

By the liberality of Hon. Samuel F. Perley, one of the trustees of the college, we were provided with a one-horse Superior Hay Spreader, built by the Higganum Manufacturing Company. The first trial of the spreader was upon an acre of lodged and tangled clover, mown by machine the same morning, and at the time heavy with dew. The wet swarths, lying compact and close as they were left by the mower, were taken clean by the spreader forks,

and thrown with sufficient force to shake most of the water from the grass, leaving it spread quite evenly and loosely over the ground. This machine essentially lessons the cost of making hay; with it heavy grass can be more uniformly cured than is usually done by manual labor, and may be prepared for hauling to the barn in from twelve to twenty-four hours sooner than by the ordinary method. What seemed at first to be imperfections in the working of the machine, we soon learned arose from our want of experience in the use of it. After a few hours' practice, any intelligent, careful driver will be able to manage it perfectly, and do more and better work than would be done in the same time by six men. By means of the arrangements for elevating and depressing the working gear, which are convenient and easily controlled, the forks can be made to conform to inequalities of surface, and good work may be performed with it on any land that can be mown by a machine.

A Shares' Horse-Hoe, presented by the Higganum Manufacturing Company, has been used to some extent. The work it performed shows the implement to be well adapted to the purpose for which it is intended.

A patent Wain Jack, presented by the same company, receives the unqualified approval of all who use it. Simple in construction, compact, light, and always ready for use, it is a very marvel of convenience and power, and seems indispensable to a well furnished carriage house.

A True's Potatoe Planter, made by Benjamin & Allen, West Waterville, was sent for trial, and used in planting about two acres of potatoes. It was claimed that the machine would make the furrow, cut the potatoes, drop them, distribute the fertilizer, and cover the seed in a satisfactory manner. After giving close attention to the working of the planter, and testing its capacity, we are convinced it will do all that is claimed. Arrangements were made to compare the product from potatoes planted by this machine, with those cut and dropped by hand and covered with a horse-hoe, but the soaking rains that fell soon after the trial plats were planted, rotted portions of the seed, and made a fair comparison of results impossible. To see the drudgery of potatoe planting performed by a machine faster and in a better manner than it is usually done by hand, seems like the realization of a wild dream.

The Grain Drill (the Farmer's Favorite), loaned by J. S. Grant, Esq., of Sidney, is designed to sow all kinds of grain, grass-seed, and comminuted fertilizers. For the distribution of these, it is provided with three distinct compartments, having gearing connected, by means of which one, two, or all three of the attachments may be operated at a time. By changes easily made in the driving wheels of the main shaft, and in the apertures through which the grass-seed is distributed, the quantity of seed to be sown on a given area, can be graduated to any desired amount. The drill tubes through which the seeds fall into the furrow are eight in number, and eight inches apart. By stopping part of the tubes with covers provided for the purpose, the distance of the rows may be arranged for any multiple of eight inches up to sixty-four inches, the full width sown at one passage of the machine. The working gear of the machine is readily understood, and easily controlled. The drills will of themselves pass over obstructions eight inches high, and can be further raised by the driver when necessary. We have done good work with the machine, in sowing wheat, beans, and fodder-corn. The seeds were evenly distributed, and covered to a uniform depth.

We hope that through the liberality of the manufacturers, or of other friends of the college, both the Grain Drill and True's Potato Planter will become the property of the institution. They will be a desirable addition to our farm equipments, and will afford to the students opportunity to become acquainted with the practical working of these important improvements in labor-saving machinery.

Farm Products.

The amount harvested from the cultivated fields has in most instances equalled or surpassed our expectations. The spring and early summer were excessively wet, and consequently were peculiarly unfavorable to early planting or sowing. The long continued wet weather seriously interfered with the plans previously matured, and in some cases made it necessary to entirely change them as the season progressed. Five acres were planted to potatoes, one acre was sown with rutabagas, and three-fourths of an acre was sown with Lane's improved sugar beets for stock; three and one-fourth acres were sown to wheat, one acre to oats, and three acres to barley. One acre of the potatoes was planted the last of June; the yield from this acre was very light and the potatoes were small in size and of poor quality.

The amount harvested was six hundred and sixty-one bushels of potatoes, four hundred fifty-eight bushels rutabagas, four hundred twenty bushels Lane's sugar beets, sixty bushels English turnips, ninety-five and one-half bushels Lost Nation wheat, thirty bushels of oats, and sixty-four bushels of barley. About ninety-five tons of hay were housed in excellent condition. The yield was above the average, but a trifle below that of last year. There were gathered from the gardens, thirty bushels early turnip beets, thirty hundred weight of squashes, several cartloads of pumpkins, fifteen hundred heads of cabbage, and eight bushels of beans. To meet the demands of the boarding-house and farm-house, early vegetables are grown in large variety, and supplied in their season. The yield of strawberries and other small fruits has not been such as to encourage the hope of immediate and large benefit from their cultivation. Fifty bushels of apples were gathered from the few trees which are in bearing.

Stock of the Farm.

In the year 1871, the mowing fields having suffered severely from the long continued drought of that and the previous season, the crop of hay was very light, rather less than forty tons. This was insufficient to feed the stock then on the farm. In accordance with advice of the trustees, the number of cattle was reduced to what could be wintered without expending any of the limited means at command in purchasing hay. From that time until this spring, excepting the payment of $75 at one time for stock, we have depended upon the natural increase of the animals as the only source of supply from which to make additions. As there were no thoroughbred females in the herd, and only one male having a recorded pedigree, it was impossible to meet with a show of thoroughbred animals, the expectations of many visitors to the farm, who knowing nothing of our straightened circumstances, evidently believed (and we think not without reason) that because the farm is owned by the State, therefore the farm stock will largely consist of the first class thoroughbred animals.

Being unprovided with means to meet these expectations, we have striven, while adding to the neat stock from the sources at command, as fast as the productions of the farm would warrant, by careful selection and judicious, liberal feeding, to show good animals in creditable condition, though not of pure blood. The appropriation of several hundred dollars at the last session of the

Legislature, having placed at command means to purchase improved stock, seven animals, embracing three of the more popular breeds, were purchased for the College herd, at a cost of about twelve hundred and thirty dollars. Selections were made from some of the best herds in New England, and although the sum expended is less than is frequently paid for one first-class animal, we were able, by the liberal dealing of the parties selling to us, to make satisfactory purchases. Five calves have already been added to the number of thoroughbreds. One of these, an Ayrshire bull calf, was sold at three months old for fifty dollars. A Jersey bull calf, dropped in June, is for sale at the same price. The other three are heifer calves, and will be kept on the farm.

We have hitherto bred only from improved White Chester swine. The gift of a fine pair of thrifty Yorkshire pigs, by Hon. Warren Percival of Vassalboro', introduces new and desirable blood to the piggery, and enables us to take a new departure in swine breeding. Such favors are gratefully received. They are substantial tokens of genuine interest in the progress of the agricultural department of the institution.

We give elsewhere the name, age and value of each one of the neat stock and horses; also the number and collective values of the sheep and swine. It is believed the prices affixed are no greater than we must give to replace the several animals.

In my last report, some description was given of the barn erected last year. Work on this building, which had been suspended because the funds were exhausted, was re-commenced in the spring of this year. The superstructure has been thoroughly finished in every part. The south side is devoted to neat stock. Provision is made to tie twenty-six head of cattle in this division. The cattle are fastened with chains sliding upon an iron rod. The lower end of this rod enters the plank which forms the foot of the manger; the upper end is bent in a curve and rests against the stanchion post, to which it is fastened with a bolt. The mangers are nicely finished with hard wood, and are nearly water tight. The partitions dividing the mangers are carried back two feet from the stanchion post. By this means any intercourse between animals disposed to be quarrelsome is effectually prevented. The floor on which the cattle stand extends from four feet nine inches to five feet three inches, according to the size of the cattle, and inclines one inch to the rear. Running directly behind the cattle

is a trench four inches deep and twenty inches wide, to receive the droppings. The manure is passed to the cellar, through trap doors at convenient distances in the bottom of the trench. Four pens about three feet by sixteen, and three feet high, are placed in the rear of the tie-up against the side of the barn, for storing the absorbents used for litter. As occasion requires, one or more of these may be used as pens for young calves. A wide, sliding door at the end of this apartment, allows the entrance of a cart, from which the litter is throw into the pens. Four ventilating tubes, each one foot by four, open from this stable, and passing upward against the side of the barn to a wire netting directly under the eaves of the building, ensure sufficient ventilation.

The water is drawn from the cistern by a pump, near the west end of the tie-up, and conveniences are provided for watering the stock within doors, or in the yard. Along the north side of the main floor are ranged the pens for calves, and the stalls for bulls. These last are strongly built, and provided with secure fastenings. On this side is also a hospital-room, a stairway leading to the cellar, and another leading to the ventilators at the top of the building; a room for the larger farm machines, a granary, and a passage-way designed to communicate with the (future) farmhouse. These several divisions of the barn are sheathed with planed spruce boards, tongued and grooved. This makes the appartments tight and warm, secures the comfort of the stock in the coldest weather, and gives to the whole a neat and finished appearance. The cattle are fed from the main floor. A portion of the sheathing in front of the cattle is divided into sections about eight feet long; these sections are again divided through the centre horizontally, and hinged so as to form doors; when these doors are closed the cattle are entirely shut from the main floor. To open these doors, the upper ones are turned up against the sheathing, and secured with a button. The lower doors turn out into the floor to an angle of thirty degrees, and are sustained in that position by chains attached to them, and fastened to the studding. The lower doors form the manger fronts over which the cattle are fed. The whole lower floor is thus occupied for other purposes than the storage of hay. Although such an arrangement may appear inconvenient, we find in practice that by means of the horse-fork the hay is easily raised and stored on the ample scaffolds.

