Public Documents of Maine:

BEING THE

ANNUAL REPORTS

OF THE VARIOUS

Public Officers and Institutions

FOR THE YEAR

1893.

VOLUME II.

AUGUSTA:
BURLEIGH & FLYNT, PRINTERS TO THE STATE
1893.

PRINCIPAL BUILDINGS.

OAK HALL. WINGATE HALL. CHEMICAL LABORATORY. COBURN HALL.

ANNUAL REPORTS

OF THE

TRUSTEES, PRESIDENT AND OTHER OFFICERS

OF THE

State College of Agriculture

AND THE MECHANIC ARTS.

ORONO, ME., 1892.

Published agreeably to a Resolve approved February 25, 1871.

AUGUSTA:
BURLEIGH & FLYNT, PRINTERS TO THE STATE.
1892.

TRUSTEES' REPORT.

To the Honorable Governor and Executive Council of Maine.

The Trustees of the State College of Agriculture and Mechanic Arts herewith submit their twenty-fourth annual report, with the reports of the President, other members of the Faculty, and Treasurer.

During the past year the college has prospered. Its affairs were never in better condition, nor the outlook for the future more encouraging than at the present time. Pleasantly situated in a healthful locality near the geographical center of the State, with fine buildings, the most of which are new, ample and attractive grounds which are constantly being improved, and an able and faithful faculty which has lately been increased and strengthened, it is now well fitted to carry on the work for which it was established, and to maintain the position it should occupy among the educational institutions of the State.

The college has been kindly treated by State and Nation, but it still has needs which the State should meet. These needs are referred to in detail in the reports of President Fernald and the other members of the faculty. The sum of $12,000 is asked for the years 1893 and 1894 to supply the necessary furnishings for the new engineering building, for the repairing and painting of farm buildings, the further improvement of the college campus and for the general purposes of the different departments. It has been the policy of the State in the past to appropriate sufficient sums of money to erect suitable buildings when needed, and to properly furnish and equip them. We trust this wise policy will

be continued, as there will be additional buildings required in the future, for which the State should provide. When the national government made its grant of lands for the establishment of the college, one of the conditions imposed upon the State was the maintenance of a military drill under the instruction of an officer of the regular army. The college has no drill hall where this instruction can be properly given in the winter season, neither has it any suitable gymnasium, something now deemed indispensable to all colleges. The legislature will be asked to make an appropriation for a building for a gymnasium, which shall also answer the purposes of a drill hall.

The officer now assigned to instruct the students in military tactics, has not only faithfully performed this service, but has also given them the benefits of instruction in physical culture, for which he specially fitted himself by a course at the Hemmenway Gymnasium, Harvard College. The gymnasium seems to be one of the needs that should be promptly met.

Last May, President Fernald, because of impaired health, tendered his resignation, which the Trustees after careful consideration accepted, to take effect the 1st of July, 1893. President Fernald's services began with the foundation of the college, twenty-four years ago. He served as acting President before the Rev. Chas. F. Allen, D. D., was called to act as head of the college, and during Dr. Allen's presidency was Professor of Mathematics and Physics; upon Dr. Allen's retirement, he was chosen President, and has served in that capacity nearly fourteen years, giving the greater part of the best years of his life to the development and upbuilding of the college. He has at all times been unremitting in his efforts to further its interests, and has labored faithfully and unselfishly for its welfare. His successor has not yet been selected, and the college will be indeed fortunate if, when his labors cease, a successor shall be found who shall work with the untiring zeal and devotion which have characterized the long service of President Fernald.

The college is progressing in all its departments. A college of Agriculture and Mechanic Arts, it is doing its work well. The marked success, especially in industrial pursuits, of so many of its graduates, fully proves the value of the instruction given. Its training is liberal and practical and the cost is comparatively small, no charge being made for tuition or room rent. The advantages now offered, are greater than ever before. Last year a larger number of students entered the college than in any previous year in its history, and the indications are all favorable to accessions equally large, the coming year. It is worthy of, and should receive the generous support of the people of the State.

HENRY LORD,

President of the Board of Trustees.

PRESIDENT'S REPORT.

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

GENTLEMEN: The material changes most worthy of note on the college campus within the past two years include the construction of Wingate Hall, the construction of a dairy house, of a building for horticultural purposes, of a foundry, of a tool-shed, of a water tower, and also include considerable additions to the books in the library, to the apparatus in the different departments, to the lathes and other machinery in the mechanical shop, a complete equipment of the dairy building and a very noticeable improvement of the roads and walks and some portions of the grounds under the direction of the college landscape gardener.

The new class recently admitted, with additions to other classes and to the list of special students makes the accession of students the largest at any one time in the history of the college.

APPROPRIATION FOR 1891 AND 1892 AND ITS EXPENDITURE.

For the information of legislators, I herewith indicate the appropriation made by the Legislature of 1890-91 and the manner of its expenditure. The separate items are shown in the following summary:

New building to replace Wingate Hall (burned)	$16,000 00
Foundry building	800 00
Cases in Coburn Hall, Dep't Natural History	600 00
Dairy building	2,500 00
Tool shed	500 00
Stand-pipe for fire protection	3,600 00
Hose and carriage	500 00
Total	$24,500 00

The money has been devoted as assigned by the legislative committee, in accordance with the plan given above.

BOUNTY OF THE STATE.

The measure of liberality shown by the State, in accordance with obligations imposed by the national government and assumed by the State in accepting the conditions of the land grant act of 1862, and of subsequent acts of Congress additional or amendatory thereto, appears in the following table.

Legislative appropriations in aid of the college.

1867	$20,000	1877	$15,218
1868	10,000	1878	6,500
1870	50,000	1880	3,000
1871	6,000	1881	3,500
1872	18,000	1883	13,000
1873	24,000	1885	12,400
1874	12,500	1887	34,600
1875	10,500	1889	30,000
1876	8,000	1891	24,500
		Total	$301,718

During the twenty-five years since the first appropriation was made, the average annual sum appropriated has been in round numbers $12,000. The larger part of the money granted by the State has been devoted to buildings and equipment. The college has much to show as the result of the judicious expenditure of this money, as appears in another table. In fact, the draft for instruction and other current expenses, upon the sums from time to time assigned by the State, has averaged less than $3000 annually.

VALUE OF BUILDINGS AND EQUIPMENT.

For nearly all the buildings, the cost in round numbers is given as nearly as it can be readily determined. In the case of the sets of buildings on the premises when the farms were

given to the college, the value is estimated. The brick buildings have undergone but little change since they were erected, and all the buildings have been kept in good repair.

Except, then, as the value of the dollar for building purposes has changed, the original cost is fairly representative of the actual value of the buildings to-day, for the objects to which they are devoted.

Oak Hall (dormitory)	$30,000 00
Boarding house and connected buildings	6,000 00
Wingate Hall (engineering)	30,000 00
Chemical laboratory	27,000 00
Mechanical shop	2,250 00
Coburn Hall (Agriculture and Natural History)	27,000 00
Horticultural building and plant house	3,000 00
Dairy house and fixtures	4,000 00
Farm house and connected buildings	5,000 00
Barn No. 1	9,000 00
Barn No. 2	3,000 00
Stable and shed	1,500 00
President's house	5,000 00
Professor's house	3,250 00
House occupied by Beta Society	4,000 00
House occupied by Q. T. V. Society	4,000 00
Two cottages	1600 00
Experiment station	8,000 00
Water system, including tower, main and distributing pipes, hydrants, pumping station, etc.	10,000 00
Stock, carriages, tools, etc	6,000 00
Apparatus in dairy building	2,000 00
Machinery and other equipment of shop	8,000 00
Apparatus in the several departments including experiment station	34,400 00
Library	12,000 00
Total	$246,000 00

GENERAL FINANCIAL STATEMENT.

The endowment fund derived from the sale of the government land-scrip is $118,300 invested in a State of Maine bond paying five per centum. The interest accumulated on this fund, now added to the endowment, is $13,000 of which $4,000 invested in the bonds of the Hallowell Scientific and Classical Academy, pays no interest, $6,000 pays interest at six per centum and $3,000 at four per centum.

The Coburn Fund, a gift of $100,000, invested in a State of Maine bond pays interest at four per centum.

The annual revenue from the above named sources is $10,395. As tuition was removed by the last legislature, this source of revenue is now cut off.

From the United States government, the college receives under the recent Morrill act, $18,000 for the fiscal year ending June 30, 1893. The prospective sum for the following year from the same source is $19,000.

The annual receipts, therefore, for all current expenses not including those of the experiment station are between $28,000 and $29,000.

To maintain the specialized system of instruction which enables its graduates to attain with remarkable facility, positions of prominence, and which is fast securing for the college a reputation of the highest value, a relatively large teaching force is required. From present indications, instead of allowing of reduction, in the near future, it will have to be increased.

After making the necessary compensation for the services of instruction, the margin for all other purposes is about four thousand dollars a year at the present time.

The other items of current expenses include repairs of buildings, improvement of grounds, travelling expenses of trustees, insurance, additions to the furniture of the buildings as needed, additions to the library, to the apparatus in all departments and other miscellaneous expenses necessarily involved in the work of a progressive institution.

The margin is clearly inadequate to meet properly all these demands, and hence the necessity of relying upon the continued bounty of the State.

COMMENCEMENT.

PRIZES AND DEGREES.

The order of exercises of the Twenty-first Annual Commencement was as follows:

1892, June 25, Saturday, 7.30 P. M., Sophomore Prize Declamations.
26, Sunday, 7.30 P. M., Baccalaureate Address by the President.
27, Monday, 7.30 P. M., Junior Exhibition.
28, Tuesday, 9.00 A. M., Meeting of Trustees.
1 to 4 P. M., College Halls open to visitors.
1.30 P. M., Military Exercises.
4 to 6 P. M., President's Reception.
8.00 P. M., Alumni Reunion.
29, Wednesday, 9.30 P.M., Commencement Exercises.
3.00 P. M., Meeting of the Alumni.

For excellence in declamation, Sophomore class, the Prentiss Prize was awarded to James Elmore Harvey, Readfield; and honorable mention was made of Frank Gilman Gould, Orono. For excellence in composition, Junior class, the Prentiss Prize was awarded to Walter Wilson Crosby, Bangor, whose essay was entitled "A Plea for Physical Culture," the committee assigning the second place of merit to Charles Prentiss Kittredge, Milo, the subject of whose essay was "Our Attitude toward the American Indian."

For best agricultural essay, the Libby Prize was given to Alva Thomas Jordan, South Lewiston, his subject being "The Ideal Education for the Agriculturist."

The Franklin Danforth Memorial Prize was given to George Washington Freeman, Portland, special student in agriculture.

In the Sophomore class, the award for highest standing in scholarship and deportment was assigned to James Mayberry Kimball, Bangor, whose rank was 90.7 on the scale of 100; in the Freshman class, Albion Moulton, Hiram, whose rank was 96.2, received the award.

In the former class, Edward Henry Cowan, Orono, with a rank of 89.7 and George Harry Hall, Bangor, with a rank of 88.3, received honorable mention, which was also given in the latter class, to Earl Clinton Merrill, East Eddington, and Charles Dura Thomas, Brownville, whose respective ranks were 95.6 and 92.3.

The following lists indicate the assignment of degrees and the subjects of essays presented.

BACHELOR'S DEGREE.

Degree of Bachelor of Science—Course in Chemistry.

Charles Maurice Randlette, Richmond,
Manufacture of Pulp from Wood.

Degree of Bachelor of Civil Engineering.

William Hacker Atkinson, Brunswick,
Sanitary Protection.

William Rowe Butterfield, Milford,
Ballot Reform as an Educator.

Ernest Wilbur Danforth, Brunswick,
The Political Question.

Herbert Edward Doolittle, Northfield, Massachusetts,
Bridge Building.

Arthur Curtis Grover, West Bethel,
A Railroad Project.

George Maguire, Biddeford,
Our Roads.

Stanley Milton Timberlake, North Turner,
The Effect of Speculation.

Frank Stevens Tolman, Milo,
The Fundamental Law.

Joseph Albert Tyler, Farmington,
Our System of Taxation.

Degree of Bachelor of Mechanical Engineering.

George Frederick Atherton, Bethel,
Free Coinage of Silver.
Mortimer Lucius Bristol, Canton Center, Conn.,
The Licensing of Engineers.
Roscoe Conkling Clark, Bethel,
A Comparison of Two Systems of Education.
Mellen Edward Farrington, Brewer,
Discrimination in Railway Rates.
Robert Heywood Fernald, Orono,
Aerial Navigation.
John Clinton Gibbs, South Turner,
Profit Sharing.
Warren Evans Healey, Rockland,
Our National Defences.
William Cross Holden, South Windham,
Forest Economics.

The degree of Bachelor of Civil Engineering, out of course, was conferred upon George Irving Bowden, class of 1890.

MASTER'S DEGREE.

Master of Science.

William Jerome Hancock, Yellow Springs, Ohio,
Preparation of Microscopic Slides.
Thomas George Lord, Skowhegan,
Comparative Profits of Growing Sweet Corn and Field Corn.
Bertrand Elmer Clark, Bar Harbor,
The Establishment of Ways and the Rights of the Public and of Adjacent Owners in Respect Thereto.
Jere Sweetsir Ferguson, New York City, N. Y.,
Keystone Embalming Fluid.

Civil Engineer.

Charles Fremont Sturtevant, Bushnell, Illinois,
The Water Works of Brookfield, Missouri.

The Degree of Master of Science was also conferred upon Lewis Carver Southard, a non-graduate, class of 1875.

STATISTICS OF GRADUATES AND NON-GRADUATES.

The number of graduates of the college is 367, of whom 348 are now living. The number of non-graduates or of those who have pursued partial courses of study is 346, of whom 314 are now living. The total number, therefore, of those who have enjoyed the advantages offered by the college, not including the present undergraduates, is 713.

Of the 314 living non-graduates, nearly all are engaged in honorable and gainful callings, many of them holding positions of large responsibility for which their mental training at this college has been the principal preparation.

The occupations of the 348 living graduates are shown in the following table of grouped employments.

AGRICULTURE AND ALLIED INDUSTRIES.

Farmers	17
Professors of Agriculture	2
Directors of Agricultural Experiment Stations	2
Chemists to Agricultural Experiment Stations	5
Veterinary Surgeons	3
Nurserymen	2
Florist	1
Assistant U. S. Bureau of Animal Industry	1
Editor of Agricultural paper	1
Total	34

CIVIL ENGINEERING AND ALLIED INDUSTRIES.

Civil Engineers	72
Professor Civil Engineering	1
Instructor Civil Engineering	1
Total	74

MECHANICAL ENGINEERING AND ALLIED INDUSTRIES.

Mechanical Engineers	26
Draughtsmen	18
Manufacturers	16
Architects	3
Professor Mechanical Engineering	1
Instructors Mechanical Shop	4
Mining Engineers	2
Total	70

EDUCATIONAL AND LITERARY WORK.

Teachers	22
Professors and Instructors in Colleges not included above	8
Superintendents of Schools	2
Journalists	8
Total	40

PROFESSIONS.

Lawyers	17
Physicians	10
Clergymen	3
Total	30

BUSINESS.

Merchants	13
Clerks	6
Traveling Salesmen	2
Bankers	3
Real Estate Agents	2
Insurance Agents	2
Total	28
Miscellaneous employments	72

It thus appears that of the 348 living graduates, 10 per cent are engaged in agriculture and allied industries, 21 per cent in civil engineering, 20 per cent in mechanical engineering, 11 per cent in educational and literary work, 9 per cent in professions, 8 per cent in business and the remaining 21 per cent, mostly recent graduates, in miscellaneous pursuits.

DAIRY SCHOOL.

In the spring term 1892, a successful session of the Dairy school was held. Although the attendance was not large, enough was accomplished to inspire confidence in its adaptedness to do an important work for the State.

With the extension of the system of butter factories, and with the largely increased demand for dairy products of first quality, it can hardly prove otherwise than that a school in which the most approved modern methods are adopted and practically taught, shall render to the dairy interests of the State, a service of the highest value. A demand clearly exists for young men trained in such a school and in such methods.

EXPERIMENT STATION.

The investigations, experiments and reports of the Maine Experiment Station are made directly in the interest of cultivators of the soil either as general farmers or cultivators of special crops. The analysis of fertilizers from which their value is determined, has hitherto been at the expense of the station or in other words at the expense of the appropriation yearly made by the United States government for specific purposes. It appears from reports of other stations that in respect to the analysis of fertilizers the Maine Station is an exception to a general rule. In other states, provision is made for such analysis without draft upon the government appropriation.

I submit that in this matter Maine ought not longer to constitute an exception among the states, but that such legislation should be secured as will save this draft upon funds which should be otherwise appropriated.

NUMBER OF CATALOGUES INADEQUATE.

The State now prints 1000 catalogues of the college for distribution. The demand is largely in excess of the supply and is constantly increasing.

I desire to suggest that the resolve under which the catalogues are now printed be so amended as to read 2500 instead of 1000.

COLUMBIAN EXPOSITION.

An event of so great moment as that which is to be celebrated in Chicago in 1893 challenges the attention not only of individuals but of institutions. An effort is making to secure fit representation of the State Colleges of Agriculture and the Mechanic Arts in this Exposition.

In accordance therewith, a plan for an exhibit by this college has been carefully made and the work of preparation is now in progress by the several departments.

GIFT OF GILBERT LONGFELLOW, ESQ. OF MACHIAS.

To the department of Natural History, Gilbert Longfellow, Esq., of Machias, has made a very attractive contribution, of which a fuller report will be given by Prof. Harvey.

It is sufficient here to say that the gift is in memory of his two sons, Henry W. and Gilbert, Jr., who were students in the college some ten or twelve years ago.

By the mates of the young men, now deceased, and by their instructors who cherish pleasant remembrances of them, the gift will be especially appreciated. To the young men themselves, it will be a permanent memorial.

SUNDRY TOPICS.

The drill of the Freshman class in gymnastic exercises has been a noteworthy feature of the present term. Some of its advantages will appear in a report to be presented by Lieut. Hersey.

The encampment of the Coburn Cadets for a week at Castine was an event highly appreciated by those who participated in it and of value by way of furnishing opportunity for military instruction such as the ordinary drill can hardly afford.

Field Day (June 15, 1892) served to bring 1200 visitors to the college, whom it was a pleasure to welcome. They manifested very great interest in all departments of the insti-

tution and returned to their homes with a most cordial appreciation of the college from their brief but pleasant acquaintance with it. The fact should be fully understood that visitors are always welcome, and that they will find much that is attractive in what is daily open to their inspection on the campus.

ESTIMATES OR NEEDS.

In Wingate Hall the State has secured a building very perfectly constructed and admirable in its adaptation to the purposes to which it is devoted. For furnishing it and supplying needed drawing tables and other furnishings necessary in Coburn Hall also, aid is asked of the State.

An embankment for target practice in the military department should be made next summer or before the next period for such practice arrives. Without such an embankment, the risk to human life is too great to be longer taken. Only a year ago, one man unknowingly on the range had his hat shot through but fortunately escaped serious injury. Notices of danger are posted but they do not prevent the danger which an embankment only can avert.

Good progress has been made in the past two years, in the improvement of the campus. Much yet remains to do.

For several departments various actual needs exist which cannot be met by the resources of the college. They are indicated in the summary below.

SUMMARY.

Furnishings for Wingate Hall, including cases, desks, chairs, drawing tables, &c.	$2,500 00
Embankment for target practice, military department	600 00
Improvement of campus	2,500 00
Potting and storage room for forcing house	500 00
For agricultural department, painting of buildings, a silo, new floors in stable, &c.	600 00
Apparatus for dairy house	150 00

Apparatus for department of mechanical engineering, lathes, &c	$1,750 00
Apparatus for department of civil engineering, testing machine and hydraulic apparatus	1,300 00
Apparatus for department of Natural History	1,500 00
Apparatus for department of Chemistry	600 00
Total	$12,000 00

In addition to the foregoing which relates to immediate needs, I desire to ask for the supplying of a want long felt in the military department of the institution. The United States government furnishing the original endowment of the college requires instruction in military science.

Complaint has been made for several years by the government inspecting officer, because the State has provided no armory or drill hall for this department. From the last report of Col. R. B. Hughes, Inspector General, the following extract is taken.

"The great need of this institution is a good gymnasium and armory. The room now used as an armory is simply a storehouse for the arms and ammunition, and does not afford any space for physical culture or military drill. A deformed body is apt to contain an unbalanced mind. The development of the physical man is one of the features of the military department, and, with a gymnasium and armory, this part of the practical work of the military department could be very readily accomplished during the winter season when the inclemency of the weather will not admit of outside exercises. The work about the college evidences the fact that the students of the mechanical department would be fully competent to supply the equipment for a gymnasium from their own shops. The gymnasium at the Michigan Agricultural College was furnished by the students in this way, and the equipment was excellent. The military professor is alive to the fact that good physique is necessary for good military training and he hopes to be able to secure a suitable building in the near future."

I respectfully urge the securing of an appropriation that shall give to the college an armory and gymnasium first-class in all its appointments.

CONCLUSION.