The failure to obtain an appropriation for building a wing to the barn, to furnish protection for stock, and conveniences for water,

rendered it imperative that some other provision be made for a water supply. It was decided that the most available way, and indeed, under the circumstances, the only way to accomplish this was to construct a cistern for the reception of rain water, in the cellar of the barn. Though to do this would involve a large additional expense, and would occupy space that was designed for other purposes and needed for them, no other alternative offered. A cistern, having a capacity for thirty thousand gallons, has been constructed; this is sunk into the ledge three and one-half feet below the level of the cellar bottom. The walls are twenty inches thick and eleven feet high. The sides of the cistern are made firm by supporting abutments, built up with the walls and extending into the cellar three feet. The cistern is built under the main floor of the barn, in the westerly end of the cellar. Forty thousand bricks were required for its construction.

That portion of the cellar between the cistern and the north wall is enclosed with a brick partition for the purpose of storing roots for the stock. It will contain four thousand bushels. Trap doors in the floor above furnish passages through which the roots are tipped from the cart as they are hauled from the field. The remaining portion of the cellar is devoted to manure. A large amount of muck, and partially decayed sawdust from the river's bank, have been stored to be used as absorbents of the liquid manure; and a number of swine will be made to pay their way in working over and mixing these materials for increasing the supply of farm fertilizers.

It has been with the greatest pleasure that we have transferred the stock from the old barn, where they have too long been crowded in insufficient and unseemly quarters, to the warm and every way satisfactory accommodations provided for them in the new building. The improved appearance of the animals in their neat and appropriate surroundings, elicits a new style of remark from critical visitors, and instead of words of depreciation and fault finding, too often heard in the past, we are encouraged by words of approval. Although, from difficulties not at first foreseen, the cost of the building has been greater than was anticipated, it is believed the money has been judiciously expended, and that the improved facilities for the care of stock, the storage of fodder, and the manufacture of manure, will fully justify the outlay.

Names and Value of Stock on Farm of Maine State College.

NEAT STOCK.

Shorthorn bull Napoleon, 4 years old	$200 00
" cow Cornelia, 8 years	150 00
" heifer Duchess of Lakeside, 2 years	150 00
" calf Cornucopia, 1 month	50 00
Ayrshire bull Maine, 4 years	150 00
" cow Olee, 3 years	200 00
" " Isabel, 4 years	175 00
" calf Olivia, 1 month	75 00
Jersey bull Butternut, 2 years	200 00
" cow Hebe, 8 years	250 00
" cow Pride of Lachine, 5 years	200 00
Bull calf Prince, 6 months	50 00
Heifer calf Hepsy, 4 months	100 00
Grade Jersey cow Bridget, 6 months	75 00
" " Joanna, 9 months	60 00
" " Nellie, 9 months	60 00
Grade Shorthorn cow Dora, 4 months	80 00
Grade Jersey cow Maggie, 5 months	100 00
Grade Native cow Forstina, 8 months	65 00
Grade Jersey cow Topsy, 4 months	100 00
" " Lucy, 3 months	60 00
" " Susan, 4 months	65 00
" heifer Gipsey, 2 months	70 00
" heifer Jenette, 2 months	60 00
" cow Dinah, 4 months	50 00
" heifer Bridget 2nd, 1 month	25 00
Grade Shorthorn heifer Nell, 1 month	30 00
" " Maggie 2nd, 1 month	30 00
Grade Jersey heifer Millie, 1 month	35 00
" " Marilla, 1 month	30 00
Grade Shorthorn heifer Tilly, 1 month	25 00
" " Dorothy, 1 month	20 00
" calf Maggie 3d, 1 month	15 00
" calf Dot, 8 months	18 00
Grade Jersey calf May, 7 months	15 00
" " Maud, 9 months	18 00

HORSES.

Dick, 10 years old	$225 00
Louis, 9 years	200 00
Robin, 7 years	250 00
Nell, 8 years	300 00

SWINE.

2 Yorkshire swine	40 00
2 White Chester breeding sows	60 00
1 Boar, "Jack"	30 00
4 Shotes	60 00
2 Pigs, 10 weeks	10 00
1 Fat Hog	30 00

SHEEP.

8 Grade South Down sheep	40 00
7 " Cotswold sheep	35 00
11 " " lambs	44 00
1 South Down sheep	8 00
	$4,388 00

INVENTORY OF FARM TOOLS AND EQUIPMENTS.

4 Sward Plows.
3 Stubble Plows.
1 Swivel Plow.
1 Garden Plow.
1 Furrow Plow.
1 French's Cultivator.
1 Nishwitz' Pulverizer.
1 Share's Coulter Harrow.
2 Scotch Harrows.
1 Chase's Revolving Tooth Harrow.
1 Chandler's Improved Horse Hoe.
1 Share's Horse Hoe.
1 Farm Roller.
1 Farm Scraper.
1 Stone Drag.
1 Clipper Mower.
1 Warrior Mower.
1 Superior Hay Spreader.
1 Bay State Horse Rake.
1 Queen of Harvest Separator.
1 Patent Wain Jack.
2 Two-horse Hay Racks.
1 Two-horse Farm Wagon.
1 Two-horse Farm Jigger.
3 Two-horse Farm Carts.
1 One-horse Express Wagon.
1 One-horse Riding Wagon.
1 One-horse Pung.
2 Two-horse Logging Sleds.
1 Two-horse Wood Sled.
1 One-horse Wood Sled.
2 Double Team Harnesses.
1 Single Team Harness.
1 Carriage Harness.
5 Sets Double Whiffletrees and Chains.
4 Crotch Chains.
3 Logging Chains.
2 Draft Chains.
8 Horse Blankets.

INVENTORY OF FARM TOOLS AND EQUIPMENTS—Concluded.

1 Whittemore's Horse Rake.
1 Whitcomb's Horse Rake.
20 Long Handle Shovels.
7 Short Handles.
3 Long Handle Garden Spades.
3 Short Handle Garden Spades.
8 Spading Forks.
10 Manure Forks.
3 Garden Trowels.
21 Garden Hoes.
5 Potatoe Diggers.
1 Grubbing Hoe.
6 Garden Rakes.
13 Grass Scythes.
1 Grain Scythe.
3 Bush Scythes.
27 Hay Rakes.
3 Drag Rakes.
18 Hay Forks.
1 Hay Knife.
1 Hay and Straw Cutter.
1 Fanning Mill.
1 Root Cutter.
8 Potatoe Baskets.
18 Wooden Pails.
15 Grain Bags.
1 Steelyard.
1 Beam Scales.
1 Fairbanks' Platform Scales.
3 Wheelbarrows.
2 Grindstones.
1 Jackscrew.
3 Clay Picks.
3 Gravel Picks.
2 Iron Bars.
2 Steel Bars.
2 Cant Dogs.
6 Head Halters.
5 Surcingles.
1 Spring Scales.
1 Pick Handspike.
3 Stone Hammers.
6 Chopping Axes.
2 Broad Axes.
2 Hand Axes.
5 Nail Hammers.
4 Jack Planes.
2 Jointing Planes.
1 Smoothing Plane.
6 Mortise Chisels.
3 Paring Chisels.
2 Bitstocks.
1 Set Auger Bits.
1 Extension Bit.
3 Handsaws.
1 Splitting Saw.
1 Fine Saw.
1 Pruning Saw.
1 Cross-cut Saw.
6 Wood Saws.
1 Meat Saw.
1 Carpenters' Square.
1 Try Square.
1 Carpenters' Bevel.
1 Draw Shave.
1 Spoke Shave.
1 Saw Sett.
1 6-8 inch Gauge.
1 Eagle Pruning Tool.
1 Ralph's Oneida Cheese Vat.
1 Ralph's Cheese Press and Equipments.
1 Lactometer.
2 Milk Testing Tubes.

J. R. FARRINGTON, *Farm Superintendent.*

TREASURER'S REPORT.

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

GENTLEMEN,—I present herewith my annual report, showing the receipts and expenditures of the College from November 25, 1873, to November 17, 1874.

General Account.

1873.	RECEIPTS.	
Nov. 25,	Balance in the hands of the Treasurer per his report of this date..	$176 52
1874.		
Mar. 14,	Received of State Treasurer in part of the appropriation made by the Legislature	5,000 00
April 9,	Received of State Treasurer the remainder of said appropriation..	7,500 00
		$12,676 52
Nov. 17,	Interest on bank deposit	93 72
		$12,770 24
1873.	EXPENDITURES.	
Dec 16,	Paid J. W. Winchester, foundation of barn	$52 50
Dec. 18,	H. W. & H. T. Hobbs, slating barn	181 88
Dec. 22,	J. R. Farrington, construction of barn	350 00
Dec. 23,	C. B. Brown, work on boarding-house	109 32
Dec. 23,	G. W. Merrill, furniture	216 00
Dec 23,	J. R. Farrington, construction of barn	500 00
1874.		
Feb. 6,	S. L. Boardman, expenses as Trustee	50 00
Mar. 7,	A. B Aubert, chemical apparatus, &c	195 24
Mar. 17,	N. W. Bond, stoves and pipe	62 60
Mar. 19,	S. S. Smith & Son, printing catalogues	60 00
Mar 23,	C. C. Prescott, furniture	46 40
April 1,	B. & P. Slate Company, slate for barn, last year	504 32
April 3,	M. C. Fernald, periodicals and binding	100 00
April 4,	J. R Farrington, farm purposes	200 00
April 11,	W. H. Pennell, repairs of steam apparatus	32 11
April 16,	P. D. & E Webster, lumber for new barn	180 12
April 23,	S. F. Perley, expenses as Trustee	121 55
April 23,	Lyndon Oak, expenses as Trustee	77 65
April 23,	S. F. Dike, expenses as Trustee	53 20
April 24,	J. R. Farrington, construction of barn	300 00
April 25,	W. A. Pike, purchase of apparatus	300 00
May 8,	A. B. Mosher, express bills and expressage	50 91
May 8,	C. H. Fernald, purchase of apparatus	500 00
May 16,	J. R. Farrington, farm purposes	200 00
May 20,	E. H. Fogg, materials for new barn	90 32
	George Hamilton, blood stock	275 00
	N R. Boutelle, blood stock	425 00
	Sturtevant Brothers, blood stock	350 00

General Account, (Concluded).