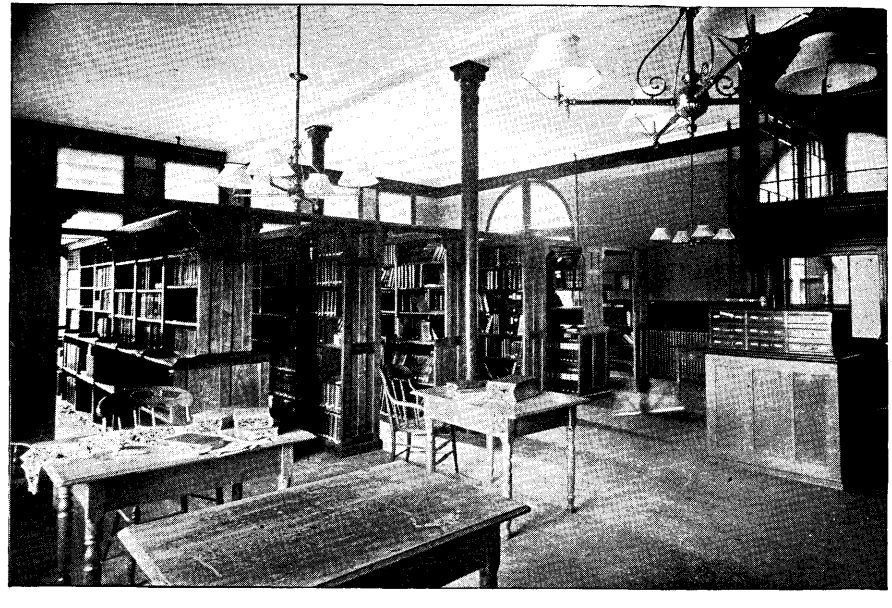
It should be stated that in the development which the college is now undergoing so satisfactorily and successfully, the effort has been to make strong the existing departments rather than to create new ones. I believe the policy to be a wise one. When, however, the financial condition of the college shall justify the addition of courses in electrical engineering and architecture, it will be found that they will also be in accord with an increasing demand and with an industrial development surely and steadily going forward in the State.

For specific information relative to the farm and all departments of the college, reference is made to the accompanying reports.

I desire to commend their suggestions together with those of this report to your consideration and the recommendations pertaining to an increased number of catalogues and to a modification of law relating to the analysis of fertilizers by the experiment station, and all the recommendations pertaining to wants or needs of the college to the consideration and favorable action of the Legislature.

Respectfully submitted,

M. C. FERNALD, *President.*



LIBRARY.

Librarian's Report.

President M. C. Fernald:

Since the last report was written, 668 volumes have been added to the library, divided as follows:

General works, 34; Philosophy and Religion, 3; Sociology, 43; Public documents, 97; Language, 34; General science, 10; Mathematics, 13; Astronomy, 22; Physics, 27; Chemistry, 14; Geology, 7; Biology, 2; Botany, 12; Zoology, 10; Useful arts, general, 17; Medicine, 2; Engineering, 45; Agriculture, 185; Fine arts, 8; Literature, 57; Travel, 5; Biography, 2; History, 19.

These additions have been made as follows: By purchase 263, by binding 207, by exchanges 56, by gift 142.

The number of volumes in the general library is now 7,006. The Experiment Station library, which is kept in the same room, contains 519 volumes, making in all 7,525 volumes to which the students have access. There are at present about 1,600 pamphlets in the library.

The use made of the library is gradually increasing. This year forty per cent more volumes have been drawn than during the same length of time last year.

I wish to urge the importance of making as liberal an appropriation as possible for the library. It needs much strengthening in all departments. As the use made of it increases, its resources need to be increased, and increased facilities will increase its use. The time seems to have come when it is desirable that at least 1,000 volumes a year should be added to the library to keep pace with the development of the college in other directions.

Respectfully submitted,

HARRIET CONVERSE FERNALD, *Librarian.*

Department of Agriculture.

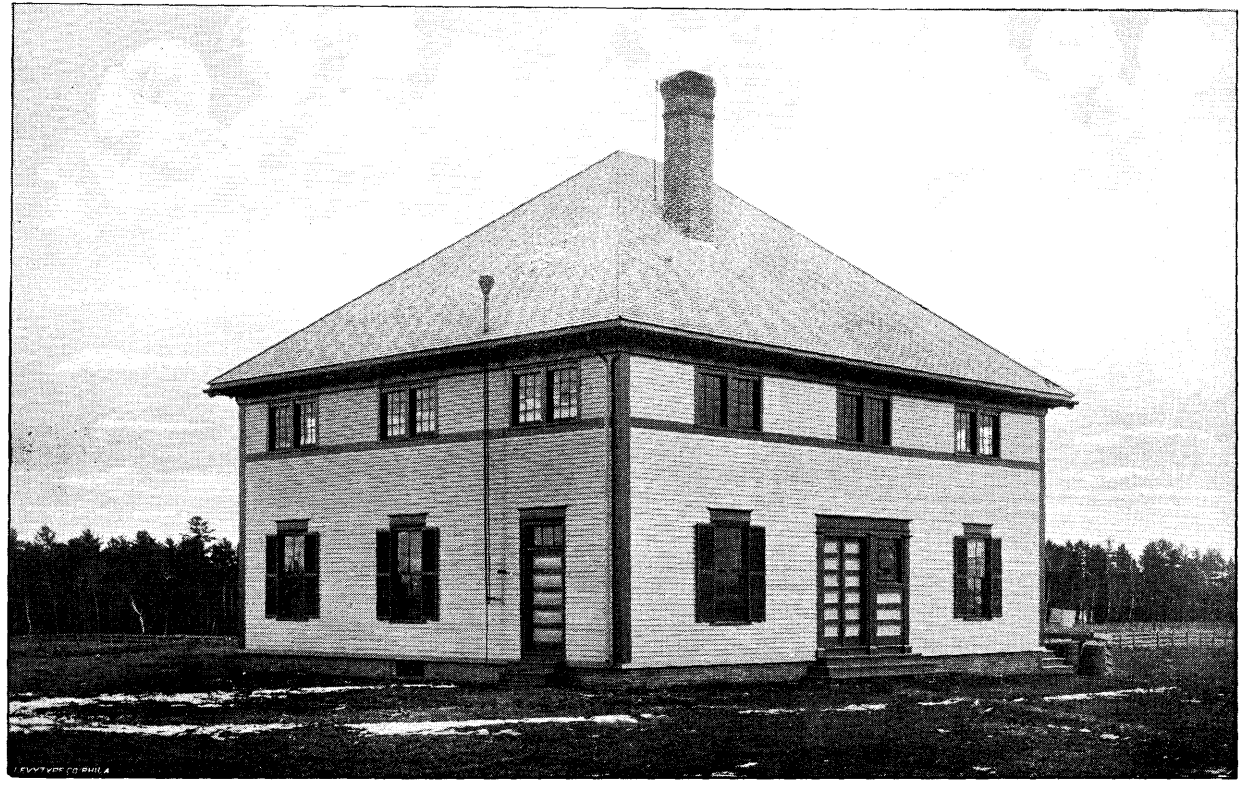
President M. C. Fernald:

In several of the reports from this department, attention has been called to the advantages possessed by many sections of Maine for market gardening and fruit culture. Occasion has been taken to urge the college authorities to provide for a thorough scientific and practical course of instruction in horticulture with a view to a fuller development of the resources of the State in this direction. Two years ago the trustees of the college made provision for the founding of a horticultural department at the college. A professor of horticulture has been appointed, forcing houses and laboratories have been constructed, orchards planted and gardens established. The college is now possessed of facilities for instruction and experimentation in horticulture which are equaled by few institutions in the United States.

In previous reports it has also been urged that steps be taken towards more thorough and systematic instruction in dairying. Last year provision was made for the erection and equipping of a dairy building, for school purposes, which was finished in the fall in season for the practical work in dairying of the students in the regular course in agriculture.

This building is forty-two feet by fifty feet and two stories high, and contains on the first floor a boiler and engine room, a creamery room, and two commodious rooms in which instruction is given in the practical manufacture of butter and cheese.

On the second floor are an office, laboratory, lecture room and cheese-curing room. This building is supplied with a Sharples Russian Steam Separator, a De Leval Hand Sep-



DAIRY HOUSE.

arator, a United States Butter Extractor, creamers, churns, butter workers, cream vats, cheese vats, cheese presses, milk testing apparatus and all appliances necessary for teaching the most approved methods of butter and cheese making.

A capable instructor has been appointed in dairy husbandry and animal industry in the person of Mr. G. M. Gowell, who also superintends the college farm.

Thus it is seen that substantial progress has been made in the development of the agricultural department.

Earnest efforts have been made on the part of the college authorities to increase the usefulness of the institution to the practical farmer.

Two years ago, two short intensely practical courses in agriculture were established, one covering a year's work and the other two years, for the benefit of those who desire to gain a better knowledge of the scientific principles underlying the business of farming, and are unable to devote to the purpose the time and money necessary for a full college course.

Later, still, the school of dairy husbandry was established for special dairy instruction.

The full course of this school covers two terms of winter lectures with practical dairy work.

These short courses are open to all persons of good moral character above fifteen years of age. No entrance examination is required. A certificate will be given to all who pass satisfactory examinations in the studies taken up, except in the dairy course in which, in addition to passing the examinations, one season of successful work in a butter or cheese factory is required for a certificate.

These courses have been widely advertised but the one and two year courses evidently have not met a popular want, as there have been no applications for admission to them. The school of dairy husbandry has, however, been more successful. Four students have completed the first term with profit to themselves and satisfaction to their instructors.

It is believed that the reason why this course has been more successful than the other short courses lies in the fact that the sessions are held at a season when the work of the farm is least pressing.

The idea has suggested itself that a course of lectures on general agriculture held during the winter months would also meet with public favor and in a few years be largely attended by a class of farmers who earnestly desire to avail themselves of such information as will enable them to carry on their work more successfully. I therefore recommend that such a course of lectures be established at the college beginning on February 7, 1893, and continuing for ten weeks.

In consideration of the fact that sheep husbandry is one of the most profitable stock industries of the State, your attention is called to the desirability of having representatives of the leading breeds of mutton and wool sheep on the college farm for purposes of illustrating their characteristics to agricultural students.

A sheep barn should be provided not only with a view to future needs as indicated above, but to comfortably house our present small flock of Shropshires.

A silo for storing succulent fodder for winter feeding to our dairy stock is much needed and it is hoped that before another season passes one will be provided.

A new floor should be laid in the cow stable, also one in the horse stable and the stalls rearranged and rebuilt.

All of the farm buildings should be repainted. The inside wood work of the dairy building should be filled and the walls painted at an early date.

In order to control the temperature within the dairy building during the winter months outside windows will be necessary.

A power butter worker and another power churn should be provided before the opening of the next term of the dairy school in February.

The agricultural department has been presented with the farm implements named in the list below.

Clark's Cutaway Harrow, manufactured by Higganum Manufacturing Company.

Aspinwall Potato Planter with Fertilizer and Corn Planter attachments, manufactured by the Aspinwall Manufacturing Company, Three Rivers, Michigan.

King of the Corn Field Corn Planter, manufactured by Whitman Agricultural Works, Auburn, Maine.

Breed's Weeder, manufactured by the Universal Weeder Company, North Weirs, New Hampshire.

Keystone Hay-loader, manufactured by the Keystone Manufacturing Company of Sterling, Ill.

These implements were solicited of the manufacturers by the department in order to be able to show to students the working of a larger number and wider range of implements than are necessary for carrying on the work of the college farm.

The placing of these implements at the disposal of the department by the manufacturers has been of mutual advantage. The college has the use of the implements for purposes of instruction, while the manufacturers have the attention of hundreds of visiting farmers called to them.

A farmers' field day meeting was held at the college last June at which the above-mentioned tools were shown in actual work together with others previously acquired by gift and purchase. Over a thousand people were present on that occasion, and great interest was shown in the work of each and every tool or machine placed on trial.

The stock on the college farm kept for illustration, experimentation and other purposes, numbers eighty-two animals as follows:

CATTLE.

11 Jersey cows.
4 Jersey heifers, two years old.
4 Jersey heifers, one year old.
3 Jersey heifers, calves.
1 Jersey bull, calf.
3 Guernsey cows.
1 Holstein cow.

1 Holstein heifer, one year old.
1 Holstein bull.
2 Ayrshire cows.
1 Ayrshire heifer calf.
2 Grade Holstein cows.
8 Grade Jersey cows.
1 Grade Jersey heifer, two years old.
2 Grade heifer calves.

HORSES.

3 work horses.
1 2 year old grade Percheron filly.
1 1 year old grade Percheron filly.

SHEEP.

7 Shropshire ewes.
4 Grade wethers.

SWINE.

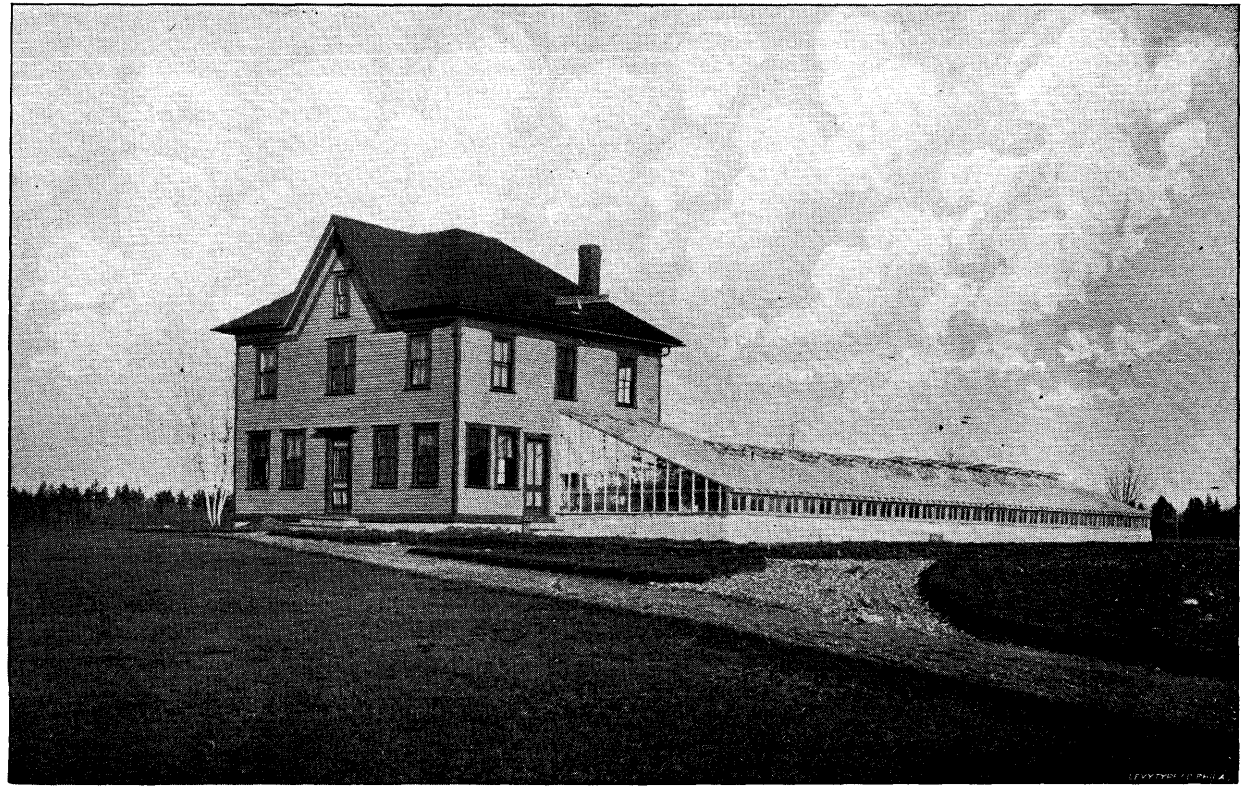
4 Berkshire sows.
1 Tamworth sow.

BOAR.

3 Tamworths, 8 months.
3 Berkshires, 8 months.
3 Berkshire Tamworths, 8 months.
3 Tamworth pigs, 2 months.
2 Berkshire Tamworth pigs, 2 months.

Respectfully submitted,

WALTER BALENTINE.



HORTICULTURAL BUILDING.

Department of Horticulture.

President M. C. Fernald:

SIR:—The work of the horticultural department for the past year has been conducted in accordance with the general plan indicated in my last report.

During the spring term I gave instruction to the juniors of the agricultural course, in landscape gardening and in the principles of horticulture—including discussions of the origin and distribution of plants, plant variation, and the methods and effects of crossing. Instruction was given by means of lectures and practical work in laboratory and forcing house.

I have had frequent inquiries as to the instruction given in floriculture. At the present time our facilities for practical illustration in this branch of horticulture are somewhat limited;—the forcing house being used largely in growing fruits and vegetables for experimental purposes. However, the general method of treating bulbous and some of the other more common plants for winter forcing can be shown; also the practical details of the care and management of greenhouses. Instruction is also given concerning the culture of the rose and other ornamentals for use on the lawn as well as in the house.

In accordance with the action of the trustees, a team has been secured for the use of the department. The arrangement is in every way satisfactory and in the end will prove cheaper than would the method followed last year. A wagon and other necessary tools have also been obtained, so that the department is now fairly equipped in this respect.

The work of improving the general condition of the campus has occupied a large part of our attention during the summer. By using our own team, the work has been accomplished much more cheaply than would otherwise have been possible, though results are necessarily delayed somewhat.

During the year a much needed system of under-drains has been put in around the forcing-house, and throughout the area between Coburn Hall and the president's house. The land thus drained is rendered suitable for a lawn, and has been plowed preparatory to seeding next spring.

The grading south of the chemical laboratory and around the building occupied by the Alpha Tau Omega fraternity, has been completed and those areas have been seeded. The area on the opposite side of the drive is also ready for seeding in the spring.

The most expensive operation of the season has been the grading about Wingate Hall. This building, located on the site of the one which was burned, was raised much higher than the old foundation—a condition which necessitated much filling. The work is now practically completed, and the area will make a very attractive stretch of lawn.

The main drive, from the entrance to Oak Hall, has been made wider and the curves have been altered somewhat, giving it, when completed, a more pleasing appearance. Both this drive, and the one in the rear of the buildings have been left in an unfinished condition this fall, with the idea of hauling on gravel as it is brought across the river in the winter.

Of the amount appropriated for the care and improvement of grounds, there remain unexpended about $100.

NEEDS OF THE DEPARTMENT.

One of the greatest needs of the department at the present time is a stable and a shed for tools, with which shall be combined a root cellar and a place for the storage of nursery stock. At the present time it is necessary to keep the team

in the experiment station barn, and part of the tools in a single section of the farm tool-house while others must go unhoused. The small tools are necessarily scattered, a portion of them being in the attic of the horticultural building, some in the small tool-room, and others with those of the farm in the farm building. In some of our experimental work it is necessary to preserve roots and tubers as well as nursery stock received in the fall. The only available place for this purpose at present, is the cellar of the farm house, where there are two furnaces, and which is used as a storage room by several other parties. I would therefore ask for funds sufficient to erect a building suitable for the needs of the department. I have had prepared a sketch of such a building and the estimated cost of the same, which are herewith presented for consideration.

Another serious need of the department is a general work and storage room, including a coal-shed, in connection with the forcing house. At present it is necessary to store the pots in the room used for a laboratory, while only a small quantity of soil can be secured under cover. Coal for the furnace is also exposed to the weather or covered by rough boards, and the building necessarily presents an untidy appearance. With the material already on hand, $500 would erect a building suitable for the purpose.

There is no question as to the desirability of making more extended improvements in the condition of the campus. I fully appreciate the liberality already shown in providing means for carrying out this work, and I trust the results obtained with the money already expended shall not prove disappointing. That there may be a definite end in view, I have prepared a sketch of the changes which seem to me desirable in the general arrangement of the grounds, and present the same for consideration at this time. Some of the changes there indicated will be somewhat expensive, but none of them will entail so much labor as was required about Wingate Hall.

My assistant, L. B. Plummer, resigned August 1st, to complete his studies at the Michigan Agricultural College. His place as foreman of the grounds is now filled by D. W. Trine, B. S., a graduate of the same college; while H. P. Gould, a senior in the course in agriculture at this college, assists in the experimental work.

I desire to express my appreciation of the cordial support received from yourself and other members of the faculty during the year.

Respectfully submitted,

W. M. MUNSON,

Professor of Horticulture.

Department of Natural History.

President M. C. Fernald:

DEAR SIR:—I have the honor to submit the following report of the department of natural history for the two years ending December, 1892.

CLASS WORK.

Since my last report the courses of study have been recast. This has made notable changes in the arrangement and extent of work in this department. Before the changes no natural history studies occurred in the last term of the sophomore year and the first term of the junior year. During this long interval students lost interest in natural history work. This defect has been partly remedied by beginning invertebrate zoology the first term of the junior year. In the second term of the junior year formerly an hour in recitation was assigned to entomology and zoology each and there was no afternoon laboratory practice. In the new arrangement only one recitation period is occupied and four hours' afternoon laboratory practice has been substituted for the other, an arrangement much more satisfactory. The senior course in vertebrate zoology has been extended by the addition of four hours' afternoon laboratory practice per week. Mineralogy has been transferred to the department of chemistry where it belongs, to relieve the natural history department, we supposed, but in its place freehand drawing, a study more foreign and which takes more time, has been assigned. The professor of natural history is required to give one-third of his time to experiment station duties, while two-thirds of the

time of his assistant is required to do the necessary museum and herbarium work. It is but justice to the department to state, that it is not on the same basis as the other departments that have the full time of a chief and assistant for recitation and laboratory work, for deducting the time devoted to museum and herbarum work and station duties, even with the greatly increased responsibilities, the department has practically the full time of only one man. This statement is made because the exact duties of the department have apparently not been understood. The freshman work in botany and physiology has been successfully done by Mr. Briggs.

MUSEUM AND HERBARIUM WORK.

The museum is growing rapidly and with its growth come largely increased responsibilities in the elaboration, arrangement and care of collections. During the last two years many hundred specimens have been added to the museum and herbarium. All the specimens donated, collected or purchased have to be elaborated, labeled, registered and put in their places in the collections. This requires considerable time and it is necessary to keep the collections well worked up so as to have the material for study and illustration. There is still enough work on the Blake Herbarium to keep one man busy for a long time. This museum and herbarium work is *entirely* outside of recitations and laboratory practice and is really not department work. To keep the current work done requires fully two-thirds of Mr. Briggs' time besides, the professor supervises the work, attends to correspondence, and does considerable museum and herbarium labor. The department demands for its best interests the full time of a professor and an assistant for recitation and laboratory practice alone, and an assistant to do the mechanical work pertaining to the museum and herbarium. Attention is respectfully called to these needs.

ORIGINAL WORK.

The original work of the department is necessarily limited, as the routine work requires most of the time. What is done is undertaken during vacations and out of college hours. It has been along the line of elaboration of natural history material collected in the State.

During the last two years special study has been made of slime mold and fresh water Algæ among plants and several species new to science have been discovered. In the former group the type of a new family was detected. Several plants new to the State have been found. Among animals, special study has been made of *Thysanonians* and several new species discovered and some described. Odonata have also been studied, and over fifty species detected about Orono. An article enumerating the Pyrenomycetes of Maine has been prepared and also a list of Maine plants collected by the chief of the department and his assistant mostly during vacation. Some of these will be presented for publication as a bulletin.

ACCESSIONS.

The collections have been greatly increased during the last two years by purchase, by donations and by exchange.

We would respectfully solicit donations of natural history, mineral or geological specimens for the collections, assuring those who send desirable material that it will be properly placed on exhibition, and full credit given on the labels and in the registers. If requested a special case or space will be assigned to collections of sufficient pretentions.

MINERALS.

The college has received from the National Museum, through the kindness of the curator in lithology, Mr. G. P. Merrill, a very large and fine collection of economic minerals and their products. This collection is on exhibition in a special case. A few specimens have been donated by several others.

PLANTS.

Since my last report there have been purchased the current centuries of Ellis and Everhard's N. A. Fungi; Underwood's Hepaticæ; Underwood and Cook's Illustrative Fungi and Seymour and Cumming's N. A. Lichenes.

The Blake herbarium and the college herbarium have been increased by exchange.

Plants have been donated as follows:

Specimens of plants and fruits from the West Indies, F. T. Dow; plant from California, O. W. Knight; a collection of ferns, L. W. Merrill; specimens from the Department of Agriculture, Washington, D. C., and a large number of species of plants collected by the department during the past season along the coast of Maine, upon Mt. Katahdin and in the vicinity of Orono.

ANIMALS.

Animals, fishes and reptiles from the West Indies have been given by F. T. Dow; a collection of shells, minerals, &c., by Mrs. E. R. Wingate, Bangor, Maine; a collection of shells, fossils, sponges, minerals, &c., by Mr. F. P. Wood, Bangor, Maine; a collection of mammals, birds, shells, curios, &c, (a memorial for his two sons formerly college students now deceased) by Gilbert Longfellow, Machias, Maine; a collection of marine animals (about 100 species) collected by the department last summer, a set of larvæ eggs and imagos of gypsy moth, by F. L. Moulton, Malden, Massachusetts; a collection of land shells (helices) by George P. Merrill, Washington, D. C., and various specimens by students and others.

Besides the above donations quite a large number of birds and animals of Maine have been purchased and are in the museum or will be by the close of the year.

APPARATUS.

To the equipments of the department have been added a human manikin; also Auzoux models of a leach, reptile, fish,

enlarged human brain and larynx. There have been added to the museum furniture seven large cases and a commodious stack of drawers. The recitation and laboratory rooms have also been further fitted with storage drawers and cases. Three new Leist microscopes were imported last year and have much increased to the laboratory's facilities. Numerous smaller pieces of apparatus have been added, also quite a number of laboratory books. To the library has been added with others, Saccord's Sylloge Fungorum, a comprehensive work on fungi.

NEEDS OF THE DEPARTMENT.

Human Physiology—The manikin purchased since my last report has added much to the facilities for teaching this subject as well as general zoology, but there are still needed models and charts of special and minute parts, and microscopic slides showing the histology. For these we ask $100.

Phenogamic Botany—There is always needed a supply of genus, mounting and drying papers, labels, etc. Botany is necessarily begun in our climate long before plants can be had for illustration, therefore models, charts and prepared illustrative material become more necessary. Models and charts showing the structure of the prominent families are great aids and necessary to a high order of instruction. For the above we ask $100.

Cryptogamic Botany—The study of lower plant life is difficult. The work is largely microscopical research. It is absolutely impossible to collect material as you need it, for the laboratory localities become exhausted, some forms are scarce, others out of season or not indigenous. Recourse must be had to models, charts, microscopic preparations, alcoholic and dried herbarium material. To purchase more of the above and preserving and collecting material we ask $100.

Accessions to Herbarium—There are several fascicles of cryptogamic and other plants issued annually that are necessary to keep up with botanical progress and are obtainable

only by purchase. These are noted elsewhere under the head of accessions to the herbarium. These will require for the two years, $100.

Laboratory Apparatus and Supplies—A work-table with several drawers for storing apparatus is much needed. The department needs in connection with others a first-class stereopticon. The college does not possess an instrument suitable to illustrate a public or class-room lecture. Such an instrument could be made very useful. The department of natural history could make such an instrument particularly useful. To apply to the above we ask $200.

Laboratory Books for All Branches—There are many reference and technical books needed for constant use in the laboratory for classifying objects and directing laboratory practice. These books should be department apparatus and not subject to library rules. To purchase a few of these we ask $200.

Type Writer—The department has many lists to make out in elaborating the collections and many labels to write. To save time and make lists and names *legible* the instrument is much needed. This will cost about $100.

For Explorations in Maine—The State College should take the lead in making known the natural history resources of the State. It is as cheap to collect material for laboratory use as to purchase it. By collecting the material used for illustration the teacher acquires a familiarity with it that aids him very much in instruction. The college that encourages original research on the part of its professors has a higher standing at home and abroad. For a teacher to be alive to his subject he must do original work. The live teacher stamps his pupils with the same spirit. The college that burdens its teachers with routine work so that they have no time or energy left to keep up with the thought of the day or by original work help mould it, will never take a high rank. The teachers of such institutions sink into ruts, become antiquated in methods and thought, drift into indifference and are never heard from, neither are their pupils. There is an

awakened interest in the botanical and zoological resources of Maine. Summer visitors at our watering places are really doing more than our State institutions in this work and they will take the credit. To defray the expenses of exploration for the next two years we ask $300.

Museum—The museum is a great attraction to visitors and a constant means of instruction to the student of all courses. For the past two years it has been largely visited by strangers and much frequented by students. The work of completing the collection of State animals should be continued and a number of exotic forms added for illustration. To continue the work that is begun to the best advantage would require for the next two years, $500.

Geology—This is an important subject and is taken by the entire senior class. It should be well illustrated as the time devoted to it is short and students of the engineering courses have no other natural science work after the freshman year. To begin an equipment of rocks, minerals, charts, models, maps, and fossils, we ask $200.

SUMMARY.

Human Physiology—model, charts etc	$100 00
Phœnogamic Botany—models, charts and supplies	100 00
Cryptogamic Botany—models, supplies and collecting material	100 00
Accessions to Herbarium—phenogamic and cryptogamic	100 00
Laboratory apparatus—table, stereopticon, microphoto apparatus	300 00
Laboratory books—for all departments	200 00
Typewriter—for department use	100 00
Botanical and zoological exploration in Maine	300 00
Museum—jars, alcohol, trays, labels and for the purchase of native and foreign specimens	500 00
Geology—maps, charts, casts, models and fossils	200 00
Total	$2000 00

Respectfully submitted,

FRANCIS L. HARVEY,

Professor of Natural History.

Department of Chemistry.

President M. C. Fernald:

The work of my department during the fall of 1890 and spring of 1891 was very similar to that pursued heretofore; owing to the fact that I had to do the work single-handed it was impossible to introduce many improvements.

The studies taken up in the fall of 1890 were general chemistry for the sophomores with laboratory exercises for a part of the class; advanced inorganic chemistry for the juniors taking the course in chemistry, and advanced organic chemistry for the senior chemical students. The junior and senior students of the agricultural and chemical courses performed quantitative determinations every afternoon in the laboratory.

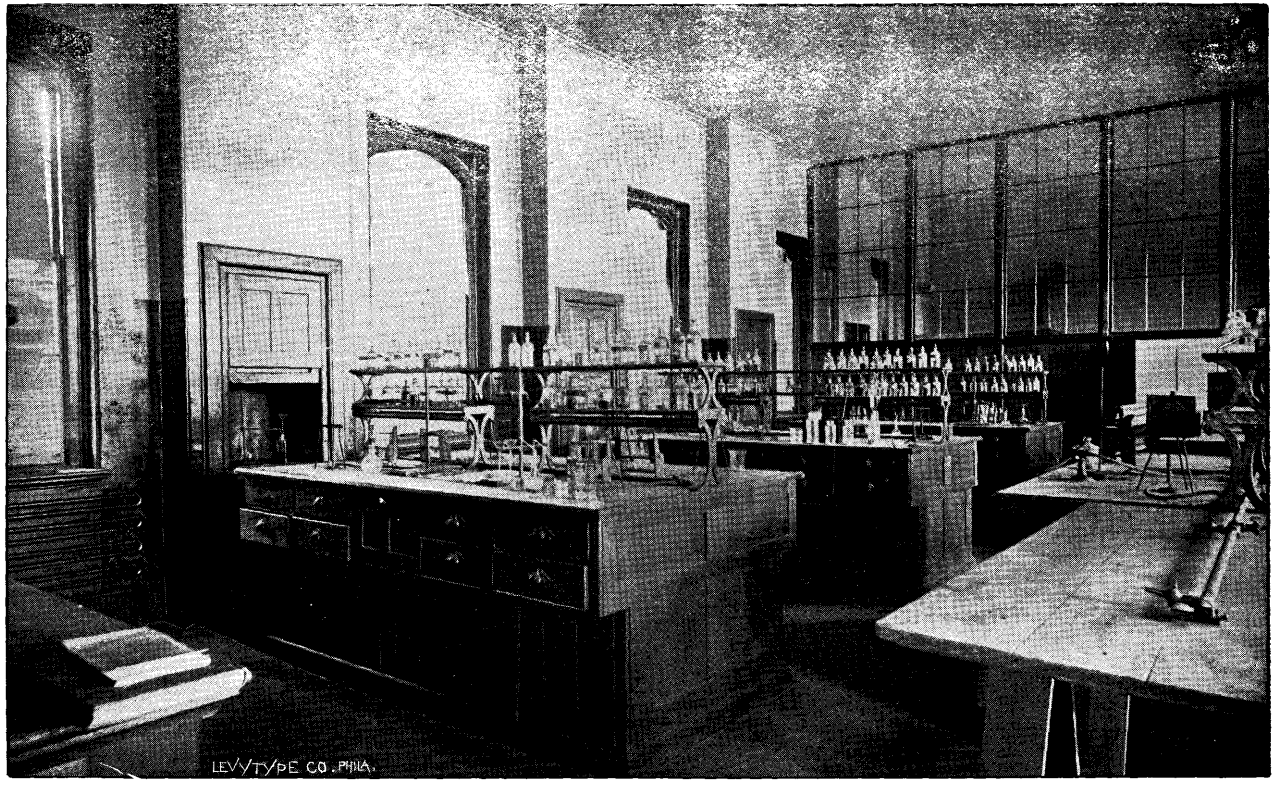
In the spring term (1891) the juniors continued the study of advanced inorganic chemistry and began that of organic chemistry. The seniors devoted two hours to advanced quantitative analysis every forenoon, while the sophomores of various courses took up qualitative analysis. The afternoons of this term were devoted by the juniors and seniors to quantitative estimations.

The following students having satisfactorily passed all examinations and presented proper theses, graduated at the commencement, June 24, 1891, each receiving the degree of Bachelor of Science:

Edmund Clark, thesis on "Aluminum and its Alloys and their Analysis."

Charles Clayton, thesis on "Full Analysis of the Mineral Contents of a Sample of Potable Water."

Cyrus Hamlin, thesis on "Analysis of Urine."



CHEMICAL LABORATORY.

Charles Herbert Kilbourne, thesis on "Solubility."

Fred Charles Moulton, thesis on "Separation of Tin from Antimony."

During the fall term of 1891 certain changes were made in the courses of study due to an increase in the number of the members of the faculty. These changes have, on the whole, proved beneficial, but I would draw attention to the fact that owing to the increasing specialization of scientific courses it would perhaps be well to arrange so that students in chemistry could devote more time to laboratory work.

The studies of the fall term, 1891, and spring of '92 have been essentially those of the corresponding terms of the year before. I have been ably seconded in my work by Mr. D. W. Colby, B. S., who entered upon his duties as assistant in the fall of 1891, and I wish to extend my thanks to him here for his valuable help. I have held the recitations of the sophomores in general chemistry and seniors in advanced organic chemistry and a short course in elementary metallurgy, while Mr. Colby has taken charge of the juniors in advanced inorganic chemistry. The exercises in qualitative and quantitative analysis have been attended to by us both.

At the commencement in June, 1892, the degree of bachelor of science was conferred upon Charles M. Randlette, who presented a thesis on Chemical Manufacture of Pulp. The degree of Master of Science was conferred upon Jere S. Ferguson, M. D., who presented a thesis on "Keystone embalming fluid, its analysis, with remarks and experimentation upon the separation of arsenic from mercury."

The liberal appropriation obtained from the national fund has helped us to make many much needed additions to our laboratory facilities, both as regards fine and expensive apparatus and special forms of glassware, etc. Our stock of chemicals has been greatly increased, so that we now have on hand an ample supply of nearly all substances used for practical laboratory work.

It is our intention to increase the number of analyses to be performed by students and to give them a certain latitude

of choice, so that one who intends to pursue a certain line of work after graduation, may, during his college course, fit himself most thoroughly in that particular branch. The preparation of organic compounds is a subject which will receive greater attention in the future; for that purpose we have imported a number of the simpler organic products with which to build up more complex compounds.

During the latter half of the spring term Mr. Colby had under his charge the senior class in mineralogy. The practical work was performed in the new mineralogical laboratory, which has proved, on the whole, well fitted for this kind of work.

A wall cabinet, a few cabinet specimens illustrating physical and other properties and some systematically selected material for laboratory determinations are imperatively needed; for this purpose, a small appropriation of not less than $75, will be necessary. A short course in photography has been undertaken by Mr. Colby. Two students took instruction in this branch during the fall of 1891 and by the end of this fall term eight more will have taken the course.

The amount of apparatus for this department is rather limited at present and an appropriation of at least $75 will be necessary if we are to give instruction to more than one student at a time. Among the most necessary pieces may be mentioned: a hand camera, a wide angle lens, a burnisher, a view camera for instruction purposes.

Besides the work of instruction in photography, Mr. Colby has made many photographs of college buildings and interiors which have been used in illustrating the catalogue and circular for general information.

Needs of the Department of Chemistry.—Below are given some of the most imperative needs, though not all, the department will, when these are furnished, offer still better facilities for laboratory work than it now does. I would draw attention to the fact that but little money has thus far been expended for lecture apparatus, most of the money being devoted to increasing laboratory facilities.

LIST OF NEEDS.

Fitting up room in basement for assay work.....	$100 00
Blast and suction apparatus for general laboratory..	150 00
Organic chemicals, specimens of elements, lecture charts.....	100 00
Fitting up spectroscope room, fume closet and drying oven	50 00
Special apparatus, chemicals and lecture apparatus.	150 00
Platinum ware (Gooch and fusion crucibles).....	50 00
Total for department of chemistry.....	600 00
For department of mineralogy.....	75 00
For department of photography.....	75 00
Total for the three departments.....	$750 00

Something should be done at an early date to improve the drainage of the cellar; it is now very defective and in protracted rainy weather parts of it are several inches under water. The heating of the rooms is also a subject which needs some consideration, as the amount of heat given off by the steam pipes is insufficient for the proper heating of the building. A little additional piping and a few radiators will remedy this defect, and make the various rooms comfortable in the coldest of weather.

With the increased facilities for practical work and larger number of instructors, this department offers superior advantages to young men who are preparing themselves to become druggists, physicians, pulp mill superintendents, teachers of chemistry or analytical chemists, and it is to be hoped that such will avail themselves of these advantages, which the State College so freely offers them.

Respectfully submitted,

A. B. AUBERT,

Professor of Chemistry.

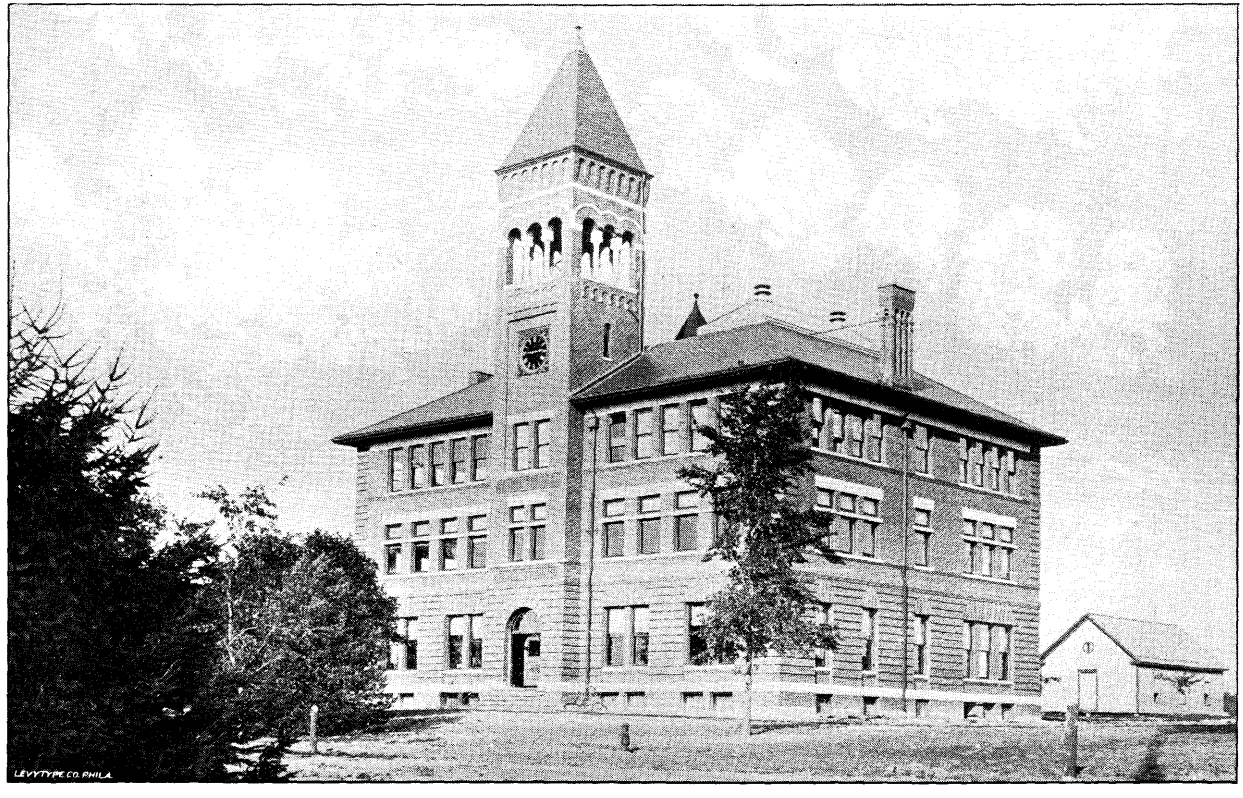
Department of Civil Engineering.

President M. C. Fernald:

The following report concerning the department of civil engineering is respectfully submitted.

The work done by this department is shown by the explanatory and tabular statements in the catalogue appended to this report. This, I think, has been accomplished by the graduates of the last class, in a more satisfactory manner than ever before, notwithstanding the fact that their work was very seriously interrupted during two years of their course, by want of accommodations caused by the burning of Wingate Hall. The assistance which I have received from Mr. Grover, has enabled me to give much more of my time to personal instruction in the higher grades of work done by the students in this course, in the senior year. It has also enabled us to do our field work in such a way, as to accomplish much more work in the same number of hours.

In railroad surveying, our practice necessarily extends over a strip of country at least three or four miles long; and when we undertook to do this work by working two hours each day, so much time was lost in getting out the apparatus, putting it back, and getting to the location, that the most satisfactory results were not secured. Taking a party out for work all day, enables us to secure very much better results. In the new building just erected for the departments of mechanical and civil engineering, we have one of the best drawing rooms to be found in the country, where there is ample room, light and good ventilation. These two improvements in the facilities for instruction and work are showing themselves to be of very great value to the course. The new building also furnishes a fine designing and work-



WINGATE HALL.

ing room for the students more advanced in the course, so that much better results, in the work of designing the various engineering structures, have been secured. There is one want in this kind of work which is a very great hinderance to us. On account of our location, we cannot readily visit and study any great engineering structures. Railroad bridges are about the only, first-class, engineering structures that we can readily visit here.

An annual trip with the senior class, for study, into the vicinity of engineering works of a more general character than are to be seen here, should be a requirement during the last year of the course. The fact also, that we are located so far from the meetings of the various engineering societies, and thus deprived of the benefit of the meetings and association with the engineers of the country, should be borne in mind by the trustees, and some provision for the instructors to attend such meetings should be made, for in no other way can we keep in touch with the times.

The construction of the engineering building has supplied the want of accommodations so long felt by this department, but the funds were not sufficient to furnish the building in a way to make it most useful. The furnishing should be completed at once.

There are some pieces of apparatus of which we feel the need very much. It is of no use to try to study the strength and other properties of iron, without the use of a testing machine of some kind, with which a bar of iron, one inch in diameter, can be placed and its behavior under stress noted by the student. We have long felt the need of such an instrument here, but as it is quite expensive, have been obliged to get along without it as best we could.

Such a machine set up and ready for use would cost $1000. It is a great defect in our course to be without it, and I trust you will find means with which to provide it. For the successful study of hydraulics, we need several pieces of apparatus most of which we could construct ourselves if the means were at hand. $300 would suffice for this purpose.