1874.		EXPENDITURES.	
May 23,	Paid	A. B. Aubert, apparatus	$74 19
May 29,		J. R. Farrington, transportation of stock, &c	103 12
May 29,		J. R. Farrington, enlargement and repairs of building, in connection with brick dormitory	68 93
June 1,		A. Leighton, materials and work for barn	233 80
		A. Leighton, materials and work for college	90 19
June 5,		Work on stable at President's house	55 00
June 8,		T. T. Cates, repairs of steam apparatus	41 74
		C. B. Brown, balance due on materials on work for college buildings	88 60
June 20,		J. R. Farrington, construction of barn	300 00
July 19,		J. R. Farrington, construction of barn	300 00
July 19,		Woodman & Maling, lumber for barn	183 94
July 20,		A. B. Aubert, chemical apparatus	161 43
July 25,		Fogg & Dole, lumber for barn	177 49
		Fogg & Dole, lumber for White Dormitory	53 35
		J. R. Farrington, construction of barn	300 00
		J. R. Farrington, farm purposes	300 00
Aug. 1,		W. A. Pike, purchase of apparatus	250 00
		W. A. Pike, to pay labor of students	135 00
Aug. 6,		J. R. Farrington, farm purposes	300 00
Aug. 6,		J. R Farrington, construction of barn	500 00
Sept. 7,		Hinckley & Egery, gas retort	38 89
Sept. 17,		J. T & L. J. Gilman, furniture	192 00
Sept. 19,		A. B. Aubert, chemical apparatus	69 14
Sept. 19,		J. R. Farrington, farm purposes	300 00
Sept. 28,		E. H. Fogg, materials for barn	179 82
Oct. 16,		B. A. Burr, printing blanks	12 75
			$10,093 50

Congressional Endowment Account.

1873.		RECEIPTS.	
Nov. 29,	Interest on State of Maine bonds		$2,145 00
1874.			
Jan. 7,	"	preferred stock of St. P. & S. C. R. R.	200 00
Feb. 26,	"	$6,000, Bangor bonds	180 00
Feb. 28,	"	State bonds	990 00
April 4,	"	preferred stock of St. P. & S C R. R.	200 00
April 9,	"	State bonds	417 00
June 3,	"	State bonds	2,145 00
July 3,	"	Bangor bonds	180 00
July 6,	"	preferred stock of St. P. & S. C. R. R.	200 00
Aug. 17,	"	State bonds	990 00
Oct. 6,	"	preferred stock of St P. & S. C. R. R.	200 00
Oct 19,	"	State bonds	417 00
			$8,264 00

1873.		EXPENDITURES.	
Nov. 26,	Paid	C. F. Allen, salary	$500 00
		M. C. Fernald, salary	450 00
1874.			
Jan. 16,		J. R. Farrington, salary	225 00
Feb. 7,		James Dean, military instruction	42 60
Feb. 26,		M. C. Fernald, salary	450 00
Feb. 27,		C. H. Fernald, salary	375 00
Feb. 28,		Randall Whittier, salary	300 00
		A. B. Aubert, in part for salary	125 00
		W. A. Pike, salary	500 00
		G. H. Hamlin, salary	150 00

Congressional Endowment Account, (Concluded)

1874.	EXPENDITURES.	
Mar. 6,	Paid C. F. Allen, salary	$500 00
	J. Perley, book-keeping	80 00
April 18,	J. R. Farrington, salary	225 00
April 25,	A. B. Aubert, in part for salary	100 00
May 23,	W. A Pike, salary	500 00
	A. B. Aubert, salary	387 50
June 1,	M. C. Fernald, salary	450 00
June 2,	C. H. Fernald, salary	375 00
June 2,	C. F Allen, salary	500 00
June 6,	Randall Whittier, salary	300 00
	C. H. Hamlin, salary	150 00
June 14,	J. R. Farrington, salary	225 00
Aug. 7,	G. H Hamlin, balance salary for the year	150 00
Aug. 18,	James Dean, military instruction	42 60
Aug. 26,	C. H. Fernald, salary	375 00
Sept. 2,	M. C. Fernald, salary	450 00
	C. F. Allen, salary	500 00
Sept. 5,	Randall Whittier, salary	300 00
	A. B. Aubert, salary	387 50
	W. A. Pike, salary	500 00
Oct. 7,	C. W. George, salary (to July 13)	100 00
Oct. 12,	G H Hamlin, salary	50 00
Oct. 17,	J. R. Farrington, salary	225 00
	C. W. George, salary	100 00
Nov. 9,	Prof. James Law, lectures on Veterinary Science	200 00
		$10,290 20

Summary.

RECEIPTS.		
GENERAL ACCOUNT.		
Balance from last year	$176 52	
From State Treasurer	12,500 00	
interest on deposits	93 72	
		$12, 770 24
ENDOWMENT FUND.		
From State of Maine bonds	$7,104 00	
Bangor city bonds	360 00	
St. P. & S. C. R. R. stock	800 00	
		8,264 00
		$21,034 24
EXPENDITURES.		
GENERAL ACCOUNT.		
For barn	$4,334 19	
farm purposes	1,300 00	
blood stock	1,153 12	
repairs on buildings, &c	465 30	
steam and gas apparatus, &c	247 74	
furniture and apparatus	2,067 00	
Expenses of Trustees	302 40	
incidentals, printing, periodicals, &c	223 75	
		$10,093 50
ENDOWMENT ACCOUNT.		
For salaries of Teachers and Farm Superintendent		10,290 20
Balance in hands of Treasurer		650 54
		$21,034 24

The foregoing exhibit shows the receipts entered to the General Account to have exceeded the expenditures charged said account	$2,676 74
And that the expenditures charged the Congressional Endowment Account to have exceeded the receipts	2,026 20
Leaving a balance in the hands of the Treasurer of	$650 54

Which amount is carried to new account.

The following statement will show the character, amount and annual interest of the College investments:

State of Maine 6 per cent. bonds deposited with the State Treasurer	$118,400 00	Interest,	$7,104 00
City of Bangor 6 per cent. bonds	6,000 00	"	360 00
Preferred stock in St. Paul & Sioux City Railroad, 6 per cent	10,000 00	"	800 00
	$134,400 00		$8,264 00

The State bonds were derived from the proceeds of the sale of the lands donated by Congress, and the other securities were purchased with the interest on said bonds accruing before the college was fully inaugurated.

ISAIAH STETSON, *Treasurer.*

NOVEMBER 17, 1874.

DONATIONS.

To the Library.

130 volumes, estate of.....Hon. C. B. Abbott.
12 volumes Pacific R. R. Survey .....Hon. H. Hamlin.
13 volumes Agricultural Reports, &c. Hon. S. L. Boardman.
Maine Register, 1874 .....S. Libbey, Esq.
Contributions .....Smithsonian Institute.
Reports .....Department of Agriculture.

To the Cabinet.

Collection of shells.....Smithsonian Institution.
Specimens from Bermuda.....Anson Allen.
Fossils .....Fred S. Bunker.
Fossils .....A. D. Blackinton.
Minerals.....H. C. Townsend.
Fossils .....J. C. Lunt.
Cone of "Cedar of Lebanon".....W. D. Roberts.
Minerals.....Prof. A. B. Aubert.
Corals.....Mrs. J. R. Farrington.
Collection of shells and antlers of Roe-
buck .....Capt. Henry Peakes.
Minerals.....M. F. Herring.
Specimens of coral.....Rev. Theo. Hill.
Collection of birds' eggs .....——— ———
Fossils and minerals .....Charles E. Reed.

To the College Farm.

Hon. S. F. Perley, Naples, Superior Hay Spreader.

Hon. Warren Percival, Vassalboro', pair of Yorkshire pigs.

Higganum Manufacturing Company, Higganum, Conn., Shares' Horse Hoe.

Hon. Fred Atwood, Winterport, carriage jack.

J. S. Grant, Sidney, use of The Farmers' Favorite, a machine for sowing grain in drills.

Benjamin & Allen, West Waterville, use of True's Potato Planter.

D. M. Dunham, Bangor, exchange of Improved Warrior Mower for one used on the farm two years.

R. L. Taylor, Manchester, Iowa, (Patentee) the right to make and use on the farm an Improved Harrow.

Hon. S. L. Goodale, Saco, roasted and ground feldspar, raw ground feldspar, and fish chum, for experimental purposes.

O. K. Wood & Co., West Chazy, N. Y., $30, on price of The Queen of the Harvest Separator.

E. C. Millett, West Minot, two varieties of squash seeds.

CATALOGUE

OF THE

OFFICERS AND STUDENTS

OF THE

Maine State College of Agriculture and the Mechanic Arts,

Orono, Me., 1874--75.