Twelve new drawing tables will be needed for the designing room, which will cost ten dollars apiece. These will have to be provided before next term, as the increase in our numbers is such as to demand them.

Nineteen drawing tables for the general drawing room will also have to be provided before next term, for the same reason, at a cost of seven dollars each.

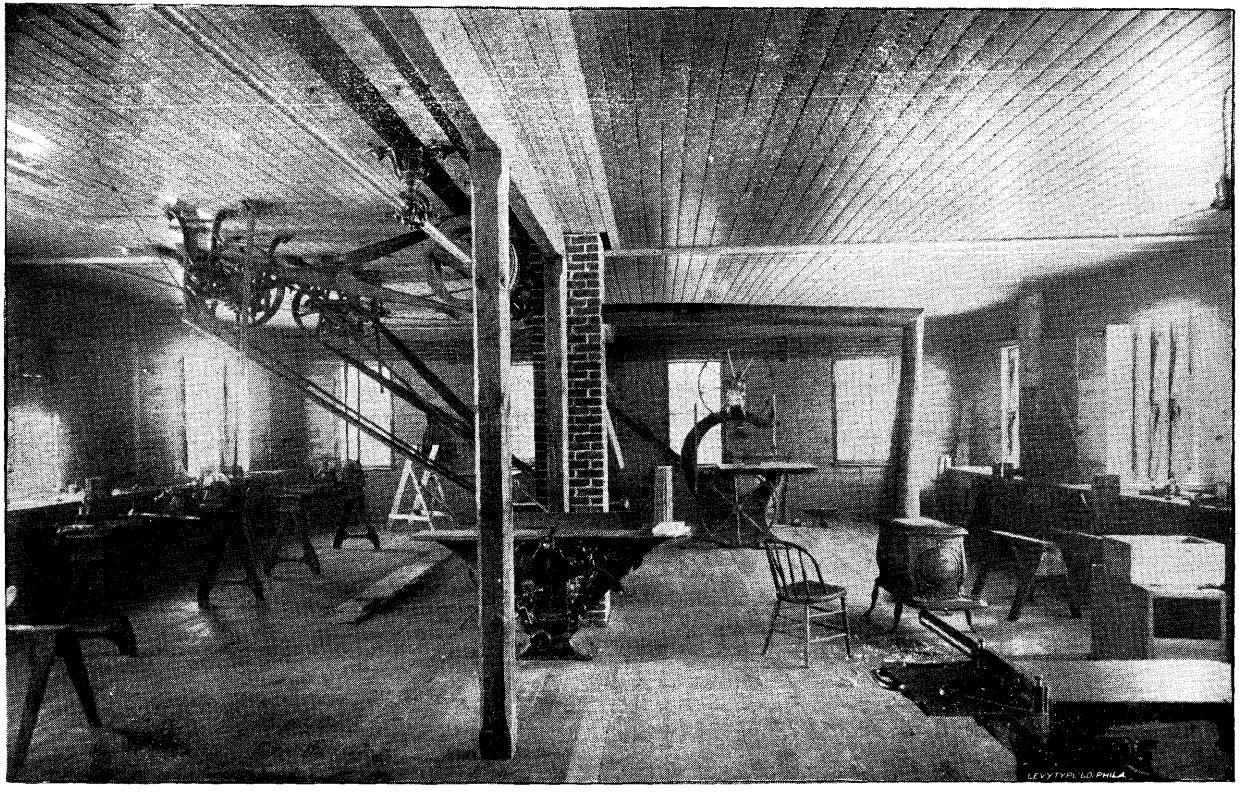
The principles underlying the construction of country roads have been taught the students in this course for several years, but we have no apparatus specially adapted to such instruction. There is to be a great demand for engineers who understand these principles, and who can apply them in a practical way, in this country, in the near future, and it is the right time now to anticipate this want, and provide facilities for the very best instruction in this important branch of engineering.

There are certain problems concerning the construction and maintenance of roads, which we can solve by reference to European practice, but there are certain others which are peculiar to this country, and in fact, to this State, which will have to be solved independently of European experience. This work should be undertaken at once at the State College. A representative from this department should be at the fair at Chicago a sufficient length of time to enable him to acquire full knowledge of the fine exhibit there, relating to construction of country roads. For this work an appropriation of $500 at least should be made

The subject of sanitary engineering is one of great importance, and one which has long been taught here, but we need special apparatus to render the subject interesting and the instruction the most valuable. An appropriation of $400 for this department of study could be judiciously expended and I hope some provision will be made for it.

GEO. H. HAMLIN,

Professor of Civil Engineering.



WOOD-WORKING ROOM.

Department of Mechanical Engineering.

President M. C. Fernald:

As will be seen by the catalogue, quite a number of changes have been made in this department. The recitation and drawing rooms are now pleasantly located and amply accommodated in Wingate Hall, thereby giving the shop work a little more room. The drawing and designing rooms in this building each need a case in which to keep drawings.

A small addition has been built to the shop and equipped as a foundry with cupola, flasks, moulder's tools, etc. The firm of Ward and O'Leary of the Old Town foundry have been employed to give instruction in moulding and casting. They have shown themselves fully competent by the proficiency gained by the boys. Quite an amount of casting has been successfully accomplished. The students have designed and made the working drawings for a speed lathe, have nearly completed the patterns, and some of the castings have been made. This lathe when completed will be used in the shop.

A systematic course of machine work on iron is now in full operation and the students take great interest in it. In order to give instruction to the increased number of students it will be necessary to further equip the shop with four lathes and one planer; even then the class will have to work in two divisions which is very inconvenient. Since Wingate Hall was built, the entire upper story of the shop has been used for carpenter work and wood-working machinery. The shop is now fairly equipped for pattern making. Before another year it will be necessary to furnish six more carpen-

ter benches in order to provide for the class that has entered this year.

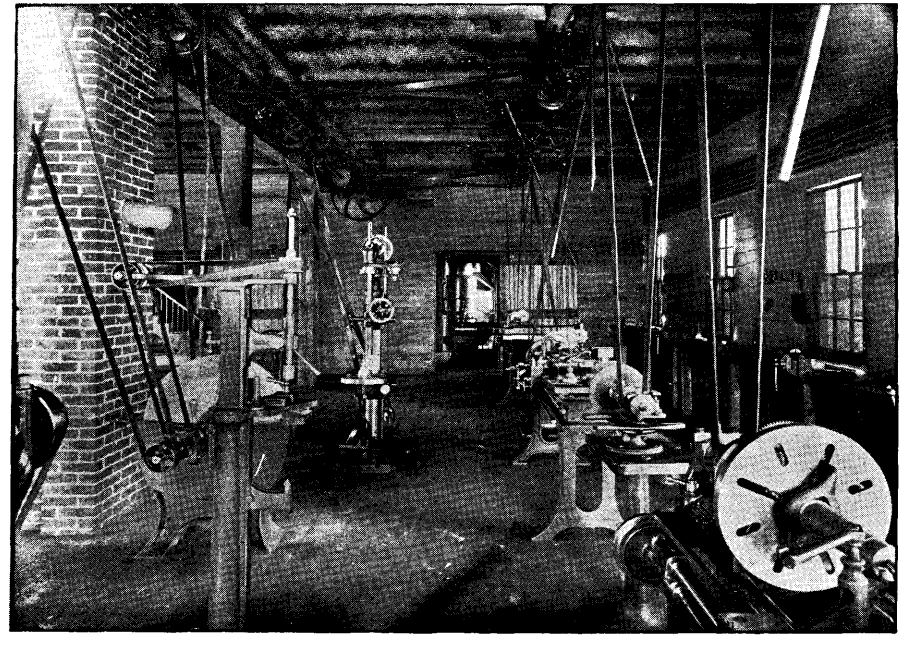
The cost of apparatus asked for is $1750.

The steam boilers connected with the college were placed in my charge about a year ago. Since that time I have examined them frequently while in operation and have watched the running of them as much as possible. Several small changes have been made to render the system more efficient. There is one change involving considerable expense that should be made. Reference is made to the chemical laboratory. Upon measurement it has been found that the heating surface in every room ought to be doubled and in some rooms even more than that. This change will have to be made before the building can be heated comfortably, and should be done at once. You are respectfully urged to give this matter your attention.

A careful study of the heating of buildings by steam will show that the method of heating each building by a separate plant is not economical. As now arranged, it is necessary to have two or three firemen, and a large part of their time is wasted in going from one building to another. The most objectionable feature of the present arrangement is the danger to life from explosion. Anything which is subjected to steam pressure is likely to explode sooner or later. A notable example is furnished by the explosion at the pulp mill in this town a short time ago.

The safest and most economical method of heating the buildings we now have and to provide for heating those we are to have in the future, is to have one central heating plant located a little distance from the rest of the buildings and so arranged as to admit of being enlarged when required. One man could fire such a plant and the danger would be reduced to a minimum.

In accordance with this idea the mechanical division of the class of '92 designed and made the working drawings for such a plant. Your attention is most earnestly called to this mat-



MACHINE ROOM.

ter with the hope that this plant may be constructed very soon and equipped with the best modern apparatus.

This department wishes to acknowledge the receipt of a set of working drawings of a plant from the A. G. Gray Company of Cincinnati, Ohio. A large photograph and numerous blue prints have been received from M. W. Sewall, M. E. of the Babcock and Wilcox Company of New York.

Respectfully submitted,

WALTER FLINT.

Department of Mathematics and Astronomy.

President M. C. Fernald:

The greatly improved facilities enjoyed during the past year, have made it possible to do much better work in this department than heretofore. We now for the first time have a recitation room that need not be shared with other departments, large, pleasant, and, what is essential for mathematical recitations, with a good supply of black-board space.

Some slight changes in the course of instruction have been made with good results. In the mathematical work of the Freshman year, somewhat less time has been given to geometry and trigonometry and more to algebra. New text-books in calculus and in astronomy have been used with success. The instruction in practical astronomy is now given by lectures, as I have found that in this way the work can be better adapted to our circumstances, and to our present instrumental outfit, than is the course given in any text-book with which I am acquainted.

At the time of the military encampment at Castine during the present term, advantage was taken of the opportunity to give the class practice in observing away from the college and in working up the position of a new station. The interest manifested and the quality of the work done indicate that such a trip might be annually made with profit.

During the spring term, a four inch telescope with portable equatorial mounting was purchased of the well known makers, Alvan Clark & Son, of Cambridgeport, Mass. It has proved entirely satisfactory, and of great assistance in

supplementing the work of the class-room in descriptive astronomy.

The present instrumental equipment for practical astronomy is as follows:

Two sextants, of which only one is really of value; a transit-theodolite, used in common with the department of civil engineering; a vertical circle.

The theodolite is somewhat out of adjustment and should be sent to the makers to be put in condition. The vertical circle is a very fine instrument, and, notwithstanding the fact that it has been in use for seventeen years, it is in practically perfect condition; but it does not entirely meet the needs of modern instruction. To teach the methods now used in the United States surveys, and by good astronomers, a portable astronomical transit and a portable zenith instrument are needed. For our purposes, the two instruments may be combined in one.

A small building to be used as an observing room, and also as a temporary shelter for the instruments during the observing season, is needed.

Such a building would secure a great saving of time and labor, as it would remove the present necessity of carrying heavy instruments from Wingate Hall to the observing station in the field near Horticultural Hall, and is really a necessity, as the present arrangement of the college terms carries the time for evening observations into November and December, when it is impracticable to do good work in the open air. The building may be of wood, and comparatively inexpensive.

The college owns no time-piece that can be used for astronomical work, and we have annually rented a mean-time chronometer during the fall term. Such a time-piece proves rather unsatisfactory and the college should own at least one portable chronometer. Another sextant is also needed.

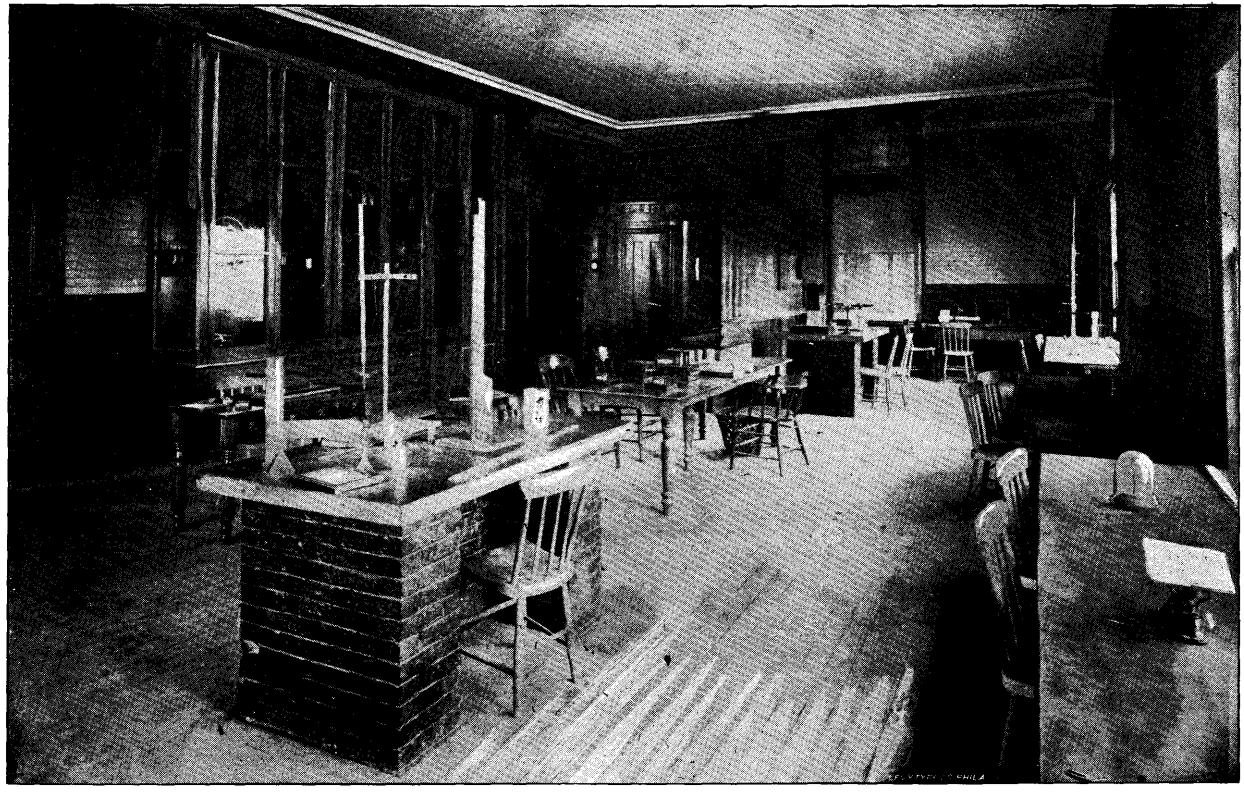
The approximate cost of the needed equipment would be as follows:

Sidereal Chronometer	$250 00
Sextant	100 00
Combined Transit and Zenith Instrument	750 00
Transit building	500 00
Repairs and incidental expenses during the next two years	100 00
	$1,700 00

It is to be hoped that before many years, either by legislative appropriation, or through some friend of the institution, we may be provided with an observatory, equipped with a good (not necessarily large) equatorial, a chronograph, sidereal clock, etc.

Respectfully submitted,

J. N. HART.



PHYSICAL LABORATORY.

Department of Physics.

President M. C. Fernald:

SIR: The recent additions to the apparatus of this department have enabled me to offer a more definitely arranged course in physics than heretofore. The work is mainly done by the Sophomores and may be divided into three branches: Class-room work; laboratory work; the solution of problems.

CLASS-ROOM WORK.

In the class-room lectures are given covering the fundamental principles of the entire subject. Once a week a written examination tests the class as to their knowledge of the subject. The lectures are taken down by the students, and the note-books are passed in for criticism each week. Thus far the work of the students along this line has been eminently satisfactory.

THE PHYSICAL LABORATORY.

In the laboratory, the Sophomores spend four hours per week throughout the entire year. The following is a list of the subjects of the experiments performed:

FALL TERM.

1. Precision of measurements.
2. Plotting.
3. Problems in measurement.
4. Problems in weighing.
5. The vernier.

6. The spherometer.
7. The hook-gauge.
8. Estimation of tenths.
9. The eccentricity of a graduated circle.
10. The insertion of cross-hairs.
11. The angle of friction.
12. The coefficient of friction.
13. The laws of the pendulum.
14. Deflection of beams.
15. Center of gravity.
16. Measurements of the diameter of a wire.
17. The balance.
18. The cathetometer.
19. The Atwood machine.
20. The principle of moments.
21. Breaking weight.
22. Cohesion disks.
23. Testing level surfaces.
24. Mariotte's law.
25. Specific gravity by displacement.
26. Specific gravity by hydrometers.
27. Specific gravity by flotation.
28. Specific gravity by Mohr's balance.
29. Specific gravity by the Jolly balance.
30. Specific gravity by the pyknometer.

SPRING TERM.

31. The laws of pitch.
32. Velocity and wave-length.
33. Sound and motion.
34. Reinforcement of sound.
35. Determination of velocity.
36. Reflection and intensity.
37. Meteorology.
38. Meteorological observations.
39. Specific heat. (liquids).

40. Specific heat. (solids).
41. Latent heat.
42. Heat-expansion.
43. Radiation.
44. Conduction and convection.
45. Thermometry.
46. Evaporation and boiling.
47. Determination of prism-angle. (Babinet's goniometer).
48. Determination of prism-angle. (Wollaston's goniometer).
49. Determination of index of refraction. (n).
50. Adjustments of the microscope.
51. The camera lucida and micrometric measurements.
52. Photometric measurements.
53. Determination of focal distance.
54. The spectroscope.
55. The polariscope.
56. Reflection and refraction.
57. The magnetic field.
58. Magnetic polarity and induction.
59. The nature of magnetism.
60. Frictional electricity.
61. The galvanic battery.
62. The electric current.
63. Current induction.
64. The electric telegraph.

MATHEMATICAL PHYSICS.

Under the head of mathematical physics each member of the class is expected to work out and hand in, in good form, with appropriate drawings, 300 problems prepared to accompany the lectures. It is thought that the ability to solve a typical problem is a good test of the student's knowledge of the subject under consideration.

ADVANCED COURSES.

In the junior year the students in the course in science and literature devote two hours a week throughout the year to advanced work in physics. In the fall term they continue the work in optics begun in the sophomore year. The work has not as yet been definitely planned for the spring term, but it will doubtless relate to sound and theoretical electricity.

The juniors in all courses may elect work in the physical laboratory two hours per week. Those so electing do work in electrical measurements and testing. The work already done includes the following:

1. Measurement of resistance by substitution.
2. By the Wheatstone bridge.
3. By the slide-wire bridge.
4. E. M. F. of batteries.
5. Internal resistance of batteries.
6. The voltmeter.
7. The ammeter.
8. The calibration of a tangent galvanometer.
9. Dynamo work.
10. Construction of galvanometer.

FURTHER EXTENSION.

While it is believed that the completion of the courses above outlined gives the student a good knowledge of physics, it is greatly to be desired that the work in this department be extended as far as possible. Courses in advance of the sophomore work should be offered in the various branches of the subject. At present the limited time of the students who are engaged in work along other lines, renders such extension practically impossible.

JAMES S. STEVENS.

Department of Science and Literature.

President Fernald: Since the publication of the last report, the course of science and literature has been developed, so that it now offers to the student advantages commensurate with those of the other courses. For information as to the design of this course and the methods of work employed, we respectfully refer to the "Explanatory Statements" in the catalogue.

Along the line of literary work there has been a decided advance. Anglo-Saxon and English philology have been added to the curriculum, which has been further improved by more fully developing it in other directions.

In the amount and character of the general academic work there has been marked improvement. To the studies of the Freshman year have been added weekly exercises in general history, extemporaneous speaking, and the use of the library as a laboratory in the study of subjects assigned to the class.

To carry on the work of the department effectively, there is needed for the purchase of books and maps an appropriation of at least $500. These means of instruction are to the academic work what apparatus and machinery are to the scientific and technical studies; and we cannot urge too strongly the need of making suitable provision to supply immediate wants.

Very respectfully,

A. E. ROGERS,

H. M. ESTABROOKE.

Military Department.

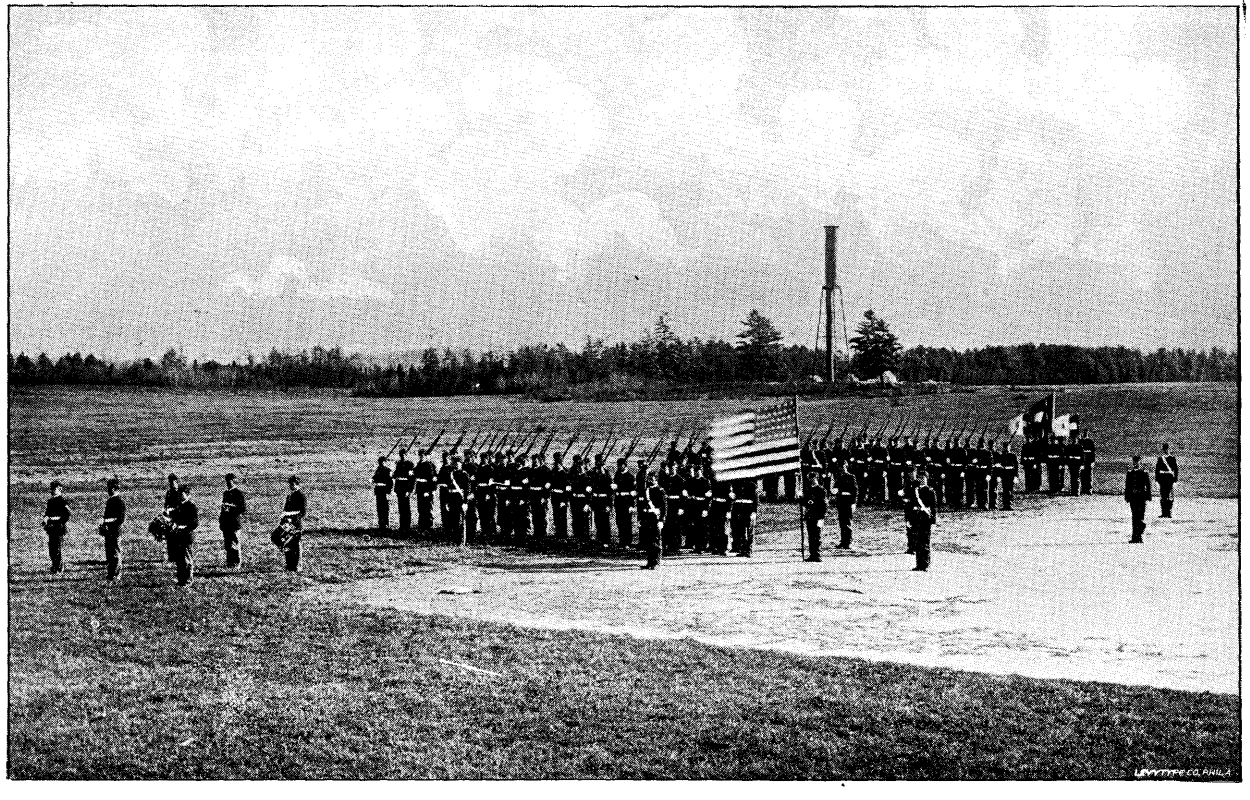
The President Maine State College:

SIR: I have the honor to submit the following report of the military department beginning July 1st, 1891, when I reported for duty relieving 1st Lieutenant E. E. Hatch, 18th U. S. Infantry. Lieutenant Hatch under orders from the War Department remained on duty at the college until September 1st, 1891, thus giving me the benefit of his experience while I was getting acquainted with the duties of my position.

The minimum of three hours practical and one theoretical work per week prescribed by the War Department has been, thanks to the cordial support of the faculty, considerably exceeded.

The routine is as follows: Fall term until October 1st, instruction of new cadets, school of battalion and ceremonies; October 1st until December 1st, target practice; December 1st until end of fall term and spring term until April 1st, Seniors, weekly lectures on art and science of war supplemented by recitation in "Califf's notes on Military Science" introduced February, 1892, Juniors, recitations twice a week in drill regulations, Sophomores, picked men from this class drill Freshmen three times per week in school of soldier; April 1st until end of spring term, schools of company and battalion giving particular attention to extended order.

The college has this year made a beginning in physical culture now generally recognized as an essential part of college training. The trustees voted $100 to the military department for this purpose. This was expended by the



COBURN CADETS.

professor of military science and tactics in part payment of his expenses while attending the summer course in physical training at Harvard College.

The freshman class is given throughout the year one-half hour daily instruction in military gymnastics and other approved forms of physical training.

A regular course has been laid out. The improvement in walk and carriage of the fifty young men who entered this year has been marked and I think is patent to the most casual observer. Physical measurements adapted from those taken by Dr. Sargent at the Hemmenway gymnasium, Harvard College, have been taken. The development between September 12 and November 5, 1892, so far as relates to the upper part of the body is offered for your inspection:

	Maximum Increase.	Average Increase for Class.
Girth of chest,	2 inches	.60 inches.
Girth of chest full,	1 3-4 "	.68 "
Girth ninth rib,	1 1-2 "	.35 "
Girth ninth rib full,	3 3-4 "	.80 "
Upper arm right,	1 "	.60 "
Fore arm right,	1.2 "	.25 "
Upper arm left,	1 1-4 "	.62 "
Fore arm left,	5-8 "	.40 "
Depth chest,	3-4 "	.32 "
Breadth of shoulders,	1-2 "	.45 "
Breadth nipples,	4 "	.18 "
Stretch of arms,	2 1-4 "	.85 "

Our great need is a drill hall and gymnasium.

Lacking these our work is at all times greatly restricted and in winter has to be almost entirely suspended.

I have the honor to submit herewith detailed plans for what I think a suitable building for both purposes.

Two encampments have been held, the first, September 13 to 18, 1891, at Fort Knox on the Penobscot river, the second October 3 to October 8, 1892, in old Fort George at Castine. Features of the encampment included practice

marches eight to fifteen miles, at the same time putting out advance and rear guards and flankers, digging rifle pits and making other hasty fortifications, a night attack, unexpected by one company on the other, the companies being camped about a mile apart, and withal particular attention given to the duties of guards and sentinels.

We were honored by a visit from Governor Burleigh and Adjutant General H. M. Sprague while in camp at Fort Knox. Both encampments were pronounced successes not only from a military point of view but as pleasure trips for the cadets and as a demonstration to the people whose towns they marched through of the efficiency of the discipline in the corps and the gentlemanly bearing of the cadets composing it.

October 5th, while in camp at Castine, I was imperatively called away. Cadet Captain Walter W. Crosby then became the commanding officer. He carried out the programme of work for rest of week as planned, made camp one night at Hampden on the return trip and brought the corps back to the college campus in a way that inspires confidence in his ability to render marked service to the United States in her hour of need. The Coburn cadets and Cadet Captain Crosby as the then commander received many well deserved compliments outside of the college at that time. In this connection it is desired to acknowledge the kindness of Adjutant General H. M. Sprague in loan of camp equipage.

The embankment for target range asked for by my predecessor is still needed. The need was emphasized last year by the close call a wood chopper in the line of fire had for his life; a bullet went through the rim of his hat. Warnings are posted in number along the roads and through the woods before target practice begins but fear of accident is always present. Special military certificates were issued to such of the graduates of 1892 as had "faithfully pursued and satisfactorily completed the course in military science and tactics," and had showed "marked proficiency" therein. Ten such certificates were issued in a class of nineteen. If

the Governor of Maine were empowered to commission the holders of such certificates and assign them to existing vacancies in the grade of 2d lieutenant in the State troops, the result, it is believed, would be mutually beneficial to the State of Maine and to the Maine State College. Some of our sister states adopt a like plan. Graduates here can and do obtain some ideas of a soldier's profession beyond the drill regulations.

In addition to my military duties, I instructed the Sophomore and Freshman classes in French last year and this year am directing the Freshman in their physical training.

Very respectfully, your obedient servant,

MARK L. HERSEY,

2nd Lieutenant 9th Infantry.

Professor of Military Science and Tactics.

TREASURER'S REPORT.

To the Trustees of the Maine State College:

GENTLEMEN:—I herewith submit my annual report as treasurer of this College.

GEORGE H. HAMLIN, *Treasurer.*

GENERAL STATEMENT OF RECEIPTS AND EXPENDITURES FOR THE YEAR ENDING JUNE 30, 1892.

Receipts from July 1, 1891, to July 1, 1892.

Balance on hand July 1, 1891	$15,708 09	
State appropriation	24,500 00	
United States Government for Experiment Station under Hatch Bill	15,000 00	
United States Government for Experiment Station under Morrill Bill	17,000 00	
Interest on Coburn fund	6,000 00	
" Land Grant fund	5,915 00	
" Lombard bonds	180 00	
" City of Bangor bonds	180 00	
" Security Loan and Trust Company bonds	180 00	
Rent	160 00	
F. E. Kidder scholarship	675 00	
M. C. Fernald to balance accounts	408 67	
Experiment Station, general account	303 99	
Horticultural Department, college	41 57	
Coal	531 34	
Sundry small receipts	95 07	
Horticultural Department, station	48 80	
M. C. Foster	121 98	
Interest on temporary loans	398 01	
Lombard Investment Company	3,000 00	
Penobscot Savings Bank	8,000 00	
Bangor Savings Bank	7,325 00	
From students	6,090 02	
		$111,862 54

Expenditures from July 1, 1891, to July 1, 1892.

Department of Agriculture	$2,859 58
Boarding house	5,316 91
Bath rooms	347 78
Chemical laboratory, station	434 54
Department of civil engineering	551 62
" chemistry	1,103 82
Diploma account	50 50
Construction of dairy building	3,104 73
Clock account	824 60
General expense, station	242 77
General expense	725 90
Wingate Hall or Engineering building	24,309 64
Field and feeding station	790 34
Farm account	9 20
Farm improvement account	821 11
Fuel account	580 58
Foundry account	1,101 75
Grading around Wingate Hall	33 00
Horticultural Department, station	692 57
" " college	1,145 30
Head house, college	867 21
" station	468 93
Heating apparatus, Oak Hall	543 72
" " green house	6 00
" " Wingate Hall	103 66

Expenditures from July 1, 1891, to July 1, 1892—Concluded.

Insurance, college		$342 50	
Horticultural Department grounds		677 13	
Incidentals		335 32	
Library, station		62 97	
" horticultural department		130 70	
" literature		136 49	
" civil engineering		25 16	
" economics		60 46	
" chemistry		56 84	
" physics		158 40	
" metaphysics		23 18	
" natural history		111 95	
" agriculture		10 15	
" mechanical engineering		6 20	
" general		467 19	
Natural history department		1,013 37	
Military department		256 57	
Mineralogy		27 79	
Furnishing Wingate Hall		1,305 68	
Oak Hall repairs		53 42	
Printing, Station		1,667 35	
Department of physics		844 08	
Q. T. V. repairs		356 96	
Repairs of laboratory		104 04	
" Coburn Hall		30 35	
" farm house		257 15	
Repairs, general		442 61	
Stationery and postage, station		108 00	
" " " college		13 82	
Shop account		368 82	
" machinery		332 27	
Stand pipe		3 05	
Traveling expenses, station		147 00	
Trustee expenses, college		308 10	
" " station		50 40	
Mechanical engineering department		1,000 43	
Construction and repairs, station		277 99	
Water supply		153 15	
Botany and entomology, station		33 50	
Water works construction		1,332 94	
Circular account		458 50	
Photographic room		19 68	
Interest		19 67	
Experiment Station		1 50	
Fertilizer inspection		209 16	
Mineralogical laboratory		2 50	
Repairs on old chapel		9 25	
Tool house—construction of		505 55	
Meteorological department, college		25 00	
" " station		20 50	
Incidentals, chemistry		10 50	
Veterinary service		22 75	
" Science, Experiment Station		28 46	
Construction of flag pole		71 53	
General salary account		350 00	
Heating of laboratory		443 54	
Horticultural department, general expense		49 25	
Reading room		23 12	
Fuel account, station		192 76	
F. T. Burpee (wages as janitor)		595 00	
B. F. Sturtevant Company		1,780 19	
Berlin Bridge Company		2,107 40	
College salaries		23,536 44	
Station salaries		9,316 10	
Penobscot Savings Bank		8,000 00	
Orono " "		3,000 00	
Sundry small bills		116 54	
Cash paid Experiment Station	$28 30		
" " " " Hort. depart.	80	34 20	111,137 53
" " " " for b'rding house,	5 10		
Balance on hand June 30, 1892		–	725 01
			$11,862 54

BANGOR, December 23, 1892.

This is to certify that I have examined the above accounts and find them correct, with proper vouchers. HENRY LORD, *Auditor.*

GENERAL STATEMENT OF RECEIPTS AND EXPENDITURES BROUGHT FORWARD TO DECEMBER 1, 1892.

Receipts from June 30, 1892 to December 1, 1892 ..... $31,966 00

EXPENDITURES FROM JULY 1, 1892 TO DECEMBER 1, 1892.

Department of agriculture	$1 20
Boarding house	3,175 98
F. T. Burpee (janitor)	250 00
Botany and entomology (station)	6 10
Chemical laboratory (station)	50 85
Civil engineering department	138 86
Department of chemistry	30 68
Clock account	3 75
Diploma account	44 75
Dairy	137 35
Expense account	791 82
" (station)	117 34
Field and feeding station	598 60
Fuel account	3,303 71
Foundry account	70 05
Furnishing Wingate Hall	21 19
Fertilizer inspection (station)	134 80
Horticultural department (station)	293 80
" " (college)	269 81
Head House (college)	67 83
Horticultural department (station) construction and repairs	12 40
" " expense account	20 69
Insurance	20 00
Grounds horticultural department	397 32
Incidentals	209 30
Interest and discount	11 00
Library, agriculture	10 77
" chemistry	7 31
" civil engineering	139 38
" economics	6 00
" horticultural department	7 02
" literature	1 55
" metaphysics	2 48
" natural history	6 00
" physics	16 25
" general	90 18
Military department	169 94
Mineralogy	3 94
" laboratory	126 43
Mechanical engineering department	106 33
Meteorology (station)	60
Natural history department	119 34
Printing (station)	667 64
Department of physics	59 50
Photographic room	21 60
Q. T. V. repairs	18 73
Repairs, general	459 37
Construction and repairs (station)	3 00
Stationery and postage (station)	2 50
B. F. Sturtevant	520 87
Shop account	186 16
General salary account	100 00
Travelling expenses (station)	33 75
Trustee expenses, college	130 90
Water supply	9 08
Water works construction	139 29
Flag pole construction account	14 69
Field day expenses	178 50
World's Fair (civil engineering account)	12 00
Berlin Bridge Company	1,319 79
Chapel chair account	14 28
World's Fair (mechanical engineering account)	52 50
Oak Hall repairs	32 11
Chemical laboratory (college)	36 12
Construction of cases (natural history department)	563 97
Repairs of laboratory	7 34
Heating Wingate Hall	18 00
Singing book account	32 60
Repairs, Coburn Hall	18 91

Expenditures—Concluded.

Preparation and binding of meteorological reports	$ 30 40	
Construction of stand pipe	100 80	
Heating Oak Hall	89 85	
World's Fair general account	7 80	
Horticultural department, college construction and repairs,	2 50	
Personal account	29 64	
College salaries	10,135 45	
Station salaries	3,737 44	
		$29,784 78
Balance on hand December 1, 1892	-	2,181 22
		$31,966 00

ACCOUNT WITH THE EXPERIMENT STATION FUNDS FOR THE YEAR ENDING JUNE 30, 1892.

RECEIPTS.

From the Treasurer of the United States as per appropriation for the year ending June 30, 1892	$15,000 00	
Amount received from W. H. Jordan, Director	352 79	$15,352 79

EXPENDITURES.

Chemical laboratory	434 54	
General expense	292 77	
Field and feeding	790 34	
Horticultural department	793 34	
Head house, construction of	468 43	
Library	62 97	
Printing	1,667 35	
Stationery and postage	108 00	
Traveling expenses	147 00	
Trustee expenses	50 40	
Construction and repairs	277 19	
Botany and entomology	33 50	
Station, general accounts	5 00	
Fertilizer inspection	209 16	
Meteorology	20 50	
Veterinary science	28 46	
Fuel account	294 45	
Salaries	9,316 10	15,000 00
Balance unexpended June 30, 1892	-	352 79
		$15,352 79

ACCOUNT WITH THE UNITED STATES GOVERNMENT APPROPRIATION UNDER THE MORRILL BILL FOR THE YEAR ENDING JUNE 30, 1892.

Balance unexpended June 30, 1891	$19,198 42	
Received from United States Treasurer	17,000 00	
		$36,198 42

EXPENDITURES.

Department of agriculture for salaries	3,499 95	
" " facilities for instruction	4,081 72	
Department of civil and mechanical engineering salaries	5,194 00	
" " " apparatus	1,578 91	
Department of English, for salaries	3,700 00	
" " facilities for instruction	603 68	
Department of mathematics, for salaries	1,500 00	
" physics, for salaries	1,375 00	
" " facilities for instruction	1,010 71	
Department of natural history, for salaries	3,800 00	
" " " facilities for instruction	2,328 75	
" economics for salaries	1,800 00	
" " facilities for instruction	83 64	
		30,556 36
Balance unexpended June 30, 1892	-	5,642 06
		$36,198 42

ENDOWMENT FUNDS.

Coburn bequest, invested in State of Maine bonds at four per cent interest	$100,000 00
Land Grant Funds, invested in State of Maine bonds at five per cent interest	118,300 00
City of Bangor six per cent bonds	3,000 00
Security Loan and Trust Company bonds at six per cent interest	3,000 00
Orono Savings Bank	3,000 00
*Hallowell Classical and Scientific Academy six per cent bonds	4,000 00
Kidder Scholarship, invested in Bangor Savings Bank	675 00
	$231,975 00

*Suspended payment of interest.

The financial year of the College has been made to correspond with the United States Government year because of the convenience in reporting to the United States departments.

GEORGE H. HAMLIN, *Treasurer.*

ACT OF CONGRESS, 1890.

An Act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July second, eighteen hundred and sixty-two, the sum of fifteen thousand dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of one thousand dollars over the preceding year, and the annual amount to be paid thereafter to each state and territory shall be twenty-five thousand dollars to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction: *Provided*, That no money shall be paid out under this act to any state or territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provisions of this act if the funds received in such state or territory be equitably divided as hereinafter set forth: *Provided*, That in any state in which there has been one college established in pursuance of the act of July second, eighteen hundred and sixty-two, and also

in which an educational institution of like character has been established, or may be hereafter established, and is now aided by such state from its own revenue, for the education of colored students in agriculture and the mechanic arts, however named or styled, or whether or not it has received money heretofore under the act to which this act is an amendment, the legislature of such state may propose and report to the Secretary of the Interior a just and equitable division of the fund to be received under this act between one college for white students and one institution for colored students established as aforesaid, which shall be divided into two parts and paid accordingly, and thereupon such institution for colored students shall be entitled to the benefits of this act and subject to its provisions, as much as it would have been if it had been included under the act of eighteen hundred and sixty-two, and the fulfillment of the foregoing provisions shall be taken as a compliance with the provision in reference to separate colleges for white and colored students.

SEC. 2. That the sums hereby appropriated to the states and territories for the further endowment and support of colleges shall be annually paid on or before the thirty-first day of July of each year, by the Secretary of the Treasury, upon the warrant of the Secretary of the Interior, out of the Treasury of the United States, to the state or territorial treasurer, or to such officer as shall be designated by the laws of such state or territory to receive the same, who shall, upon the order of the trustees of the college, or the institution for colored students, immediately pay over said sums to the treasurers of the respective colleges or other institutions entitled to receive the same, and such treasurers shall be required to report to the Secretary of Agriculture and to the Secretary of the Interior, on or before the first day of September of each year, a detailed statement of the amount so received and of its disbursement. The grants of moneys authorized by this act are made subject to the legislative assent of the several states and territories to the purpose of said grants: *Provided*, That payments of such installments of the appropriation herein made as shall become due to any state before the adjournment of the regular session of legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of the state or territory for the further and more complete endowment, support, and maintenance of colleges, or of

institutions for colored students, as provided in this act, shall, by any act or contingency, be diminished or lost, or be misapplied, it shall be replaced by the state or territory to which it belongs, and until so replaced no subseqnent appropriation shall be apportioned or paid to such state or territory; and no portion of said moneys shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings. An annual report by the president of each of said colleges shall be made to the Secretary of Agriculture, as well as to the Secretary of the Interior, regarding the condition and progress of each college, including statistical information in relation to its receipts and expenditures, its library, the number of its students and professors, and also as to any improvements and experiments made under the direction of any experiment stations attached to said colleges, with their costs and results, and such other industrial and economical statistics as may be regarded as useful, one copy of which shall be transmitted by mail free to all other colleges further endowed under this act.

SECT. 4. That on or before the first day of July in each year, after the passage of this act, the Secretary of the Interior shall ascertain and certify to the Secretary of the Treasury as to each state and territory whether it is entitled to receive its share of the annual appropriation for colleges, or of institutions for colored students, under this act, and the amount which thereupon each is entitled, respectively, to receive. If the Secretary of the Interior shall withhold a certificate from any state or territory of its appropriation the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the state or territory may, if it should so desire, appeal to Congress from the determination of the Secretary of the Interior. If the next Congress shall not direct such sum to be paid it shall be covered into the Treasury. And the Secretary of the Interior is hereby charged with the proper administration of this law.

SECT. 5. That the Secretary of the Interior shall annually report to Congress the disbursements which have been made in all the states and territories, and also whether the appropriation of any state or territory has been withheld, and if so, the reasons therefor.

SECT. 6. Congress may at any time amend, suspend, or repeal any or all of the provisions of this act.

Approved August 30, 1890.

SUMMARY OF

METEOROLOGICAL OBSERVATIONS

TAKEN AT THE

MAINE STATE COLLEGE of AGRICULTURE and the MECHANIC ARTS,

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

FROM JANUARY, 1869, TO JANUARY, 1893.

BY PRESIDENT FERNALD.

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

Explanations, Deductions and Remarks.

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

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

The warmest day of the year 1892 was July 26th, when the mean temperature was 78°.6, and the coldest day was December 26th, when the mean temperature was 1°.8 below zero.

The highest temperature (90°.4) recorded during the year was on the 25th of July, and the lowest temperature (7°.7 below zero) on the 24th of December.

The range of temperature between the two extremes is 98°.1, which is less by 14°.4 than the average range between the extremes for the last twenty-four years.

The warmest day within the period covered by the tables was August 7th, 1876, when the mean temperature was 85°.3, and the coldest day January 8th, 1878, when the mean temperature was 17°.2 below zero. The highest temperature (96°.7) occurred on August 6th, 1876, and the lowest temperature (36°.3 below zero) on December 31st, 1890.

A comparison, as regards temperature, of the several months of 1892, with the mean temperature of corresponding months for twenty-four years, is given below:

Months.	Mean Temperature from 1869 to 1892 inclusive.	Mean Temperature for 1892.	
January	16°.09	22°.05	5°.96 warmer.
February	19°.21	22°.81	3°.60 "
March	27°.31	28°.08	0°.77 "
April	40°.19	42°.76	2°.57 "
May	52°.51	52°.69	0°.18 "
June	62°.41	63°.28	0°.87 "
July	67°.40	68°.49	1°.09 "
August	65°.54	66°.27	0°.73 "
September	57°.51	57°.39	0°.14 colder.
October	45°.81	45°.07	0°.74 "
November	34°.12	36°.71	2°.59 warmer.
December	21°.57	21°.24	0°.33 colder.