FACULTY.

REV. CHARLES F. ALLEN, D. D., President and Professor of English Literature, Mental and Moral Science.
MERRITT C. FERNALD, A. M., Professor of Mathematics and Physics.
ALFRED B. AUBERT, B. S., Professor of Chemistry.
WILLIAM A. PIKE, C. E., Professor of Engineering.
CHARLES H. FERNALD, A. M., Professor of Natural History.
WINFIELD S. CHAPLIN, Professor of Modern Languages and Mechanics, and Military Instructor.
GEORGE H. HAMLIN, C. E., Assistant Professor of Engineering.
JOSEPH R. FARRINGTON, Farm Superintendent and Instructor in Agriculture.
PROF. G. H. HAMLIN, Librarian.
PROF. W. A PIKE, Secretary.
REV. A. W. REED, Steward.

STUDENTS.

SENIOR CLASS.

Bates, Solomon Wheaton	Somerset Mills.
Bumps, Wilbur	Bangor.
Clapp, Samuel Hervey	Damariscotta.
Coburn, Lewis Farria	Brunswick.
Colesworthy, Charles Franklin	Portland.
Durham, Charles Frederic	Monroe.
Goodale, Alfred Montgomery	Saco.
Hitchings, Edson Forbes	Waterville.

AGRICULTURAL COLLEGE.

SENIOR CLASS—CONCLUDED.

Jordan, Whitman Howard ..... New Gloucester.
Mayo, Edward Doliver ..... S. W. Harbor.
Mitchell, Allen Gilmore ..... Madison.
Mitchell, Albert Eliphalet ..... Madison.
Moore, Fred Lamson ..... Sebec.
Rogers, Luther Woodman ..... Stillwater.
Sewall, Minott Wheelwright ..... St. Albans.
Shaw, George Moore ..... Augusta.
Southard, Louis Carver ..... Boston, Mass.
Webb, Wesley ..... Unity.
Work, Edgar Alexander ..... Bangor.

JUNIOR CLASS.

Abbott, Edmund ..... Winterport.
Allen, Charles Plummer ..... Maysville.
Bacon, Francis Henry ..... Biddeford.
Bisbee, Fred Milton ..... Livermore Center.
Beckler, Eldridge Harlow ..... Livermore Center.
Blanding, Edward Mitchell ..... Saco.
Brainard, Charles Marcellus ..... Skowhegan.
Buker, George Haskell ..... Castine.
Crosby, Oliver ..... Dexter.
Cowan, Florence Helen ..... Orono.
Cyr, Vetal ..... Fort Kent.
Dike, James Edward ..... Sebago.
Dike, Willis Oliver ..... Sebago.
Estabrooke, Horace Melvin ..... Linneus.
Farrington, Arthur Manley ..... Orono.
Foss, George Obed ..... Dexter.
Freeman, Charles Morse ..... Portland.
Gurney, Frank Paris ..... Foxcroft.
Haines, William Thomas ..... West Corinth.
Hamilton, Henry Fairfield ..... Saco.
Hazeltine, Frank Adlam ..... Dexter.
Haskell, Newall Prince ..... New Gloucester.
Hopkins, Eugene Leslie ..... Oldtown.
How, Edward ..... Portland.
Hubbard, Philip Wadsworth ..... Hiram.
Jones, Samuel Messer ..... Madison.
Lewis, Albert Augustus ..... Orono.
Long, Herbert Augustine ..... Machias.
Lothrop, Luther Ramsdell ..... Leeds.
Martin, Nelson ..... Topsfield.
Moody, George Jameson ..... South Windsor.
Mudgett, Webster ..... Albion.
Oak, Charles Edson ..... Garland.
Parks, George Daniel ..... Richmond.
Peirce, Hayward ..... Frankfort.
Reed, Frank Radford ..... Roxbury.
Reynolds, Henry Jones ..... Dennysville.

JUNIOR CLASS—CONCLUDED.

Rogers, Charles Wilson ..... Richmond.
Soule, Sidney Smith ..... Freeport.
Stevens, William Lewis ..... West Waterville.
Whitaker, Frank Pierce ..... Albion.
Williams, John Howard ..... Orono.

SOPHOMORE CLASS.

Andrews, Charles Frederic ..... Biddeford.
Bunker, Fred Story ..... Cambridge.
Burns, Robert Bruce ..... Fort Fairfield.
Blackinton, Alvah De Orville ..... Rockland.
Chase, Edson Clifford ..... Stillwater.
Danforth, Edward Franklin ..... Norridgewock.
Dow, William Wheeler ..... Foxcroft.
Elkins, Augustus Jerome ..... Oldtown.
Emery, Alicia Town ..... Orono.
Goud, Frank Herbert ..... Fort Fairfield.
Gould, Samuel Wadsworth ..... Hiram.
Harvey, Austin Irving ..... Carmel.
Herring, Menzies Fessenden ..... Dexter.
Lovejoy, Ardean ..... Orono.
Lunt, Joseph Cony ..... Benton.
Mallett, Fred Bartlett ..... Fort Kent.
Partridge, Fred Lincoln ..... Stockton.
Phillips, Fred Foster ..... Hermon.
Pullen, Fred Hubbard ..... Foxcroft.
Roberts, Woodbury Davis ..... Stockton.
Shaw, Samuel ..... Augusta.
Stone, Frank Pierce ..... Livermore Falls.
Stevens, Thomas Jefferson ..... Auburn.
Sturgis, George Eugene ..... Vassalboro'.
Towne, Charles Elmer ..... East Dover.
Townsend, Henry Clay ..... Fort Fairfield.
Webb, Clara Ella ..... Unity.
Weeks, James Walter ..... Castine.
Weeks, Nellie Estelle ..... Orono.
Wiggin, Fred Sumner ..... Fort Kent.
Whitney, William Butler ..... Stillwater.

FRESHMAN CLASS.

Berry, Eugene Manassah ..... Sumner.
Brown, Emma ..... Orono
Chamberlain, Cecil Calvert ..... Foxcroft.
Fernald, George Everett ..... South Levant.
Hartwell, Howard Hampson ..... Fox Island.
Haynes, John Edgar ..... Oldtown.
Heald, James ..... Orono
Hinckley, Fred Hale ..... Bluehill.
Howe, Richard Scrope ..... Fryeburg.
Jameson, Samuel Carl ..... Oldtown.

FRESHMAN CLASS—CONCLUDED.

Jameson, William Smith.....Bangor.
Lancaster, Edgar Harvey.....Oldtown.
Leathers, Alvra Willis.....Dover.
Locke, John Jr.....Fryeburg.
Mallett, Hubert Alston.....Fort Kent.
Miller, Silas Niles.....Burlington.
Oakes, Frank Judson.....Oldtown.
Patterson, John Cameron.....Dexter.
Perkins, Frank Judson.....Oldtown.
Plumly, Charles Fremont.....Lincoln.
Richardson, John Oakes.....Oldtown.
Stuart, Albert Harmon.....Newport.
Tripp, Winfield Eastman.....Lyman.
Walker, Edward Colby.....Fryeburg.
Warriner, Edson.....Fryeburg.
Webster, Ivan Eldorus.....Orono.
Webster, Otis Colby.....Augusta.
Weeks, Erastus Gilmore.....Jefferson.

SPECIAL COURSE.

Dakin, Eugene Herbert.....Bangor.
Small, A. Judson.....North Lubec.

SUMMARY.

Seniors	19
Juniors	42
Sophomores	30
Freshmen	28
Special Course	2
Total	121

OFFICERS OF THE COLLEGE MILITARY COMPANIES.

Major of Battalion, A. M. Goodale. Adjutant, C. F. Colesworthy. Company A—Captain, G. M. Shaw; 1st Lieutenant, L. F. Coburn; 2nd Lieutenant E. D. Mayo. Company B—Captain E. F. Hitchings; 1st Lieutenant J. P. Gurney; 2nd Lieutenant, W. L. Stevens.

PRIZES.

The following prizes were awarded in 1874:

SOPHOMORES,—For excellence in Declamation, to H. M. Estabrooke.

JUNIORS,—For best Essays, to C. F. Durham, E. A. Work.

DESIGN OF THE INSTITUTION.

It is the design of the MAINE STATE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS, to give the young men of the State who may desire it, at a moderate cost, the advantages of a thorough, liberal and practical education. It proposes to do this, by means of the most approved methods of instruction, by giving to every young man who pursues the course of study, an opportunity practically to apply the lesson he learns in the class-room, and by furnishing him facilities for defraying a part of his expenses by his own labor.

By the act of Congress donating 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 course of study fully meets this requisition, and is especially adapted to prepare the student for agricultural and mechanical pursuits, it is designed that it shall be also sufficiently comprehensive, and of such a character as to secure to the student 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, History of the United States, Algebra as far as Quadratic Equations, and five books in Geometry.

Although the knowledge of Latin is not required as a condition of admission, yet the study of that 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.

COURSE OF INSTRUCTION.

Five full courses are provided, viz: A course in Agriculture, a course in Civil Engineering, a course in Mechanical Engineering, a course in Chemistry, and an Elective course. The studies of the several courses are essentially common for the first two years.

Branches marked thus, (E) are Elective, and from them students may select, with the advice of the Faculty, to make up the required number (three) of daily exercises.