The year 1892 (mean temperature 43°.90) averaged 1°.42 warmer than the mean temperature of the twenty-four years under notice.

The earliest autumnal frost was on the morning of September 8th. Light frosts occurred also on September 20th and 21st and destructive frosts on October 3 l and 10th.

The thunder storms of 1892 were on June 10th and 14th, July 23d, August 4th, 6th, 9th, 10th and 11th.

The rainfall and melted snow of 1892 amounted to 39.13 inches, a quantity less by 6.31 inches than the average for twenty-four years; the snowfall was 75.50 inches, a quantity less by 16.93 inches than the average for the same period.

The number of days in 1892 on which the sky was at least eight-tenths covered with clouds was 109, or 30 per cent of the whole number. The number of days on which at least .01 inch of rain or snow fell was 123, or 34 per cent of the whole number; the number of days, therefore, without any considerable quantity of rain or snow, was 243, or 66 per cent of the whole number.

The prevailing wind during January and February was N. E. and N.; during March, April and May, N. W. and W.; during June, July, August and September, S. W. and S.; and during October, November and December, N. W. and W. On June 14th, between 5.16 P. M. and 5.30 P. M., eastern standard time, occurred one of the heaviest tornadoes that has ever visited this section of the State. In its path, chimneys were blown over, buildings unroofed and trees upturned. For two minutes, as shown by a Robinson's Anemometer, the wind maintained a velocity of 98 miles an hour.

Heavy winds, but not violent, also prevailed on January 26th, 27th and 31st, February 11th, 12th and 13th, March 4th, 5th, 11th, 12th and 13th, April 3d and 11th, September 14th and October 1st.

The prevailing wind for the twenty-four years from 1869 to 1892, inclusive, was from the north-west and west. The relative direction and force of the wind for this period are indicated approximately by the following numbers: N. W. and W., 4; S. W. and S., 3; S. E. and E., 1; N. E. and N., 2.

The principal auroras of 1892 were on the evenings of January 5th, February 13th, 18th, 20th, 23d, 24th, 26th, 27th, 28th, March 11th, 15th, 24th, 25th, 26th, 31st, April 23d, 24th, 25th, 26th, 27th, 30th, June 17th, July 16th, 20th, 21st, 28th, August 23d, September 12th, 21st, 27th, October 12th, 17th, 19th, 20th, 22d, and November 17th.

The principal lunar halos were on January 8th and 10th, and March 10th and 12th, and the principal solar halos on February 7th, April 27th and 30th, and May 6th and 10th.

The barometer indicated the greatest pressure in the month of February, and the least in the same month. The range between the two extremes was 2.079 inches. The least mean pressure was during March and the greatest during February, when the average height of the mercury in the barometer at an elevation of 129 feet above the sea level was 30.08 inches.

The mean humidity of the air for the year was .77.

SUMMARY BY MONTHS—1892.

Months.	Temperature in the Open Air.											Rain and Snow.		Clds.	Winds.				Barometer.			Relative humidity or fraction of saturation.		
	Mean of warmest day.		Mean of coldest day.		Highest temperature.		Lowest temperature.		Mean of maximum temperatures.	Mean of minimum temperatures.	Mean of three daily observations.	Amount of rain and melted snow—inches.	Amount of snow—inches.	Mean percentage of cloudiness.	Per cent of direction and force.				Barometer height reduced to freezing point of water.					
	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.							N. W. and W.	S. W. and S.	S. E. and E.	N. E. and N.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
		°		°		°		°	°	°	°													
January	14	47.1	20	2.5	14	51.5	17	-6.4	29.75	13.22	22.15	4.80	18.5	.67	.23	.23	.13	.41	30.613	29.195	29.877	100	64	85
February	22	38.1	17	5.5	26	50.0	17	-5.2	32.09	12.79	22.81	1.96	17.5	.48	.39	.17	.02	.42	30.779	28.700	30.008	100	46	81
March	10	40.9	15	8.9	8	50.4	13	2.6	34.92	19.56	28.08	2.52	17.0	.44	.58	.14	.05	.23	30.383	28.817	29.750	100	37	71
April	3	54.8	12	31.9	3	66.8	1	24.1	53.19	33.61	42.76	1.12	0.5	.39	.58	.22	.06	.14	30.376	29.198	29.815	100	20	63
May	31	64.1	7	43.4	26	73.5	1	23.6	60.57	41.88	52.69	1.94	–	.66	.29	.27	.18	.26	30.265	29.336	29.868	100	16	69
June	2	77.6	5	54.6	2	88.3	11	40.1	72.86	53.30	63.28	5.96	–	.58	.16	.50	.18	.16	30.312	29.414	29.818	100	55	82
July	26	78.6	4	59.3	25	90.4	17	45.6	79.68	56.93	68.49	1.99	–	.42	.37	.43	.14	.06	30.381	29.433	29.860	100	36	75
August	18	75.5	27	54.8	18	87.3	23	43.0	76.33	57.78	66.27	6.41	–	.58	.17	.34	.20	.29	30 238	29.602	29.884	100	44	82
September	24	66.1	29	45.8	24	76.4	20	37.1	69.20	47.21	57.39	3.91	–	.36	.31	.41	.23	.05	30.336	29.227	39.999	100	41	79
October	14	58.5	12	38.3	8	69.8	18	25.9	53.67	36.77	45.07	1.79	–	.47	.71	.13	.05	.11	30.334	29.315	29.751	100	39	75
November	18	55.7	23	22.7	8	61.3	12	16.1	43.18	30.49	36.71	4.47	15.5	.71	.35	.18	.23	.24	30.358	29.414	29.918	100	48	83
December	9	38.0	26	-1.8	9	43.2	24	-7.7	28.75	14.57	21.24	2.26	6.5	.47	.73	.14	.01	.12	30.258	29.241	29.781	100	55	82
	July		Dec.		July		Dec.																	
Year	26	78.6	26	-1.8	25	90.4	24	-7.7	52.85	34.84	43.90	39.13	75.5	.52	.41	.26	.12	.21	30.779	28.700	29.777	100	16	77

SUMMARY BY YEARS—From 1869 to 1892, inclusive.

Year	Temperature in the Open Air.											Rain and Snow.		Cl'ds.	Winds.				Barometer.								
	Mean of hottest day.		Mean of coldest day.		Highest temperature		Lowest temperature		Mean of maximum temperatures	Mean of minimum temperatures.	Mean of three daily observations.	Amount of rain or melted snow in gauge—inches.	Depth of snow—inches.	Mean percentage of cloudiness.	Per cent of direction.				Barometer height reduced to freezing point.			Force or pressure of vapor in inches.			Relative humidity or fraction of saturation.		
	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.	Day.	Temperature.							N. W. and W.	S. W. and S.	S. E. and E.	N. E. and N.	Maximum.	Minimum.	Mean.	Maximum	Minimum.	Mean.	Maximum.	Minimum.	Mean.
		°		°		°		°	°	°	°																
1869,	July 11	74.2	Jan. 22	-3.8	July 11	87.2	Mar. 6	-22.0	50.01	33.37	41.77	44.72	84.92	.55	.41	.29	.14	.16	30.519	28.858	29.780	.826	.005	.250	100	25	76
1870,	July 24	82 8	Jan. 14	-9.7	July 24	94.0	Feb. 4	-17.0	53.02	35.45	44.26	40.98	78.75	.50	.35	33	10	.22	30.578	28.902	29.791	.878	.016	.279	100	13	74
1871,	May 30	76 0	Jan. 23	-14.9	May 30	88.6	Jan. 23	-20.6	50.44	33.33	41.92	41.63	80.50	.50	.42	.33	.10	.15	30.585	29.000	29.795	.956	.006	.244	100	17	75
1872,	July 16	79.5	Dec. 25	-11.8	June 30	90.6	Dec 25	-23 0	50.02	33.22	41.60	48.54	113.00	.53	.37	.28	.13	.22	30.446	28.712	29.706	.793	.011	.258	100	23	77
1873,	July 30	75.5	Jan. 30	-4.9	July 26	92.0	Jan. 30	-26.5	49.93	31.28	40.93	40.78	124.00	.49	.38	.30	.10	.22	30.680	28.423	29.794	.778	.009	.232	100	20	74
1874,	July 15	76.3	Jan. 26	-15.5	July 15	86.3	Feb. 2	-26.0	50.18	32.21	41.35	44.94	132.00	.52	.37	.36	.08	.19	30.719	28 981	29.825	.794	.009	.240	100	19	76
1875,	Aug. 29	74.8	Nov 30	-9.8	Aug. 29	87.8	Dec 20	-23.0	48.49	30 11	39.58	41 94	93 80	.50	.40	.30	.09	.15	30.550	28.939	29 814	.844	.014	.239	100	24	76
1876,	Aug. 7	85.3	Feb. 24	13.4	Aug. 6	96.7	Dec 26	-21.5	50.74	32 32	42.03	52.37	123.00	.49	43	.30	.08	.19	30.783	28.458	29.808	.935	.014	.250	100	21	76
1877,	Aug. 24	75.1	Jan. 25	-11.3	June 1	89.0	Jan 26	-32.5	52.45	33.63	43.39	40.17	66.50	.52	.34	.30	.12	24	30.494	28.888	29.837	.762	.009	.269	100	19	76
1878,	June 30	81.9	Jan. 8	-17.2	June 30	93.5	Jan. 8	-35.6	52 07	35.38	44.34	48 57	59.50	.56	.33	.33	.13	.21	30.554	28.794	29.796	.872	.009	.280	100	20	78
1879,	July 16	77 8	Dec. 21	-11.7	Aug 2	88.0	Dec 27	-26.0	50.10	31.67	41.62	46.73	112.00	.51	.38	.37	.07	.18	30.638	28.537	29.851	.843	.012	.258	100	15	75
1880,	July 10	82.3	Feb. 2	-4.4	July 10	94.8	Jan. 14	-15.4	52 05	33.50	43.85	33.81	69.00	.50	.39	.23	.18	.20	30.644	29.090	29 874	.790	.015	.269	100	23	75
1881,	Aug. 5	78.1	Feb. 2	-9.1	Aug. 5	91.0	Jan. 2	-18.2	52.11	34 98	43.87	42.80	54 50	.54	.45	18	.14	.23	30.647	28.919	29 862	.891	.019	.281	100	21	77
1882,	Aug. 6	80.7	Jan. 24	-10.0	Aug. 5	92.0	Jan. 25	-22.4	50.76	33.10	42.54	41.26	110.00	.49	.46	.18	.12	.24	30.724	29.121	29.885	.819	.016	.261	100	24	75

1883,	July 6	75.1	Dec.23	-13.1	July 7	85.6	Jan. 6	-25.0	50.04	31.79	40.72	40.60	53 00	.48	.41	.30	.13	.16	30.641	28.750	29 904	.860	.015	.259	100	18	78
1884,	Aug.18	77.2	Dec 20	-10.4	Aug.18	86.0	Jan.28	-29 0	51 57	33.23	42.85	44.95	90.00	.56	.35	.33	.14	.18	30.716	28.768	29.875	-	-	-	100	16	81
1885,	July 25	76.4	Jan 22	-11.5	July 25	89 2	Jan.31	-22.3	50.54	32.30	41.37	52.99	108.00	.49	.41	.32	.11	.16	30.608	28.800	29.849	-	-	-	100	24	79
1886,	July 7	78.0	Jan 12	-15.3	July 7	92.5	Jan.12	-26 5	52.20	33.24	42.61	48.04	136.50	.53	.40	.35	.10	.15	30.731	28.556	29.889	-	-	-	100	10	78
1887,	Jnly 2	82.5	Jan. 9	-13.8	July 2	93.3	Jan. 9	-29.0	51.05	32.90	42.07	52 88	115.25	.52	44	.31	.09	.16	30.810	28.917	29.883	-	-	-	100	20	79
1888,	July 5	78.5	Jan.15	-6.9	Jan. 23	93.4	Jan 25	-19.6	49.79	32 02	41.26	58.04	134.60	.56	.51	.16	.13	.20	30.686	28.859	29.851	-	-	-	100	29	79
1889,	June30	75.1	Feb.23	-8.0	May 18	89.0	Feb.24	-20 3	54.51	36.29	45.11	42.94	64.30	.54	.37	.33	.11	.19	30 833	28.781	29.870	-	-	-	100	26	78
1890,	Aug. 4	77.0	Jan.10	-11.7	Aug. 4	86.4	Dec.31	36.3	50 55	32 60	41.84	53.23	107 50	.53	.40	.25	.14	.21	30.741	29.064	29.877	-	-	-	100	35	80
1891,	July 14	78.2	Feb.14	1.4	June 16	92 8	Feb 15	-17.0	53.95	34 51	44.48	47.48	82.00	.49	36	.24	.17	.23	30.618	28.438	29.905	-	-	-	100	26	78
1892,	July 26	78.6	Dec.26	-1.8	July 25	90.4	Dec 24	-7.7	52.85	34.84	43.90	39.13	75.50	.52	.41	.26	.12	.21	30.779	28.700	29 777	-	-	-	100	16	77
	1876.		1878.		1876.		1890.					Mn	Mean.														
24 yrs	Aug. 7	85.3	Jan. 8	-17.2	Aug. 6	96.7	Dec 31	-36.3	51.26	33.68	42.48	45.44	94.43	.52	.40	.28	.12	.20	30.833	28.423	29.842	-	-	-	100	10	77

APPENDIX.

CATALOGUE

OF THE

Maine State College of Agriculture and Mechanic Arts.

ORONO, MAINE, 1892–93.

TRUSTEES:

HON. HENRY LORD, BANGOR, *President.*
HON. WM. T. HAINES, B. S., LL. B., WATERVILLE, *Secretary.*
ARTHUR L. MOORE, B. S., LIMERICK.
RUTILLUS ALDEN, ESQ., WINTHROP.
HON. CHARLES P. ALLEN, B. S., PRESQUE ISLE.
B. F. BRIGGS, ESQ., AUBURN.
G. J. SHAW, ESQ., HARTLAND.
GEN. R. B. SHEPHERD, SKOWHEGAN.

TREASURER:

PROF. G. H. HAMLIN, ORONO.

EXECUTIVE COMMITTEE:

HON. HENRY LORD.
HON. WM. T. HAINES.

EXAMINING COMMITTEE:

HIS EXCELLENCY HENRY B. CLEAVES.
REV. CHARLES F. ALLEN, D. D.
HON. S. W. MATTHEWS.

FACULTY.

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

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

ALFRED B. AUBERT, M. S.,
Professor of Chemistry.

ALLEN E. ROGERS, A. M.,
Professor of History, Logic, and Civics.

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

WALTER FLINT, M. E.,
Professor of Mechanical Engineering.

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

JAMES N. HART, C. E.,
Professor of Mathematics and Astronomy.

HOWARD S. WEBB, B. M. E.,
Instructor in Shop-Work, Secretary and Registrar.

FRED P. BRIGGS, B. S.,
Assistant in Natural History.

NATHAN C. GROVER, B. C. E.,
Assistant in Civil Engineering.

HARRIET CONVERSE FERNALD, M. S.,
Librarian.

WELTON M. MUNSON, B. S.,
Professor of Horticulture and Landscape Gardening.

HORACE M. ESTABROOKE, M. S., A. M.,
Professor of Rhetoric and Modern Languages.

JAMES S. STEVENS, M. S., PH. D.,
Professor of Physics.

MARK L. HERSEY, A. M.,
Lieut. 9th U. S. Infantry, Professor of Military Science and Tactics.

GILBERT M. GOWELL,
Instructor in Practical Agriculture.

DAVID WILDER COLBY, B. S.,
Assistant in Chemistry.

DAVID W. TRINE, B. S.,
Assistant in Horticulture.

AARON E. SPENCER,
Steward.

NOTE—Order of Faculty according to seniority of appointment.

STUDENTS.

GRADUATES OF 1892.*

Atherton, George Frederic,	Bethel.
Atkinson, William Hacker,	Brunswick.
Bristol, Mortimer Lucius,	Canton Ctr., Conn.
Butterfield, William Rowe,	Milford.
Clark, Roscoe Conkling,	Bethel.
Danforth, Ernest Wilbur,	Brunswick.
Doolittle, Herbert Edward,	Northfield, Mass.
Farrington, Mellen Edward,	Brewer.
Fernald, Robert Heywood,	Orono.
Gibbs, John Clinton,	South Turner.
Grover, Arthur Curtis,	West Bethel.
Healey, Warren Evans,	Rockland.
Holden, William Cross,	South Windham.
Maguire, George,	Biddeford.
Randlette, Charles Maurice,	Richmond.
Timberlake, Stanley Milton,	North Turner.
Tolman, Frank Stevens,	Milo.
Tyler, Joseph Albert,	Farmington.

*The annual report being made in December, includes parts of two academic years, hence the catalogue bears the names of students who have been connected with the College during any portion of the year 1892.

SENIOR CLASS.

Alexander, James Almore,	Richmond.
Alexander, John Francis,	Richmond.
Atkinson, Timothy Ralph,	North Anson.
Crosby, Walter Wilson,	Bangor.
Gannett, Charles Henry,	Augusta.
Gould, Harris Perley,	North Bridgton.
Hutchinson, George Weymouth,	Orono.
Jack, Walter Dows,	Topsham.
Kittredge, Charles Prentiss,	Milo.
Murphy, Charles Clark,	Hampden.
Rowe, George Freeman,	Bangor.
Shaw, Orrin John,	Hampden.
Smith, Harry Maubic,	Bangor.
Webster, John Milton,	Augusta.
Whitney, George Ansel,	Madison.
Williams, Hiram,	Portland.

JUNIOR CLASS.

Alford, Abbott Edwin,	Old Town.
Buck, Hosea Ballou,	Stillwater.
Cowan, Edward Henry,	Orono.
Cowan, George Parker,	Bangor.
Durham, Leroy Tolford,	Monroe.
French, Charles Frederick,	Glenburn.
Gould, Frank Gilman,	Orono.
Gray, Jesse Alexander,	Old Town.
Hall, George Harry,	Bangor.
Jerrard, John,	Bangor.
Jordan, Alva Thomas,	South Lewiston.
Kimball, James Mayberry,	Bangor.
Lewis, Hugh McLellan,	South Berwick.
Murray, Herbert,	Rockland.
Norwood, Leon Orlando,	Union.
Wood, Edward Butler,	Camden.

SOPHOMORE CLASS.

Boardman, Harold Sherburne,	Bangor.
Bowler, Frank Colburn,	Berlin, N. H.
Buck, Alfred Howard,	Foxcroft.
Calderwood, Isaac Glidden,	Vinalhaven.
Chase, Wendall Wyze,	Auburn.
Dolley, Harry Adelbert,	Waterville.
Ellis, Merton Eugene,	West Guilford.
Folsom, LeRoy Rowell,	Corinna.
Frost, Charles Albert,	Monmouth.
Gilbert, Charles Edward,	Orono.
Harvey, James Elmore,	Readfield.
Hayes, Augustus Daniel,	Belfast.
Hincks, Charles Trask,	Bangor.
Jose, Wallace Hight,	Newport.
Knight, Ora Willis,	Bangor.
Martin, James William,	Waltham, Mass.
Merrill, Earl Clinton,	East Eddington.
Moulton, Albion,	Hiram.
Murphy, Walter Marshall,	So. Norridgewick.
Ricker, John Hale,	Cherryfield.
Rollins, Melville Frederick,	Bangor.
Rumball, George Washington,	Harrington.
Thomas, Charles Dura,	Brownville.
Urann, Mark Libby,	Sullivan.

FRESHMAN CLASS.

Atwood, Ernest Johnston,	Boston, Mass.
Bartlett, Charles Simming,	Norway.
Briggs, Walter James,	Farmington.
Brown, Lendall,	Gorham.
Buffum, Charles Nathaniel,	Dillsboro, N. C.
Duncan, Lindsay,	Northfield, Mass.
Farrell, Harry Clifford,	Machias.
Fernald, Roy Lynde,	Winterport.
Gibbs, Edward Everett,	Bridgton.
Glidden, Everett Gray,	Augusta.
Groves, Oscar Llewellyn,	Redlands, Cal.
Hancock, Edward Henry,	Corinna.
Haseth, Gerardus Andries de.	Curacao, W. I.
Heywood, Heywood Hall,	New York City.
Hobbs, Frederick Andrew,	Alfred.
Holmes, Frank Lewis,	Bangor.
Jeffery, George Wesley,	North Monmouth.
Kidder, Elmer Elwood,	Winslow.
Knights, George Ernest,	South Waterboro.
Leavitte, George Greenwood,	South Berwick.
Lee, John Lewis,	Bangor.
Libby, Frank Joshua,	Richmond.
Lord, Harold Eastman,	Steep Falls.
Manter, Ralph Barton,	Milo.
Marston, Frank Leonard,	Bangor.
McLeod, Daniel James,	Brewer.
Niles, Herbert Lester,	Levant.
Palmer, Perley Burnham,	South Bridgton.
Pattee, Clifford James,	Belfast.
Porter, Richard Lebens,	Bangor.
Powers, Delmer Dellsworth,	Caribou.
Pride, Frank Perley,	Westbrook.
Randlette, Joseph William,	Richmond.
Redlon, Harrison,	Perham.
Robinson, William Chandler,	Rockland.
Rogers, Lore Alfred,	Patten.

Sargent, Paul,	Machias.
Snare, James Archer,	Hampden.
Starr, John Alvah,	Orland.
Steward, Stanley John,	Foxcroft.
Tolman, Gilbert,	Milo.
Walker, Perley,	Embden.
Weymouth, Frank Edwin,	Medford Centre.
Weston, Ernest Clarence,	Madison.
Weston, Charles Partridge,	Madison.
Whitcomb, Beecher Davis,	Easton.
Wilkins, Gardiner Benson,	Brownville.