There will be regular exercises during the four years in English Composition, Declamation, and Military Tactics. Lectures will be given to the Freshmen Class on Physics, Meteorology, Physical Geography and Botany; to the Sophomore Class, on Chemistry, Horticulture and Practical Agriculture; to the Junior Class, on Anatomy, Physiology, Astronomy, and English Literature; to the Senior Class, on Rural Law, Mineralogy, Geology, Stock Breeding, Cultivation of Grasses and Cereals.

ELECTIVE COURSE. Students in the Elective course will pursue the required studies common to all the other courses, and may select from other courses and the elective studies, to make up their full course.

SPECIAL COURSE. Students may be received for less time than the full course, and may select from the studies of the first, second or third term of any year, such branches of study as they choose, provided they are qualified to pursue them successfully.

Students in the Special Course will not be entitled to a Degree, but certificates of proficiency may be given them.

DEGREES CONFERRED. The full course in Civil Engineering entitles to the Degree of Civil Engineer; the full course in Mechanical Engineering to the Degree of Mechanical Engineer; the full course in Agriculture, in Chemistry, or the full Elective course, to the Degree of Bachelor of Science.

FIRST YEAR—*First Term.* Physical Geography, Guyot; Meteorology; Algebra, Robinson; Rhetoric, Haven.

Second Term. Physics, Ganot; General Properties of Bodies, Hydrostatics, Pneumatics, Acoustics; Algebra, Robinson; Botany, Gray; Book-keeping and Commercial Forms.

Third Term. Physics, Ganot; Heat, Light, Electricity; Geometry, Chauvenet; Botany, Gray; Horticulture.

SECOND YEAR—*First Term.* Chemistry, Barker; Trignometry, Chauvenet; (E) Navigation; Botany, Gray; Horticulture; Elements of Agriculture, Waring.

Second Term. (E) Chemistry, (qualitative analysis); (E) History of France; English Literature; French, Magill; Free Hand Drawing; Mechanical Drawing.

Third Term. (E) Chemistry, (qualitative analysis); (E) English Literature; Surveying, Gillespie—with chain, with compass, computing areas, dividing land, leveling, topographical drawing; French, Magill.

THIRD YEAR—COURSE IN AGRICULTURE. *First Term.* Human Anatomy, Physiology and Hygiene, Huxley; Agricultural Chemistry; French, Magill; (E) History of England.

Second Term. Zoology, Nicholson; Farm Implements; Mechanical Cultivation of the Soil; Farm Drainage, Waring; (E) German.

Third Term. Mechanics, Peck; Dairy Farming, Flint; Entomology, Packard; (E) Logic; (E) German.

COURSE IN CIVIL ENGINEERING.—*First Term.* Human Anatomy, Physiology and Hygiene, Huxley; Analytical Geometry, Loomis; Engineering—Henck's Field Book, Survey of Roads and Railways; Computation of Earthwork and Masonry; Mechanical Drawing; French, Magill.

Second Term. *(E.) Zoology, Nicholson; Differential Calculus, Loomis; Descriptive Geometry, Warren; Mechanical Drawing; Engineering, Rankine—Construction of Roads, Railways and Canals; Hydraulics; (E.) German.

Third Term. Integral Calculus, Loomis; Descriptive Astronomy, White—The Earth, the Sun, the Moon, Gravitation, Planets, Comets, Nebulæ; Descriptive Geometry, Warren; Mechanics, Rankine; Drawing—Plans, Profiles, Elevations, Sections, &c.; (E.) German.

COURSE IN MECHANICAL ENGINEERING.—*First Term.* Human Anatomy, Physiology and Hygiene, Huxley; Analytical Geometry, Loomis; Elements of Mechanism, Goodeve; Mechanical Drawing; French, Magill.

Second Term. (E.) Zoology, Nicholson; Differential Calculus, Loomis; Descriptive Geometry, Warren; Machinery and Mill-work, Rankine; Mechanical Drawing; (E.) German.

Third Term. Integral Calculus, Loomis; (E.) Descriptive Astronomy, White; Descriptive Geometry, Warren; Machinery and Mill-work, Rankine; Mechanical Drawing; (E.) German.

COURSE IN CHEMISTRY.—*First Term.* Chemistry—Analytical and General. Human Anatomy; French.

Second Term. Chemistry; Zoology; German.

Third Term. Chemistry; (E.) Entomology; (E.) Logic; German.

FOURTH YEAR—COURSE IN AGRICULTURE. *First Term.* Comparative Anatomy; Stock Breeding, Goodale; Sheep Husbandry; Veterinary Art; (E.) German; History of Civilization.

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* Zoology is only elective to the Engineering classes.

Second Term. Constitution of the United States; Mineralogy, Dana; Cultivation of the Cereals; Landscape Gardening; Rural Architecture; (E) Mental Philosophy, Haven; (E.) International Law.

Third Term. Political Economy; Geology, Dana; Rural Economy of England and the United States; Rural Law; (E.) Moral Philosophy, Haven; (E.) International Law.

COURSE IN CIVIL ENGINEERING.—*First Term.* Practical Astronomy, Coffin—Time, latitude, longitude; *(E.) Comparative Anatomy; Engineering, Rankine—Theory of Structures, Field Practice; Stereotomy—Applications to Masonry and Carpentry; Drawing—Plans, profiles, elevations, sections, &c.; (E.) German; (E) History of Civilization.

Second Term. Constitution of the United States; Mineralogy, Dana; Engineering, Rankine—Strength of Materials, Structures of Stone, (Foundations, Retaining walls, arches, bridges), Hand Machinery, Water Wheels; Drawing—Plans, profiles, elevations, sections, and machinery; (E.) Mental Philosophy.

Third Term. Political Economy; Geology, Dana; Engineering, Rankine—Structures of Wood, Framing, Structures of Iron, Boilers, Steam Engines, Field Practice; Drawing—Plans and Specifications; (E.) Moral Philosophy; (E.) International Law.

COURSE IN MECHANICAL ENGINEERING—*First Term.* (E) Practical Astronomy, Coffin; (E) Comparative Anatomy; Steam Engines, Rankine; Application of Descriptive Geometry; Mechanical Drawing; (E) German; (E) History of Civilization.

Second Term. Constitution of the United States; Mineralogy, Dana; Building Materials; Hand Machinery; Water Wheels, &c.; Drawing; (E) Mental Philosophy.

Third Term. Political Economy; Geology, Dana; Designs; Estimates; Specifications for Machinery; (E) Moral Philosophy; (E) International Law.

COURSE IN CHEMISTRY—*First Term.* History of Civilization; Chemistry; Comparative Anatomy.

Second Term. Constitution of the United States; Chemistry; Mineralogy; (E) Mental Philosophy.

Third Term. Political Economy; Chemistry; Geology; (E) Moral Philosophy.

SPECIAL FEATURES OF THE COURSE.

The prominence given to the Natural Sciences, and the practical element associated with nearly all departments of study, cannot fail to render the course especially valuable.

Nearly a year is devoted to Botany and Horticulture, commencing early in the spring and continuing till late in autumn. This course embraces a thorough drill in Botanical Analysis; the study of plants as to their relative importance and geographical distribution; the study of those having commercial or medical value; of those which are cultivated for ornament, and also those which are detrimental, as weeds and poisonous plants. The students learn practically the operations and processes in the department of Horticulture.

A year and a half is devoted to Chemical Physics and Chemistry, commencing with the third term of the first year. The course in Chemistry proper will include general, analytical, and agricultural chemistry. Under Analytical Chemistry will be taken up general analysis, use of blow-pipe, analysis of minerals, alloys, fertilizers and farm products.

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* Elective only for the Civil and Mechanical Engineers.

All the students, while studying, devote two hours a day to anlaysis, under the direction of the Professor of Chemistry, thus acquiring facility in conducting experiments, and securing a practical knowledge of the methods employed in chemical investigations. Those in the course of Chemistry devote three hours a day to laboratory work.

Under Agricultural Chemistry will be considered composition of soils, relations of air and moisture to vegetable growth, food of plants, chemical changes during vegetable growth, chemistry of farm processes, methods of improving soils, and various other topics which may properly be treated of under this department.

Other departments of science are studied and taught, so far as may be, with special reference to their practical bearing, or their relations to Agriculture and Useful Arts.

Especial attention is given to Mechanical and Civil Engineering, by which students may be thoroughly prepared to enter upon these professions with a thorough knowledge of the principles and practice in these departments of industry.

LABOR.

It is a peculiarity of the College, that it makes provision for labor, thus combining practice with theory, manual labor with scientific culture. Students in this institution are required to labor a certain portion of each day, not exceeding three hours, for five days in the week

The labor is designed to be as much as possible educational, so that every student may become familiar with all the forms of labor upon the farm and in the gardens. In the lower classes the students are required to work on the farm, and thus receive compensation for their labor according to their industry, faithfulness and efficiency, the educational character of the labor being also taken into account. The maximum amount paid will be thirty cents for three hours labor.

MILITARY.

Thorough instruction is given in Military Science by a competent officer. The instruction extends through the whole College course, and embraces personal, squad, company and battalion drill. The students are enrolled in companies, and choose their officers. Arms are furnished by the State. The uniform of the students is similar to that of Cadets at West Point.

LOCATION.

The College has a pleasant and healthful location, between the villages of Orono and Upper Stillwater, and 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 European and North American Railway, over which trains pass several 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 for 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. The Boarding House connected with the College buildings, is open to students. With these buildings, the institution furnishes desirable accommodations for one hundred and twenty-five students.

The Chemical 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.

APPARATUS.

The College is furnished with new and valuable apparatus for the departments of Physical Geography, Natural Philosophy and Chemistry, and for Surveying and Civil Engineering, to which additions will be made as the exigencies of the several departments require. Models have been obtained from the United States Patent Office, and others have been purchased, that serve for purposes of instruction.

LIBRARY.

The Library already contains 2,000 volumes, some of which have been obtained by purchase, while others have been kindly given to the College. The volumes secured through the liberality of Gov. Coburn, and the gifts of other friends, are a valuable addition to this department. It is earnestly hoped that so important an auxiliary in the education of students in the College will not be disegarded by the people of the State, but that liberal contributions will be made to the Library, not only of Agricultural and Scientific works, but also works of interest to the general reader.

READING ROOM.

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

Sunrise, Presque Isle; Piscataquis Observer, Dover; American Sentinel, Bath; Maine Farmer, Augusta; Dexter Gazette, Dexter; North Star, Caribou; Somerset Reporter, Skowhegan; Aroostook Times, Houlton; Kennebec Journal, Augusta; York County Independent, Saco; Bangor Weekly Courier, Bangor; Maine Democrat, Biddeford; New England Farmer, Boston, Mass ; Santa Barbara Press, Santa Barbara, Cal.; Official Gazette, U. S. Patent Office, Washington, D. C.; Weekly Eastern Argus, Portland; Oxford Register, Paris; Dirigo Rural, Bangor; Northern Border, Bangor; Christian Mirror, Portland.

The following are furnished by subscription:

Edingburgh Review, Eclectic Magazine, Harper's Magazine, Atlantic Monthly, Scribner's Monthly, Old and New, Galaxy, American Naturalist, American Journal of Chemistry, American Agriculturist, Littel's Living Age, Harper's Weekly, Hearth and Home, Appleton's Journal, The Nation, Evening Post, Boston Daily Globe, The College Courant, New York Weekly Witness, Bangor Daily Whig and Courier, American Builder, Popular Science Monthly, Journal of Science and Art, International Review, Country Gentleman, American Chemist. Lewiston Journal, by T. J. Stevens. Portland Daily Press, by Fred H. Pullen.

CABINET.

Rooms have been fitted up with cases for Minerals, and specimens of Natural History, and several hundred specimens have been presented to the College. The valuable private cabinet of Prof. C. H. Fernald, is placed in these rooms, and is accessible to the students. All specimens presented will be properly credited and placed on exhibition. Rocks illustrating the different geological formations, and minerals found within the State, are particularly solicited. Large additions have been made during the past year.

LITERARY SOCIETIES.

Flourishing societies have been organized by the students of the college, which hold weekly meetings for declammations, discussions, and other literary exercises.

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 free to students from all parts of the State. Those from other States will be charged twelve dollars per term. Rooms are free, and each room is furnished with a bedstead, mattrass, table, sink and chairs. All other bedding and furniture must be supplied by the students, who will also furnish their own lights. Board, washing and fuel will be furnished at cost. The price of board has been, hitherto, three dollars per week, the fuel and washing fifty cents per week. These bills, with those for incidental expenses, are payable at or before the close of each term.

The terms are so arranged that the long vacation occurs in the winter, that students may have an opportunity to teach during that time. By means of the amount thus earned, together with the allowance for labor, the industrious and economical student can cancel the greater part of his college expenses.

GENERAL STATEMENT.

Students are required to make their own beds, and sweep their own rooms.

Each student is required, at the commencement of his College course to deposit with the Treasurer of the College, a bond for $100, signed by responsible sureties, to secure the payment of his board bill and any incidental charges.

Strict conformity to College regulations and requirements is the only condition of continued membership in the College.

Candidates for the next class should make early application.

GRADUATES.

CLASS OF 1872.

Benjamin F. Gould	Civil Engineer.
George E. Hammond	" "
Heddle Hilliard	" "
Edwin J. Haskell	Bachelor of Science.
Eber Davis Thomas	" "
George O. Weston	" "

CLASS OF 1873.

Russell W. Eaton	Civil Engineer.
George H. Hamlin	" "
Fred W. Holt	" "
Charles E. Reed	" "
John M. Oak	Bachelor of Science.
Frank L. Scribner	" "
Harvey B. Thayer	" "

CLASS OF 1874.

William A. Allen	Civil Engineer.
Walter Balentine	Bachelor of Science.
William H. Gerrish	" "
John I. Gurney	" "
Miss Louise H. Ramsdell	" "

CALENDAR.

1874. Aug. 27—Thursday, First Term commenced.
" Nov. 24 and 25—Tuesday and Wednesday, Examination.
" Nov. 25—Term closes. Vacation of ten weeks.
1875. Feb. 2—Tuesday, Second Term commences.
" April 22 and 23—Thursday and Friday, Examinations.
" April 23—Term closes. Vacation of one week.
" May 4—Tuesday, Third Term commences.
" July 31—Prize Declamation by Sophomores.
" Aug. 1—Baccalaureate Address.
" Aug. 2 and 3—Examinations.
" Aug. 2—Prize Essays by Juniors.
" Aug. 4—Commencement.
" Aug. 5—Examination of Candidates for admission. Vacation of 3 weeks.
" Aug. 24—Examination of Candidates for admission.
" Aug. 26—Thursday, First Term commences.
" Nov 18 and 19—Thursday and Friday, Examination.
" Nov. 19—Term closes. Vacation of ten weeks.

SUMMARY OF

METEOROLOGICAL OBSERVATIONS

TAKEN AT THE

Maine State College of Agriculture and the Mechanic Arts,

FROM JANUARY, 1869, TO JANUARY, 1875.

BY PROF. M. C. FERNALD.

Latitude 44° 53′ 10″ N. Longitude 68° 38′ 57″ W. Elevation above the sea, 134 feet.

EXPLANATIONS, DEDUCTIONS AND REMARKS.

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

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 tables indicate that the warmest day of the year 1874 was July 15th, when the mean temperature was 76°.3, and the coldest day January 26th, when the mean temperature was 15°.5 below zero.

The highest temperature (86°.3) recorded during the year was on the 15th of July, and the lowest temperature (26° below zero) on the 2d of February.

The range of temperature between the two extremes is 112°.3, which is precisely the average range between the extremes for the last six years.

The warmest day within the period covered by the tables was July 24th, 1870, when the mean temperature was 82°.2, and the coldest day January 26th, 1874, when the mean temperature was 15°.5 below zero. The highest temperature (94°.0) occurred on July 24th, 1870, and the lowest temperature (26°.5 below zero) on January 30th, 1873.

A comparison, as regards temperature, of the several months of 1874, with the mean temperature of corresponding months for six years, is given below.

Months.	Mean temperature from 1869 to 1874, inclusive.	Mean temperature for 1874.	
January	17°.63	19°.28	1°.65 warmer.
February	18°.59	17°.50	1°.09 colder.
March	26°.60	27°.56	0°.96 warmer.
April	39°.50	33°.30	6°.20 colder.
May	51°.65	51°.88	0°.23 warmer.
June	62°.09	60°.17	1°.92 colder.
July	67°.75	66°.73	1°.02 colder.
August	64°.87	63°.17	1°.70 colder.
September	57°.43	58°.38	0°.95 warmer.
October	46°.72	47°.91	1°.19 warmer.
November	31°.59	32°.66	1°.07 warmer.
December	19°.18	17°.63	1°.55 colder.

The year 1874 averaged 0°.62 colder than the mean temperature for the six years above noticed.

The earliest frost noted in the autumn of 1874, was on the morning of the 4th of October, and the first frost destructive to vegetation on the morning of the 22d of October.

The first thunder shower of the season occurred on the 18th of March.

The rain-fall for the year 1874 was greater by about 1.34 inches than the average rain-fall for six years; and the amount of snow (132 inches) was greater by nearly 30 inches than the average snow-fall for the same period.

The prevailing wind during 1874, as also during the period of six years, was from the northwest. The relative direction and force of wind for six years 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 brilliant auroras of the year were on the evenings of January 16th and 17th, April 1st, July 14th, (continuing through the night,) and October 3d and 4th. The aurora of October 3d was one of remarkable brilliancy.

The barometer indicated the greatest pressure of the atmosphere in February, and the least in September. The least mean pressure was during the month of March, the greatest during the month of January.