SPECIAL STUDENTS.

Achorn, Davis Tillson,	Rockland.
Atwood, Gustavus Gilbert,	South Carver, Mass.
Barker, Irving Washington,	Casco.
Bradbury, Henry Marston,	Limerick.
Bragg, Alvah,	Oakland.
Cooper, Walter,	Newport.
Cowan, Mary Abagail,	Orono.
Damon, Frank,	Hampden.
Folsom, John Edwin,	Corinna.
Freeman, George Washington,	Portland.
French, Frank Luther,	Solon.
Frink, Harry Arthur,	Bangor.
Goodridge, Nathan,	Orono.
Haley, George,	Brownfield.
Jordan, Edwin Roscoe,	Stillwater.
Jordan, Llewellyn Woodard,	West Ellsworth.
Keith, William Everett,	Old Town.
Marsh, Mary Holmes,	Orono.
Morse, Percy Franklin,	West Hampden.
Plummer, Leo Benjamin,	Orono.
Robinson, Halbert Gardner,	Patten.
Sawtelle, William Otis,	Bangor.
Sprague, Edward Bela,	Bowdoinham.
Towle, Jesse Craig,	Sherman Mills.
Warren, John Came,	Buxton.

SUMMARY.

Graduates of 1892,	18	Sophomores,	24
Seniors,	16	Freshmen,	47
Juniors,	16	Special students,	25
		Total,	146

PRIZES OF 1892.

Prentiss Prize for best Junior Essay, awarded to Walter Wilson Crosby of Bangor.

Prentiss Prize, Sophomore Declamation, awarded to James Elmore Harvey of Readfield.

Libbey Prize for best Agricultural Essay, awarded to Alva Thomas Jordan of South Lewiston.

The Franklin Danforth Memorial Prize for highest standing, course in Agriculture, awarded to George Washington Freeman of Portland.

Award for highest standing, Sophomore Class, to James Mayberry Kimball of Bangor.

Award for highest standing, Freshman Class, to Albion Moulton of Hiram.

ORGANIZATION OF COBURN CADETS.

Second Lieutenant Mark L. Hersey, 9th U. S. Infantry, Commandant of Cadet's Staff.

First Lieutenant and Adjutant, Cadet Harry M. Smith.

First Lieutenant and Quartermaster, Cadet George A. Whitney.

NON-COMMISSIONED STAFF.

Sergeant Major, Cadet Herbert Murray.

COMPANY "A."

Captain	Cadet	Walter W. Crosby.
1st Lieutenant	"	Charles H. Garnett.
2nd "	"	John Jerrard.
2nd "	"	Charles P. Kittredge.
1st Sergeant	"	William H. Jose.
Sergeant	"	Frank C. Bowler.
"	"	James M. Kimball.
"	"	George H. Hall.
"	"	Edward H Cowan.
"	"	Timothy R. Atkinson.
Corporals	"	Earl C Merrill.
"	"	Albion Moulton.
"	"	Isaac G. Calderwood.
"	"	Charles A. Frost.
"	"	James W. Martin.
"	"	Leroy R. Folsom.
"	"	Harold S. Boardman.
"	"	Melville F. Rollins.
"	"	G. Audries de Haseth.

COLOR GUARD.

Color Sergeant, Cadet Augustus D. Hayes.
" " " Walter D. Jack.
" " " Hosea B. Buck.

LEADER OF DRUM CORPS.

Cadet Corporal, James W. Martin.
Bugler, Cadet Alfred H. Buck.

DESIGN OF THE INSTITUTION.

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

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

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

CONDITIONS OF ADMISSION.

Candidates for admission to the Freshman Class must be not less than sixteen years of age, and must pass a satisfactory examination in Arithmetic, Geography, English Grammar (especial attention should be given to Orthography, Punctuation and Capitals), History of the United States, Physical Geography, Book-Keeping, Algebra to Logarithms, and Plane Geometry.

Candidates will also be tested on their knowledge of certain standard works in English Literature.

The required reading will include the following books or subjects:

For 1893—Shakespeare's Julius Cæsar and Twelfth Night; Scott's Marmion; Longfellow's Courtship of Miles Standish; The Sir Roger de Coverly Papers in the *Spectator*; Macaulay's second Essay on the Earl of Chatham; Emerson's American Scholar; Irving's Sketch Book; Scott's Ivanhoe; Dicken's David Copperfield.

For 1894—Shakespeare's Julius Cæsar and Merchant of Venice; Scott's Lady of the Lake; Arnold's Sohrab and Rustum; The Sir Roger de Coverly Papers in the *Spectator*; Macaulay's second Essay on the Earl of Chatham; Emerson's American Scholar; Irving's Sketch Book; Scott's The Abbot; Dicken's David Copperfield.

For 1895—Shakespeare's Merchant of Venice and Twelfth Night; Milton's L'Allegro, Il Penseroso, Comus, Lycidas; Longfellow's Evangeline; The Sir Roger de Coverly Papers in the *Spectator*; Macaulay's Essay on Milton, Essay on Addison; Webster's first Bunker Hill Oration; Irving's Sketch Book; Scott's The Abbot.

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

Candidates for advance 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 are required. They should be presented on or before the day of examination.

The Friday following the last Wednesday of June, and the Tuesday nearest the first day of September, are the appointed times for the examination of candidates at the college.

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

C. P. Allen, B. S.,	Presque Isle.
E. S. Danforth, B. S., S. W. Gould, B. S.,	Skowhegan.
Henry K. White, A. M.,	Bangor.
Ashley St. Clair,	Milltown.
Hon. N. A. Luce,	Augusta.
E. F. Heath,	Monmouth.
W. E. Sargent, A. M.,	Hebron.
Edwin P. Sampson, A. B.,	Saco.
A. D. Hall, A. B.,	Bethel.
J. A. Roberts, A. M.,	Norway.

Examiners will indicate to parties applying, the time and special place of examination. Arrangements have also been made with the

Seminary at Bucksport and with the Academies at Hampden, East Corinth and Foxcroft, by which students from these institutions may be admitted to the college on certificate of qualification from the respective Principals.

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

COURSES OF INSTRUCTION.

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

The studies of the several courses are essentially common for the first year, and are valuable not only in themselves, but also as furnishing a necessary basis for the more technical studies and the practical instruction of the succeeding years.

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

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

Composition and Declamation are regular exercises in all the courses throughout the four years. Military exercises by all able-bodied male students are also maintained throughout the entire course. For the characteristic features of each course, reference is made to the explanatory statements following the several schemes of study.

SPECIAL COURSES.

Students may be received for less time than that required for a full course, and they may select from the studies of any class such branches as they are qualified to pursue successfully. Students in Special Courses are not entitled to degrees, but may receive certificates of proficiency. Two short courses in Agriculture, definite in form, are also provided; courses involving less time than that required for obtaining a degree.

DEGREES.

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

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

COURSE IN AGRICULTURE.

FIRST YEAR.

First Term.

Physiology.
Rhetoric. (4)
Reading and Analysis of Authors. (1)
Solid Geometry. (12 w.)
Algebra. (4 w.)
Physical Culture.
Lectures, Agricult. and Horticult.
P. M.
Free-Hand Drawing. (2)
Dissecting. (1)
General History. (1)

Second Term.

Botany.
French.
Algebra. (6 w.)
Trigonometry. (14 w.)
Physical Culture.
Lectures, Agricult. and Horticult.
P. M.
Mechanical Drawing. (F. of T.)
Botanical Laboratory Work. (L. of T.) (2)
History. (L. of T.) (1)
Analysis of Authors. (L. of T.) (1)

SECOND YEAR.

First Term.

Botany. (Cryptogamic.)
General Chemistry.
French. (2)
German. (3)
Physics.
P. M. Laboratory.
Laboratory Physics. (2)
Laboratory Botany. (2)
Experimental Chemistry. (1)

Second Term.

Qualitative Chemistry.
Physics.
French. (3)
German. (2)
P. M.
Laboratory Physics. (2)
Analytical Chemistry. (3)

THIRD YEAR.

First Term.

German. (2)
Horticulture. (3)
Agricultural Chemistry.
Invertebrate Zoology.
English and American Literature.
P. M.
Horticulture. (2)
Analytical Chemistry. (3)

Second Term.

German. (2)
Horticulture. (F. of T.) (3)
Landscape Gardening. (L. of T.) (3)
Logic.
Entomology. (F. of T.)
Descriptive Astronomy. (L. of T.)
Agricultural Engineering.
P. M. Zoology and Entomology. (2)
Horticulture. (1)
Analytical Chemistry. (2)

FOURTH YEAR.

First Term.

Stock Feeding and Dairying.
Comparative Anatomy.
Psychology.
Political Economy and International Law.
P. M.
Comparative Anatomy. (2)
Horticulture and Farm Experiments. (2)
Literary Work. (1)

Second Term.

Stock Breeding and Veterinary Science.
Mineralogy and Geology.
U. S. Constitution and Business Law.
Psychology.
P. M. Thesis and Laboratory Work.

EXPLANATORY STATEMENTS.

In the framing of this course the design has been to fit young men to follow agriculture as a profession with success, never losing sight of the fact that education, in the truest sense, is the end to be attained.

The curriculum of studies is largely scientific and technical, not omitting, however, those branches that pertain to social and civil relations, and that serve to lay a broad foundation for a liberal and generous culture.

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

AGRICULTURAL ENGINEERING.

Agricultural engineering includes land surveying, the construction of roads, drainage of land, irrigation, water supply for stock and household, farm implements and machinery, methods of cultivation, and the handling of different farm crops.

AGRICULTURAL CHEMISTRY.

Under agricultural chemistry the following topics are taken up; origin, formation, and composition of soils; classification of soils and their physical characteristics; chemical composition of plants; sources of plant food; farm manures, their composition, preservation, and application; commercial fertilizers, their origin, composition, preparation, and use; fermentation and decay; the relations of the soils to heat and moisture; the mechanical conditions best adapted to plant growth and the objects to be gained by cultivation.

STOCK FEEDING.

The subject of stock feeding treats of animal nutrition; foods and fodders, their composition, digestibility, and comparative values; the calculation of rations for the various classes of farm animals and for various purposes, as for growth, fattening, milk production, and work.

DAIRYING.

Dairying includes the study of milk secretion, the chemical and physical properties of milk, rennet action, milk analysis, and milk testing, and practical lessons in butter and cheese making.

BOTANY.

Botany is taught by text-books, explanatory lectures, and practical laboratory work. The subject embraces General and Cryptogamic Botany.

General Botany considers the structure and uses of the organs of plants; the relation of the plant to the soil and atmosphere; the description, classification and naming of plants: preparation of plants for the herbarium; the relationship of the more important agricultural plants; and a special study of forage plants. Besides the regular recitations, the students have thirty hours of laboratory practice, describing, drawing and classifying plants, and each prepares a collection of fifty species.

Cryptogamic Botany embraces a detailed study of about thirty type forms of the prominent group of non-flowering plants. Their life history is traced in detail by the aid of compound microscopes, and accurate drawings of them made. Special attention, so far as possible, is given to useful and injurious forms. Such injurious species as blue mold, black molds, fish molds, mildews, wheat smut, corn smut, ergot, potato rot, black knot, &c., are especially studied, and known remedies considered. Fungicides and spraying apparatus receive attention. Students are required to collect specimens and prepare them for the herbarium.

Horticulture.—During the first term of the junior year instruction is given in vegetable gardening and fruit-growing. Lectures are given concerning the construction, care, and management of green-houses, hot-beds, and other forcing structures; fertilizers for the garden; the general principles of planting and cultivating; the culture of the leading vegetables in the field and under glass; methods of propagation—grafting, budding, etc.; the culture of orchard fruits and small fruits; the enemies and diseases of vegetables and fruits, with preventives and remedies. The lectures are supplemented by practical work in the forcing-house, and in the college gardens and fruit plantations.

In the second term, special attention is directed to the underlying principles of horticulture. Lectures are given concerning the laws of plant growth; the variations of plants as affected by soil, climate, and cultivation; methods and effects of crossing and hybridizing; and the principles of selection. Students are required to spend one afternoon each week in the laboratory or in the green-house.

Landscape Gardening.—The object of instruction in this branch is to convey definite ideas concerning the ornamentation of the home grounds, the school yard, and the cemetery, as well as hints on the arrangement of public parks and pleasure grounds; and to encourage a taste for attractive surroundings. The course includes a discussion of the general principles of landscape gardening as an art, and special stress is laid on the practical applications of these principles. Lectures are given on the relative positions of buildings, the arrangement and construction of walks and drives, the formation and care of lawns, the selection and planting of ornamental trees and shrubs with directions for pruning and general care, the improvement of school yards and rural cemeteries.

Zoology.—The branches studied that pertain to animal life are: Human Physiology, General Invertebrate Zoology, Comparative Vertebrate Zoology, Entomology, Stock Breeding, and Veterinary Science.

Human Physiology occupies one full term. In addition to the use of a text-book, explanatory lectures, the examination of a skeleton, a manikin, models of the larynx, ear, eye, and brain, and dissections of lower animals, contribute to a practical knowledge of the anatomy and functions of the human body. Special attention is given to Hygiene and Pathology. Two hours a week are devoted to laboratory work. This includes an examination of models and dissecting.

General Invertebrate Zoology embraces a detailed study of type forms of all the branches of invertebrates. "Packard's Zoology" is used as a guide. Martin and Huxley's, Brooks', Colton's, and Osborne's labora ory manuals are followed in laboratory practice so far as they apply. Students daily use the compound microscope to examine minute forms and tissues. Fresh, dried, and alcoholic materials, charts, models, and a good working library of reference books, contribute to a practical knowledge. Students make dissections, careful drawings, and classify the forms studied. Besides a full term in recitations, students do forty hours laboratory work.

Comparative Vertebrate Zoology embraces a comparative study of type forms of vertebrate animals. The methods and facilities for work are the same as in Invertebrate Zoology. The college is provided with a set of Auzoux's Models and a good working collection of type forms. One hundred and forty-four hours in recitation and laboratory work are devoted to the subject. Special attention is given to the zoology of the domestic animals.

Entomology embraces a study of the anatomy, physiology, classification, and economic importance of insects. Packard's Entomology for beginners is used as a guide. This work is preceded by a careful study of the Arthropoda. Special attention is given to injurious and beneficial insects. Insecticides and approved methods of destroying insects are considered. About 100 hours in recitations and laboratory work are devoted to this subject.

STOCK-BREEDING AND VETERINARY SCIENCE.

Stock-breeding is taken up under such divisions as heredity, atavism, fecundity, in-and-in breeding, cross-breeding; and, connected with the teaching of this subject, studies are made of the various breeds of animals represented on the college farm and instruction given in the scaling of animals. The course of veterinary instruction includes the presentation of the principles of the science with the practical information necessary to enable the student to recognize and treat the more common diseases of our domestic animals, and to meet intelligently emergencies which frequently arise among live-stock requiring the aid of the veterinarian.

Mineralogy embraces a careful study of the physical and chemical properties and plowpipe tests of about thirty species of the more common minerals that are useful in the arts and sciences. Special attention is given to building materials and to the minerals that enter into the composition of soils or are applied to soils as fertilizers. Attention is given to the principles of classification and naming of minerals and the arrangement of cabinets.

Geology embraces a study of the forces that are and have been at work modifying the features of the earth, a consideration of the records these forces have left in the crust of the earth, and a history of the earth, or a succession of the events that have occurred through the agency of chemical, physical, and vital forces. The subject is illustrated by many mineral, rock, and fossil specimens, and by charts, maps, and diagrams.

Special attention is given to the origin and formation of soils, to the method of conducting geological surveys, and to the geology of Maine. Excursions are made so far as practicable for the purpose of study in Geology and Natural History.

Throughout the course, the endeavor is made to inculcate established principles in agricultural science, and to illustrate and enforce them to the full extent admitted by the appliances of the laboratory

and the farm. So far as possible, students are associated with whatever experimental work is carried on, that they may be better fitted to continue such work in after life.

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

SHORT COURSES IN AGRICULTURE.

In addition to the full course in agriculture requiring four years for its completion, short courses in agriculture are arranged to meet the wants of young men who desire to extend their knowledge in their chosen vocation, but who can devote only a limited amount of time to preparation or study.

In order to adapt them to varying conditions of earlier acquirement and of time that can be given to special study, two courses are offered, one extending over a period of two college years and the other over a single year of thirty-six weeks. Both are designed to be intensely practical. While the former affords the wider range of study and practice, the latter, in its narrower range, offers also a plan of systematic study of prominent and important agricultural subjects.

Outline of Course of Two Years in Agriculture.

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Structural and Physiological Botany.	Plant Analysis and Horticulture.
General Chemistry.	Agricultural Chemistry.
Farm Accounts and Rural and Business Law.	Drainage and Road Construction.
Plane Geometry, or Agricultural Physics.	Plane Trigonometry and Surveying, or Entomology.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Horticulture.	Stock Feeding and Dairying.
Agricultural Chemistry.	Stock Breeding and Veterinary Science.
Animal Anatomy and Physiology.	Civil Government.
Political Economy.	Geology and Meteorology.

Outline of Course of One Year in Agriculture.

FIRST TERM.	SECOND TERM.
Botany and Horticulture.	Plant Analysis and Horticulture.
General and Agricultural Chemistry.	Agricultural Chemistry.
Animal Anatomy and Physiology.	Stock Feeding and Dairying.
Farm Accounts and Rural and Business Law.	Stock Breeding and Veterinary Science.

REQUIREMENTS, CERTIFICATES.

Students in these short courses should be at least sixteen years of age and have a good common school education. While no formal entrance examination is required, the Professor in charge will satisfy himself of the fitness of candidates to pursue the course selected with success. Young men considerably older than the minimum age named and who have a practical knowledge of farming, will find one of these short courses especially valuable.

Certificates will be given those completing either of the courses successfully and passing a satisfactory examination. Certificates will also be given on completion of the practical course in dairying, for which arrangements have also been made.

COURSE IN CIVIL ENGINEERING.

FIRST YEAR.

First Term.

Solid Geometry. (12 w.)
Algebra. (4 w.)
Rhetoric. (4)
Reading and Analysis of Authors. 1
Physiology.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Free-Hand Drawing. (2)
Dissecting. (1)
General History. (1)

Second Term.

Algebra. (6 w.)
Trigonometry. (14 w.)
Botany.
French.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Mechanical Drawing. (F. of T.)
Laboratory Botany. (L. of T.) (2)
History. (L. of T.) (1)
Analysis of Authors. (L. of T.) (1)

SECOND YEAR.

First Term.

Descriptive Geometry.
General Chemistry.
French. (2)
German. (3)
Physics.
P. M. Laboratory Physics. (2)
Mechanical Drawing. (3)

Second Term.

Analytical Geometry.
Descriptive Geometry. (F. of T.)
Surveying. (L. of T.)
Physics.
French. (3)
German. (2)
P. M. Laboratory Physics. (2)
Analytical Chemistry. (F. of T.) (3)
Field Work in Surveying. (L. of T.) (3)

THIRD YEAR.

First Term.

Calculus. (3)
German. (2)
Field Book and R. R. Surveying.
P. M. Field Work and Drawing or
{ Field Work and Drawing. (3)
{ Laboratory Physics. (2)

Second Term.

Calculus. (F. of T.)
Descriptive Astronomy. (L. of T.)
Mechanics of Engineering. (F. of T.)
Graphic Statics. (L. of T.)
German. (2)
Logic.
P. M. Isometric and Cabinet Projection or
{ Laboratory Physics. (2)
{ Isometric and Cabinet Projection. (3)

FOURTH YEAR.

First Term.

Civil Engineering.
Stereotomy. (F. of T.)
Sanitary Engineering. (L. of T.)
Practical Astronomy.
Political Economy and International Law.
P. M. Higher Surveying.

Second Term.

Civil Engineering.
Designing.
U. S. Constitution and Business Law.
Geology and Mineralogy.
P. M. Designing and Thesis Work.

EXPLANATORY STATEMENTS.

The object of this course is to give the student a thorough knowledge of higher mathematics, mechanics, astronomy and drawing, and, at the same time, a thorough drill in the use and care of the ordinary engineering instruments and in the application of mathematical principles and rules, so that the graduate can at once apply himself to engineering work, and be fitted, after a limited amount of experience in the field, to fill positions of importance and trust. The course also affords the education required to prepare the graduate for a responsible position among *men*, as well as among engineers.

The work is identical with that of the other courses during the first year. During the fall term of the sophomore year, students in this course work six hours each week on mechanical drawing, and four hours in the physical laboratory. In the first part of the last term of this year the afternoons are given to physical and chemical laboratory practice, each student devoting ten hours per week to the laboratories. During the last part of this term, the subject of land surveying is taken up, four hours each week being devoted to recitation work and three afternoons or one whole day each week being given to practical surveying in the field, where the student becomes familiar with the use and proper care of the instruments, and puts into practice the problems of the text-book so far as is possible in actual surveys.

During the first term of the junior year, the subject of railroad surveying is taken up by means of lectures and recitations. From these the student obtains a knowledge of the theory of railroad curves, switches, turnouts, slope-stakes, the calculation of earthwork, levelling, resistance to trains offered by grades and curves, and the construction of country roads, streets, and pavements. The methods of the class-room, so far as possible, are applied in the field by the execution of the preliminary and final surveys of a railroad from the college buildings to some point on the Maine Central Railroad, together with the necessary drawings, calculation of earthwork and estimate of the cost of building and equipping.

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

this term, each student in the class works two hours each day in the drawing room, where isometric, cabinet, and perspective projection is taken up by means of lectures and problems drawn by the students.

During the first term of the Senior year, an extended topographical survey, with the plane table and stadia measurements, is made, based upon a previous trigonometrical determination of the principal points. During this term, the students are also taught the use of the current meter, and apply their knowledge in the actual measurement of the volume of the Stillwater river.