SUMMARY—1869.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS.	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
		°		°		°		°	°	°	°																
January	5	37.5	22	-3.8	8	43.0	19	-16 0	25.44	10 74	18.37	2.542	10.75	.61	.46	.16	.03	.35	30.391	29.178	29.767	.293	.011	.092	100	26	78
February	13	37.4	2	7.7	13	44 0	25	-8.0	29.21	14.79	21 83	4.264	32.25	.58	.46	.25	.04	.25	30.254	28 858	29.706	.191	.020	.094	100	25	74
March	27	42.3	5	1.2	28	50.0	6	-22.0	32.62	12.51	22.99	3.356	10.42	.46	.54	.32	.07	.07	30.300	29.265	29 828	.236	.005	.099	100	29	67
April	21	48.1	4	25.8	28	60 5	5	18.5	46.78	33.33	39.51	2.392	1.75	.58	.51	.26	.09	14	30.016	29.319	29.660	.377	.071	.179	100	27	73
May	26	67.6	4	37.8	25	80.3	1	30.0	58.72	41 55	51.33	2.950	.....	.63	.43	.25	.16	.16	30.030	29.088	29.630	.546	.112	.279	100	27	73
June	3	67.7	9	52.5	3	81.5	9	38.0	68.38	50 34	59 58	3 800	.....	.56	.41	.34	.23	.02	30.143	29.346	29.797	.574	.196	.405	100	35	80
July	11	74.2	1	57 5	11	87.2	2	45.0	76.07	56.69	66.66	1.620	.....	.46	.29	.53	.18	.00	30.137	29.291	29.735	.826	.286	.495	100	38	76
August	20	74.0	31	51.2	11	83 0	8	44.0	71.91	53.10	62.25	1.910	.....	.42	.48	.32	.08	.12	30.229	29.447	29.818	.730	.229	.406	100	34	72
September	8	69.5	28	41.7	5	80.5	29	35.0	68 86	50.67	59.55	3.670	.....	.55	.26	.39	.23	.12	30.243	29.316	29.979	.758	.154	.415	100	42	80
October	4	65.3	28	26.2	1	73.5	28	21.0	53.38	38.05	44.83	9.570	9.00	.54	.34	.29	.20	.17	30.167	29.176	29.746	.585	.095	.269	100	38	82
November	6	46.3	16	24 0	20	52.8	26	15 5	38.93	24.42	32.32	3.360	0.75	.62	.29	.28	.24	.19	30.174	28.883	29.740	.374	.057	.162	100	35	85
December	1	39.7	15	-0.2	1	53.0	9	-13.5	29.85	13.28	22 08	5.283	20.00	.55	39	.12	.11	.38	30.519	28.891	29.949	.375	.009	.109	100	28	77
	July		Jan'y		July		March																				
Year	11	74°.2	22	-3°.8	11	87°.2	6	-22° 0	50°.01	33°.37	41°.77	44.717	84.92	.55	.41	.29	.14	.16	30 519	28 858	29.780	.826	.005	.250	100	25	76

SUMMARY—1870.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS.	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
		°		°		°		°	°	°	°																
January	23	40.6	14	-9.7	23	44.2	14	-14.2	30.92	13 05	22.35	5.615	26.00	.57	38	.26	.12	.14	30.578	29.249	29.913	.284	.020	.108	100	26	80
February	15	39.6	4	-6.6	19	47.0	4	-17.0	26.59	8.36	18.22	4.296	15.00	.57	.43	.12	.21	.24	30.409	28.902	29.692	.323	.016	.093	100	47	80
March	30	42.2	11	6.2	30	52.5	12	-5.8	35.01	21.09	27.90	2.114	10.50	.47	.44	.04	.08	.44	30.343	29.190	29.761	.227	.020	.104	100	18	65
April	28	57.4	4	34.3	28	70.0	16	25.5	52.78	34.61	43.51	3.553	2.00	.57	.18	.24	.19	.39	30.402	29.390	29 850	.443	.068	.206	100	13	73
May	29	65.0	9	39.8	29	81.0	5	31.0	62.26	41.48	51.87	1.960	.....	.44	.31	.40	.10	.19	30.211	29.347	29.791	.604	.102	.264	100	20	68
June	25	74.7	9	56.7	25	89.5	10	51.0	75.34	57.24	65.74	2.070	.....	.53	.19	.58	.13	.10	30.023	29.455	29.813	.703	.253	.479	100	30	76
July	24	82.2	1	58.5	24	94.0	2	48.0	79.03	58.35	68.88	1.780	.....	.40	.26	.58	.10	.06	29.980	29.543	29.758	.878	.228	.499	97	28	71
August	10	77.8	27	54.6	9	88.0	27	39.8	77.52	55.60	66.69	3.210	.....	.41	.34	.42	.13	.11	30.136	29.488	29.805	.805	.217	.470	100	31	72
September	4	68.4	12	48.3	4	78.0	13	35.0	67.26	47.64	57.76	2.230	.....	.37	.41	.34	.03	.22	30.273	29 392	29.928	.725	.170	.363	100	29	70
October	12	60.1	27	31.0	2	70.0	27	21.0	56.24	38.91	47.25	5.530	1.50	.50	.30	.55	.05	.10	30.414	29.116	29.840	.527	.096	.271	100	31	79
November	3	52.0	30	23.6	3	56.8	30	21 0	42.80	30.61	36.58	5.608	5.50	.55	.47	.28	.07	.18	30.240	29.194	29.702	.436	.068	.173	100	38	77
December	2	36.9	24	3.4	2	44.0	24	-8.3	30.54	18.50	24 43	3.010	18.25	.61	.47	.17	.02	.34	30.320	29.175	29.645	.226	.028	.114	100	42	80
	July		Jan'y		July		Feb'y																				
Year	24	82°.2	14	-9°.7	24	94°.0	4	-17°.0	53°.02	35°.45	44° 26	40.976	78.75	.50	.35	.33	.10	.22	30 587	28 902	29.791	.878	.016	.279	100	13	74

SUMMARY—1871.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
		°		°		°		°	°	°	°																
January	16	37.6	23	-14.9	16	42.0	23	-20.6	21.74	5.08	13 34	2.597	13.50	.57	.47	.16	.05	.32	30.585	29.263	29.988	.236	.006	.084	100	17	80
February	25	42.1	5	-6.8	25	47.2	5	-16.7	30.42	10.99	19.90	2.532	14.00	.43	.55	.27	.11	.07	30.348	29.025	29.766	.234	.013	.092	100	38	72
March	12	51.4	24	24.8	12	58.7	29	17.0	41.02	28.35	34.65	4.108	8.00	.59	.39	.37	.07	.17	30.282	29.128	29.788	.354	.053	.159	100	27	76
April	21	52.7	6	30.9	21	66.5	1	22.6	48.02	33.97	40.85	4.010	1.00	.65	.35	.21	.12	.32	30.193	29.269	29.704	.335	.052	.187	100	34	73
May	30	76.0	5	36.3	30	88.6	5	33.0	59.73	41.43	50.65	3.480	1.50	.48	.47	.43	.03	.09	30.167	29.136	29.763	.545	.089	.240	100	17	63
June	3	75.4	16	52.9	3	87.8	16	44.0	72.01	51.82	61.99	2.580	.....	.45	.45	.51	.02	.02	29.990	29.302	29.708	.638	.203	.396	100	31	72
July	14	72.8	17	59.3	13	85.0	1	47.0	77.48	57.78	67.05	2.130	.....	.46	.27	.49	.14	.10	30.111	29 392	29.771	.671	.272	.482	100	31	75
August	4	73.9	20	58.2	4	85.0	22	42.0	75.85	56.08	65.83	3.850	.....	.37	.39	41	.14	.06	30.247	29.420	29 788	.956	.244	.471	100	35	74
September	3	69.5	30	44.8	3	80 0	15	28.8	64.11	44.53	54.70	1.100	.....	.35	.41	.30	.14	.15	30.270	29.453	29.885	.644	.095	.326	100	20	76
October	11	62.8	19	34.4	10	72.5	21	25.3	55.95	38.84	47.68	7.500	.....	.56	.29	.40	.20	.11	30.362	29.404	29.858	.644	.107	.272	100	39	76
November	1	43.0	30	3.4	1	53.0	30	0.0	34.53	22.95	29.00	3.580	15.00	.48	.58	.07	.10	.25	30.299	29.150	29.728	.403	.031	.132	100	44	78
December	4	40.4	21	-9.8	25	47.5	22	-11.5	24.87	8.16	17.43	4.163	27.50	.59	.40	.33	.07	.20	30.534	29.000	29.794	.277	.024	.090	100	42	84
	May		Jan'y		May		Jan'y																				
Year	30	76°.0	23	-14°.9	30	88°.6	23	-20°.6	50°.44	33°.33	41°.92	41.630	80.50	.50	.42	.33	.10	.15	30 585	29.000	29.795	.956	.006	.244	100	17	75

SUMMARY—1872.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS	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 temperature.	Mean of minimum temperature.	Mean of three daily observations				PER CENT. OF DIRECTION.				BAROMETER HEIGHT REDUCED TO FREEZING POINT.								
	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.				Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage of cloudiness.	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.
		°		°		°		°	°	°	°																
January	13	32 8	7	-2.4	23	38.2	7	-9 2	24.99	9.54	17.45	2.182	16 00	.54	.48	23	.05	.24	30 446	29.264	29.712	.201	.028	.087	100	49	82
February	25	31.6	23	2.2	21	40 0	3	-9 8	28 99	7.13	17.89	1.703	13.50	.39	.53	.15	.09	.23	30.382	29.140	29 708	.226	.025	.082	100	28	76
March	27	33.5	6	-8.0	26	44 0	7	-16.5	29.01	10.00	19.30	5 234	38.00	.51	.52	.13	.05	.30	30.202	28 988	29.702	.191	025	.086	100	32	76
April	30	49.2	1	27.4	20	63.0	7	20.0	48.72	31.49	40 26	1 928	3 00	.49	.48	31	.05	.16	30.200	29.219	29.731	.302	.070	.162	100	25	66
May	27	60.2	5	41.5	19	71.8	11	34.0	60 08	44.10	52 13	3.920	.....	.67	.19	.32	.12	.37	30.162	29.244	29.745	.416	.098	.280	100	23	73
June	30	78.5	2	49.0	30	90 6	4	37.3	73.28	56 22	64 30	4 470	.....	.55	.27	34	.19	.20	30 040	29.449	29.772	.750	.210	.459	100	36	77
July	16	79.5	27	61.1	16	90 0	26	49.0	78 54	59.19	68.69	2.680	.....	.47	.34	.42	.13	.11	30.047	29.531	29.736	.793	.256	.517	100	33	74
August	9	76.8	30	54.3	9	90.3	29	45.2	76.32	59 46	67.63	6 230	.....	.45	30	.36	.18	.16	30.075	29.277	29 823	.750	.236	.530	100	28	79
September	8	72.2	3	52 5	8	84 3	5	41.4	66.16	51.38	58.70	3 550	.....	.56	.27	.30	.27	.16	30.172	29.409	29 829	.688	.234	.403	100	39	81
October	7	60.5	28	33 3	7	66.0	29	23.0	53.78	37 39	45.75	6.010	.....	.47	.23	.34	.12	.31	30.423	29 279	29 838	.500	.108	.254	100	36	80
November	12	44 6	30	20.4	12	47.0	21	12.4	39 35	28.18	33.77	7.055	10.00	.64	.29	.25	.20	.26	30.252	28 712	29.770	.323	.068	.163	100	41	83
December	3	34.5	25	-11.8	6	38 4	25	-23.0	21.07	4.52	13 39	3.615	32.50	.59	.55	.23	.11	.11	30.363	29.056	29.822	.196	.011	.077	100	44	78
Year	July 16	79° 5	Dec. 25	11°.8	June 30	99°.6	Dec. 25	-23° 0	50° 02	33°.22	41° 60	48 577	113.00	.53	.37	.28	.13	.22	30 446	28.712	29 766	.793	.011	.258	100	23	77

SUMMARY—1873.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
		°		°		°		°	°	°	°																
January	17	37.8	30	-4.9	17	43.1	30	-26.5	23.52	4.75	15.01	4.090	22.00	.56	.38	.21	.09	.32	30.680	29.148	29.882	.275	.009	.086	100	44	83
February	28	31.4	2	-2.7	7	39.5	2	-14 0	24.84	5.69	16.23	2.965	28.00	.48	.47	.20	.04	.29	30.290	28.960	29.690	.174	.020	.079	100	41	76
March	30	38.3	24	12.6	29	46.2	5	-5.6	34.21	19.19	27.22	4.700	31.00	.54	.36	.29	.14	.21	30.311	28.838	29.682	.288	.028	.118	100	27	76
April	30	46.6	19	34.2	30	61.6	17	26.0	46.22	32 82	39.58	2.590	5.00	.58	.42	.10	.20	.28	30.060	29.205	29.717	.230	.088	.164	100	24	68
May	28	68.2	14	42.8	28	81.2	7	31.5	62.03	41.89	52.03	1.960	.....	.43	.41	.38	.04	.17	30.084	29.291	29 802	.663	.088	.245	97	20	62
June	26	72.7	4	47.1	26	86 5	3	36.0	71.57	48.78	60.74	1.320	.....	.40	.35	.32	.15	.18	30.142	29.296	29.770	.673	.115	.356	100	22	68
July	30	75.5	18	62.1	26	92.0	7	47.0	78.80	58.60	68.45	3.260	.....	.47	.34	.50	.11	.05	30.110	29.492	29.801	.748	.191	.497	100	26	71
August	3	73.4	24	55.3	3	88.0	28	35.0	74.50	52.95	63.65	1.810	.....	.41	.30	.33	.08	.29	30.141	29.621	29.878	.778	.197	.420	99	23	72
September	5	68.6	22	46.9	5	82.5	18	31.2	66.47	44.80	55.50	4.740	.....	.38	34	.41	.13	.12	30.258	29.413	29.864	.690	.170	.346	100	31	76
October	6	58.9	30	34.0	11	70.0	18	24.5	56 87	37.73	47.40	6.560	.....	.46	.20	.40	.16	.24	30.308	29.180	29.863	.500	.099	.264	100	31	78
November	2	43.0	30	5.2	3	53.2	30	-4.0	31.64	18.30	25.17	5.050	24.00	.55	.54	.18	.06	.22	30.332	28.432	29.689	.232	.039	.109	100	42	75
December	4	46.5	1	-3.5	4	50.3	2	-26.0	28.45	9.87	20.12	1.735	14.00	.59	41	.24	.05	.30	30.680	29.108	29.893	.343	.014	.099	100	31	80
	July		Jan'y		July		Jan'y																				
Year	30	75°.5	30	-4°.9	26	92°.0	30	-26° 5	49°.93	31°.28	40°.93	40.780	124.00	.49	.38	.30	.10	.22	30 680	28.423	29.794	.778	.009	.232	100	20	74

SUMMARY—1874.

MONTHS.	THERMOMETER IN THE OPEN AIR.											RAIN AND SNOW.		CLOUDS	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
		°		°		°		°	°	°	°																
January	8	48.3	26	-15.5	8	54.4	27	-19 0	27.49	10.12	19.28	4 570	25.00	.56	.40	.21	.14	.25	30.623	29.381	29.988	.400	.019	.112	100	41	86
February	14	38.7	2	-15.1	14	46.0	2	-26.0	26.00	8.50	17.50	5.500	40.00	.48	.58	.23	.05	.14	30.719	29.254	29.924	.285	.012	.086	100	26	77
March	4	45.1	24	5.4	19	50.0	1	-5.4	35.78	19.41	27.56	3.400	14.00	.48	.57	.31	.04	.08	30.279	28.983	29.645	.319	.027	.112	100	24	67
April	15	47.9	1	13.9	15	60.0	1	1.0	40.50	26.16	33 30	3.760	30.00	.57	.35	.32	.08	.25	30.260	28.984	29.764	.351	.031	.133	100	26	67
May	28	64.9	1	35.8	28	78.3	2	31.0	61.35	41.71	51.88	4.740	.....	.45	.29	.43	.12	.16	30.200	29.110	29.708	.602	.096	.255	100	19	64
June	28	71.6	12	48.1	28	82.8	2	41.2	69.71	51.06	60.17	4.930	.....	.65	31	.35	.04	.30	30.004	29.323	29.692	.685	.177	.391	100	26	74
July	15	76.3	3	54.1	15	86 3	3	50.0	75.44	58.29	66.73	2.100	.....	.54	.23	.54	.12	.11	30.045	29.432	29.799	.794	.304	.515	100	41	80
August	11	72.4	26	54.7	11	82.0	27	40.3	72.75	53.69	63.17	5.390	....	.43	.36	.44	.06	.14	30.167	29.373	29.826	.662	.250	.447	100	34	77
September	10	68.4	22	50.2	10	83.3	23	34.2	67.73	48.69	58.38	4.370	.....	.53	.26	.41	.10	23	30.321	28.981	29.921	.573	.240	.402	100	34	83
October	11	54.2	23	37.3	26	65.7	23	28.0	57.46	37.30	47.91	1.140	.....	.44	.28	.50	.04	.18	30.341	29.355	29.851	.427	.104	.254	100	26	75
November	5	47.5	22	13.8	5	54.7	23	5.2	41.32	24.62	32.66	3.060	10.00	.49	.46	.37	.07	.10	30.406	29 024	29.922	.363	.057	.158	100	39	80
December	3	38.7	15	-4.0	3	44.7	16	-19.1	26.67	7.01	17.63	1.980	13.00	.57	.36	.20	.11	.33	30.606	29.319	29.858	.254	.009	.093	100	45	81
	July		Jan'y		July		Feb'y																				
Year	15	76°.3	26	-15°.5	15	86°.3	2	-26°.0	50°.18	32°.21	41°.35	44.940	132.00	.52	.37	.36	.08	.19	30.719	28.981	29.825	.794	.009	.246	100	19	76

SUMMARY FROM 1869 TO 1874, INCLUSIVE.

YEARS.	THERMOMETER IN THE OPEN AIR.										RAIN AND SNOW.		CLOUDS	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 temperature.	Mean of minimum temperature.	Mean of three daily observations.	Amount of rain or melted snow in guage—inches.	Depth of snow—inches.	Mean per centage 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.
	July	°	Jan.	°	July	°	Mar.	°	°	°	°															
1869	11	74.2	22	-3.8	11	87.2	6	-22.0	50.01	33.37	41.77	44.717	84.92	.55	.41	.29	.14	.16	30.519	28.858	29.780	.826	.005	.250	100	25	76
	July		Jan.		July		Feb.																				
1870	24	82.2	14	-9.7	24	94.0	4	-17.0	53.02	35.45	44.26	40.976	78.75	.50	.35	.33	.10	.22	30.578	28.902	29.791	.878	.016	.279	100	13	74
	May		Jan.		May		Jan.																				
1871	30	76.0	23	-14.9	30	88.6	23	-20.6	50.44	33.33	41.92	41.630	80.50	.50	.42	.33	.10	.15	30.585	29.000	29.795	.956	.006	.244	100	17	75
	July		Dec.		June		Dec.																				
1872	16	79.5	25	-11.8	30	90.6	25	-23.0	50.02	33.22	41.60	48 577	113.00	.53	.37	.28	.13	.22	30.446	28.712	29.766	.793	.011	.258	100	23	77
	July		Jan.		July		Jan.																				
1873	30	75.5	30	-4.9	26	92.0	30	-26.5	49.93	31.28	40.93	40.780	124.00	.49	.38	.30	.10	.22	30.680	28.423	29.794	.778	.009	.232	100	20	74
	July		Jan.		July		Feb.																				
1874	15	76.3	26	-15.5	15	86.3	2	-26.0	50.18	32.21	41.35	44.940	132.00	.52	.37	.36	.08	.19	30.719	28.981	29.825	.794	.009	.246	100	19	76
	1870		1874		1870		1873																				
	July		Jan.		July		Jan.																				
Six years	24	82°.2	26	-15°.5	24	94°.0	30	-26°.5	50°.60	33°.14	41°.97	43.603	102.20	.51	.38	.32	.11	.19	30.719	28.423	29.792	.956	.005	.252	100	13	75