In the recitation room, during this term, the principles of hydraulics as applied in engineering practice are taken up by means of lectures. The strength of materials, their durability, preservation, and fitness for special purposes, and the theories of ties, struts, beams, and arches are fully treated.

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

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

The first part of the last term of this year is devoted to the theory of foundations, retaining walls, and roof and bridge trusses, while the last part is given to the application of the principles already learned, to the designing and calculation of various kinds of engineering structures, and to making out estimates and specifications.

MINERALOGY AND GEOLOGY.

Mineralogy is taught by an introductory course of lectures, followed by laboratory practice in the determination of minerals and rocks, especial attention being given to their value for building purposes. This is immediately followed by a course of lectures in geology, together with excursions for the purpose of studying the rocks *in situ*, and also superficial deposits. Critical examinations are made in various railroad cuts of the hardness, slaty structure, jointed structure, etc., as bearing upon the cost of excavation.

ASTRONOMY.

In the last part of the spring term, Descriptive Astronomy is taken by the students of the Junior Class, and Practical Astronomy in the first term, Senior year.

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

Students in this department on the completion of the full course and the presentation of a satisfactory thesis, receive the degree of Bachelor of Civil Engineering. Three years later, on proof of professional work and the presentation of a satisfactory thesis the degree of Civil Engineer is conferred.

COURSE IN MECHANICAL ENGINEERING.

FIRST YEAR.

First Term.

Solid Geometry. (12 w.)
Algebra. (4 w.)
Rhetoric. (4)
Reading and Analysis of Authors. (1)
Physiology.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Free-Hand Drawing. (2)
Dissecting. (1)
General History. (1)

Second Term.

Algebra. (6 w.)
Trigonometry. (14 w.)
Botany.
French.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Mechanical Drawing. (F. of T.)
Laboratory Botany. (L. of T., (2)
History. (L. of T.) (1)
Analysis of Authors. (L. of T.) (1)

SECOND YEAR.

First Term.

Descriptive Geometry.
General Chemistry.
French. (2)
German. (3)
Physics.
P. M. Carpentry. (3)
Laboratory Physics. (2)

Second Term.

Analytical Geometry.
Descriptive Geometry. (F. of T.)
Mechanical Drawing. (L. of T.)
Physics
French. (3)
German (2)
P. M. Laboratory Physics. (2)
Forge Work. (3)

THIRD YEAR.

First Term.

Calculus. (3)
Link and Valve Motion. (2)
German. (2)
Mechanics. (3)
Kinematics.
P. M. Machine Work. (3)
{ Laboratory Physics or
{ Shop Work. (2)

Second Term.

Calculus. (F. of T.)
Descriptive Astronomy. (L. of T.)
{ Isometric and Cabinet Projection.
{ and Machine Design. (3)
German. (2)
Logic.
Mechanics.
P. M. Machine Work. (3)
{ Laboratory Physics or
{ Shop Work. (2)

FOURTH YEAR.

First Term.

Steam Engine.
Practical Astronomy.
Political Economy and International Law.
P. M. Mechanical Drawing.

Second Term.

Hydraulic Engineering.
Steam Engineering
U. S. Constitution and Business Law.
Geology and Mineralogy.
P. M. Machine Designing and Thesis Work.

EXPLANATORY STATEMENTS.

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

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

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

During the last term, senior year, the study of steam engineering is continued in its application to the construction of steam boilers. In connection with this subject, the student is required to design a steam boiler in all its details. The subject of hydraulics is taken up briefly, by text-book work in hydro-mechanics, and the principles applied to the solution of practical problems.

SHOP WORK.

The first term of the sophomore year, two hours of each day are devoted to work in carpentry, special attention being given to

accuracy of workmanship. Students are encouraged in every way to make articles of practical use.

During the second term of the same year, the student receives instruction in forge work, including the welding and tempering of steel. Each student is required to make a set of cold chisels and lathe tools for future use in machine work. A course in machine work during the first term of the junior year gives the student practice in the various methods of shaping and fitting metals by the use of the chisel, hack-saw and file, engine lathe, shaping machine, planer, and milling machine. During their second term, the sophomore students in this course take turns in running the shop engine, and are taught the rules of safety and economy in this branch of Engineering. Instruction in wood turning and pattern making is given during the senior year. There is also a course in foundry work in which the student is taught molding and casting. Physical laboratory practice engages the student two afternoons each week throughout the year.

DRAWING.

The work in drawing commences with a course in free-hand and elementary mechanical drawing, extending through the freshman year.

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

The second term of this year is devoted to isometric projection. During this term the student prepares an original design of some machine, makes working drawings of its details on tracing cloth, and finally prepares copies by the blue-print process. The drafting of the senior year consists of making calculations for designs of engines and boilers, the construction of the necessary working drawings, and making thesis drawings.

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

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

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

COURSE IN CHEMISTRY.

FIRST YEAR.

First Term.

Solid Geometry. (12 w.)
Algebra. (4 w.)
Rhetoric. (4)
Reading and Analysis of Authors. (1)
Physiology.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Free-Hand Drawing. (2)
Dissecting. (1)
General History. (1)

Second Term.

Algebra. (6 w.)
Trigonometry. (14 w.)
Botany.
French.
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Mechanical Drawing. (F. of T.)
Laboratory Botany. (L. of T.) (2)
History. (L. of T.) (1)
Analysis of Authors. (L. of T.) (1)

SECOND YEAR.

First Term.

General Chemistry.
Botany. (Cryptogamic.)
French. (2)
German. (3)
Physics.
P. M. Laboratory Physics. (2)
Laboratory Botany. (2)

Second Term.

Analytical Chemistry.
Physics.
French. (3)
German. (2)
P. M. Laboratory Physics. (2)
Analytical Chemistry. (3)

THIRD YEAR.

First Term.

Analytical Chemistry.
Chemistry. (3)
German. 2)
Invertebrate Zoology.
P. M. Analytical Chemistry.

Second Term.

Chemistry. (3)
German. (2)
Logic.
Entomology. (F. of T.)
Descriptive Astronomy. (L. of T.)
P. M. Laboratory Work, Zoology and Entomology. (2)
Analytical Chemistry. (3)

FOURTH YEAR.

First Term.

Chemistry.
Psychology.
Comparative Anatomy.
Political Economy and International Law.
P. M. Comparative Anatomy. (2)
Analytical Chemistry. (3)

Second Term.

Chemistry.
Psychology.
U. S. Constitution and Business Law.
Geology and Mineralogy.
P. M. Analytical Chemistry and Thesis Work.

EXPLANATORY STATEMENTS.

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

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

The class-room text-books used by this department are: Remsen's Chemistry and Naquet's Principes de Chimie. In the Laboratory are used: Craft's Qualitative Chemical Analysis, Fresenius' Quantitative Chemical Analysis, Frankland's Agricultural Chemical Analysis, Flint's Examination of Urine, Rickett's Notes on Assaying, Appleton's Quantitative Analysis, and Classen's Quantitative Analysis.

Valuable books of reference are found in the library.

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

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

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

COURSE IN SCIENCE AND LITERATURE.

FIRST YEAR.

First Term.

Rhetoric. (4)
Reading and Analysis of Authors. (1)
Physiology.
Solid Geometry. (12 w.)
Algebra. (4 w.)
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Free-Hand Drawing. (2)
Dissecting. (1
General History. (1)

Second Term.

French.
Botany.
Algebra. (6 w.)
Trigonometry. (14 w.)
Physical Culture.
Lectures, Agricult. and Horticult.
P. M. Mechanical Drawing. (F. of T.)
Laboratory Botany. (L. of T.) (2)
General History. (L. of T.) (1)
Analysis of Authors. (L. of T.) (1)

SECOND YEAR.

First Term.

Botany. (Cryptogamic.)
General Chemistry.
French. (2)
German. (3)
Physics.
P. M. Laboratory Physics. (2)
Laboratory Botany. (2)
General History. (1)

Second Term.

Physics.
Analytical Chemistry.
French. (3)
German. (2)
P. M. Laboratory Physics. (2)
Analytical Chemistry. (3)

THIRD YEAR.

First Term.

German. (2)
Anglo-Saxon. (3)
English and American Literature.
Invertebrate Zoology.
Advanced Physics. (2)
P. M. Laboratory Physics or Chemistry. (2)
Analysis of Authors and Historical Reading. (3)

Second Term.

German. (2)
Philology of the English Language. (3)
Logic.
Entomology. (F. of T.)
Descriptive Astronomy. (L. of T.)
Literary Work. (3)
Advanced Physics. (2)
P. M. Laboratory Work in Physics or Chemistry. 2)
Laboratory Work in Zoology and Entomology. (2)
Literary Work. (1)

FOURTH YEAR.

First Term.

History of Civilization.
Psychology.
Comparative Anatomy.
Political Economy.
P. M. Elements of Municipal Law. (1)
Comparative Anatomy. (2)
Literary Work. (2)

Second Term.

Horticulture. (F. of T.) (3)
Landscape Gardening. (L. of T.) (3)
Psychology.
U. S. Constitution.
International Law.
Geology and Mineralogy.
P. M. Literary and Scientific Work.

EXPLANATORY STATEMENTS.

The course in Science and Literature is designed for those young men and women who intend to pursue professions or callings for which the other courses do not especially fit them.

This course is generally parallel with that of the ordinary classical college except that a more complete study of the mother-tongue and of the natural sciences takes the place of the work done in Latin and Greek.

The aim in this, as in the other curricula of the college, is to educate in the etymological and best sense of the word; to draw the student out, to train and develop his powers of observation and reason, and to avoid so far as possible what is familiarly known as *cram*. With this end in view, the instruction by text-books and lectures, as will be seen by reference to the foregoing scheme, is closely associated with constant work in the library, laboratories, and field; every means available being employed to bring the student into direct contact with the subject-matter of his studies.

In the study of Anglo-Saxon and English Philology, the student becomes familiar with the origin of our language, its place in the Teutonic family, its relation to the other Indo-Germanic tongues; the sources whence it has been enriched, and the circumstances that have combined to bring it to its present fullness and strength. In Rhetoric, the most important part of the work is held to be the acquirement on the part of the student of an ability to express himself easily and well, hence much attention is given to written exercises, themes, and essays.

In Literature, following out the idea that the best way to become acquainted with an author is to study his productions, the text-book is made subordinate to the library work to which much attention is given during the entire course.

The soundest basis for a liberal education lies in a careful study and a clear knowledge of our own noble language and literature, and it is believed that the line of studies above set forth, supplemented by the courses in French and German, furnishing as it does a broad foundation for a true and generous culture, cannot fail to be of the greatest advantage to the young men and women of our State.

Upon graduation the students in Science and Literature receive the degree of Bachelor of Science; three years later, on proof of satisfactory advancement and on the presentation of a thesis embodying original work or investigation, they become entitled to the degree of Master of Science.

CLASS HOURS—First Term.

Hours.	Seniors.	Juniors.	Sophomores.	Freshmen.
7.45 A. M.	Chapel Services.	Chapel Services.	Chapel Services.	Chapel Services.
8.00 A. M.	Stock Feeding and Dairying, I Civil Engineering, II. Stereotomy (F. of T.), II. Sanitary Engineering (L of T.), II. Steam Engine (2), III. Chemistry, IV History of Civilization, V.	German (2) Horticulture (3), I. Kinematics (3), III. Chemistry (3), IV. Anglo-Saxon (3), V.	Botany (Cryptogamic), I, IV, V. Descriptive Geometry, II, III.	Solid Geometry (12 w.) Algebra (4 w.)
9.00 A. M	Psychology, I, IV, V. Practical Astronomy, II, III.	English and Amer. Literature, I, V. Field Book and R. R. Surveying, II. Mechanics, III. Anal. Chemistry, IV.	General Chemistry.	Rhetoric (4). Reading and Analysis of Authors (1).
10.00 A.M	Comparative Anatomy, I, IV, V. Steam Engine (3), III.	Agricultural Chemistry, I. Calculus (3), II, III Link and Valve Motion (2), III. Anal. Chemistry, IV. Advanced Physics (2), V.	French (2). German (3).	Physical Culture (3). Lectures, Ag. & Hort. (2).
11.00 A.M	Political Economy. Business Law.	Invertebrate Zoology, I, IV, V. Calculus (3), II, III. Link and Valve Motion (2), III	Physics.	Physiology.
P. M.	Comparative Anatomy (2), I, IV, V. Horticulture and Farm Experiments, (2), I. Literary Work (1), I. Higher Surveying, II. Mechanical Drawing, III. Analytical Chemistry (3), IV. Literary and Scientific Work (3), V Military Exercises.	Horticulture (2), I. Anal. Chemistry (3), I. Field Work and Drawing, II, or { Field Work and Drawing (3), II. { Laboratory Physics (2), II. Machine Work (3), III. Lab. Physics or Shop Work (2), III Analytical Chemistry, IV. Lab. Physics or Chemistry (2), V. Analysis of Authors (2), V. Military Exercises.	Laboratory Physics (2). Laboratory Botany (2), I, IV, V. Mechanical Drawing (3), II. Carpentry (3), III. General History (1), V. Military Exercises.	Free-Hand Drawing (2). Dissecting (1). General History (1). Military Exercises.

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

CLASS HOURS—Second Term.

Hours.	Seniors.	Juniors.	Sophomores	Freshmen.
7.45 A. M.	Chapel Services.	Chapel Services.	Chapel Services.	Chapel Services.
8.00 A. M.	Stock Breeding and Veterinary Science, I. Civil Engineering, II. Hydraulic Engineering, III. Chemistry, IV. Horticulture (F of T.) (3), V. Landscape Gardening (L. of T.) (3), V	German (2). Horticulture (F. of T) (3), I. Landscape Gardening (L. of T.) (3), I Isometric and Cabinet Projection and Machine Design (3), III. Chemistry (3), IV Philology of English Language (3) V.	Physics.	Botany.
9.00 A. M.	Psychology, I , IV., V. Designing, II Steam Engineering, III. Chemistry (2), IV.	Logic.	Analytical Chemistry, I , IV , V. Analytical Geometry, II , III.	French
10.00 A.M.	U. S. Constitution. International Law.	Entomology (F of T.), I , IV., V. Calculus(F. of T), II, III. Descriptive Astronomy, (L of T.)	Analytical Chemistry, I., IV , V. Descr'pt've Geometry (F. of T.), II, III. Surveying (L of T.), II. Mechanical Drawing (L of T.) .III.	Physical Culture (3). Lectures, Ag. & Hort. (2)
11.00 A.M.	Geology and Mineralogy.	Agricultural Engineering, I. Mechanics of Engineering (F. of T.), II. Graphic Statics (L of T.), II. Mechanics, III. Chemistry, IV. Literary Work (3), V. Advanced Physics (2), V	French (3) German (2).	Algebra (6 w.) Trigonometry (14 w.)

P. M.	Thesis Work, I. Designing and Thesis Work, II. Machine Designing and Thesis Work, III. Analytical Chemistry, IV. Literary and Scientific Work, V. Military Exercises.	Laboratory Work, Zoology and Entomology (2), I, IV, V. Horticulture (1), I. Analytical Chemistry (2), I. Isometric and Cabinet Projection (3), II Laboratory Physics or Isometric and Cabinet Projection (2), II. Machine Work (3), III. Laboratory Physics or Shop Work (2), III. Analytical Chemistry (3), IV. Laboratory Physics or Chemistry (2), V. Literary Work (1), V. Military Exercises.	Laboratory Physics (2). Analytical Chemistry (3), I., IV., V Analytical Chemistry (F. of T.) (3), II. Field Work in Surveying (L. of T) (3), II Forge Work (3), III. Military Exercises.	Mechanical Drawing (F. of T) Laboratory Botany (L. of T) (2). History (L of T) (1). Analysis of Authors (L. of T) (1) Military Exercises.

LABOR.

In the several courses, a large amount of practice is required in connection with the theoretical instruction of the class-room. Such labor is purely educational and for it no pecuniary compensation is made.

Nearly all the work in the chemical, botanical and zoological laboratories, in the drawing-rooms, in the shop, and a large part of that in the gardens and fields is of this nature. While a small amount of non-educational labor is obtainable, the principal prominence is given to that which has educational value.

MILITARY INSTRUCTION.

Thorough instruction in Military science is given by an officer of the United States army, detailed for that purpose from the active list by the Secretary of War.

By requirement of the National Government all able-bodied male students receive instruction in this department. In addition to the practical work in drill, guard-mounting, rifle-practice, castrametation, and hasty fortifications, theoretical instruction is given by recitations in tactics, and by lectures on the art and science of war. The corps is supplied with the Springfield breech-loading rifles by the general government, which also furnishes five thousand rounds of ammunition for target practice yearly.

The uniform is a dark blue blouse with the State of Maine buttons and gilt braid on the cuffs; the trousers are of a lighter blue, and the caps blue with a gold wreath ornament. The shoulder straps and chevrons are of red and gold.

The students are required to wear their uniforms during the military exercises, but may and usually do wear them about their ordinary college work. The uniform costs about eighteen dollars and is an inexpensive and serviceable suit.

LOCATION.

The college has a pleasant and healthful location, between the villages of Orono and Stillwater, about a mile from each. Stillwater river, a tributary of the Penobscot, flows in front of the buildings, forming the western boundary of the college farm, and adding much to the beauty of the surrounding scenery.

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

FARM AND BUILDINGS.

The college farm contains three hundred and seventy acres of land, of fair natural productiveness, and of sufficient diversity of soil, to adapt it to the experimental purposes of the institution.

Oak Hall contains forty-eight rooms, and has connected with it a boarding-house. This and the "White" and "Goddard" houses occupied by student societies, furnish desirable accommodations for one hundred and twenty-five students.

The chemical laboratory contains two apparatus rooms, a lecture room, a 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 department.

The Shop is amply equipped for instruction in the working of wood and of iron, including the processes of carpentry, wood turning, filing, forging, lathe work, and the casting of metals.

Coburn Hall is occupied by the departments of Natural History and Agriculture. In addition to the rooms needful for the two departments named, it contains a large audience-room, a commodious room for the College Library, and a room especially arranged for a Physical Laboratory.

Wingate Hall furnishes abundant room and facilities for instruction in the departments of Civil and Mechanical Engineering. It also contains two recitation rooms, a physical apparatus room, a physical lecture-room, and commodious rooms for the Young Men's Christian Association.

The Horticultural Building and Plant House and the Dairy House are supplied with needful apparatus and meet very perfectly the requirements for which they were constructed.

The College is supplied in all its departments with apparatus sufficient to meet fully the requirements of instruction.

The library, of which the nucleus was obtained by the generosity of ex-Governor Coburn, has recently received valuable additions through contributions made by other friends of the college and through purchase. The present number of volumes, about seven

thousand five hundred, is continually receiving accessions of standard works in literature and science. A card-catalogue of all the books has been made, and the library has become a most important auxiliary to all departments of instruction.

The following periodicals are supplied by the college to the library: Agricultural Science, American Garden, American Geologist, American Journal of Meteorology, American Journal of Psychology, American Journal of Science, American Machinist, Atlantic Monthly, Botanical Gazette, Bulletin of Torrey Botanical Club, Century Magazine, Cosmopolitan, Cultivator and Country Gentleman, Edinburgh Review, Education, Educational Review, Electrical Engineer, Electrical Enterprise, Electrical World, Engineer (N. Y.), Engineer (London), Engineering News, Forum, Garden and Forest, Gardener's Chronicle, Harper's Magazine, Journal of Analytical Chemistry, Journal de Pharmacie et de Chimie, Journal of the Franklin Institute, Journal of the Royal Agricultural Society, Magazine of American History, Manufacturer and Builder, Messenger of Mathematics, Nation, New England Magazine, Nineteenth Century, North American Review, Observatory, Philosophical Review, Political Science Quarterly, Popular Science Monthly, Railroad and Engineering Journal, Science, Transactions of the American Society of Civil Engineers, United Service, Western Electrician.

The following publications are kindly sent by the publishers to the library:

Engineering (London), Experiment Station Record, Industrialist (published by Kansas State College), Official Gazette of the United States Patent Office, Sanitary Inspector (published by the Maine Board of Health).

READING ROOM.

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

American Cultivator, Aroostook Republican, Gospel Banner, Kennebec Journal, Lewiston Journal, Maine Farmer, Maine Industrial Journal, Oxford Democrat, Piscataquis Observer, Portland Transcript, Somerset Reporter, Bangor Daily Whig and Courier, Zion's Herald, Bangor Daily Commercial, Springvale Advocate, Eastport Sentinel, The Industrialist (Kansas), Old Town Enter-

prise, Boston Evening Transcript, Bangor Daily News, Aroostook Times, National Farmer, The Farmer's Home, The Star-Herald, Rural New Yorker, Oxford County Advertiser, Prairie Farmer, Delaware Farm and Home, Machias Union, Brunswick Telegraph, Stationary Engineer, Printer's Ink, Camden Herald.

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

American Machinist, Cultivator and Country Gentleman, Scientific American, Eastern Argus (furnished by S. W. Gould), Lewiston Evening Journal, Journal of Education, Boston Sunday Herald, Boston Daily Globe, Boston Record, Portland Daily Press, Harper's Weekly, Science, Puck, Judge, Mirror and Farmer, Rockland Free Press, Science, Morning Star, Auburn Daily Gazette, Army and Navy Register, Healthy Home, Public Opinion, Electrical World.

CABINET.

The natural history collections of the college include about nine hundred named and mounted species of the flowering plants of Maine, the Blake Herbarium consisting of foreign and indigenous phenogams and cryptogams numbering about fourteen thousand specimens, the Ellis collection of North American fungi of twenty-three hundred species, a collection of several hundred specimens of marine algæ and several small miscellaneous collections, a collection of sections of tropical species of wood presented by the Department of Agriculture at Washington, and a similar collection of the United States species from the Census Bureau.

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

On exhibition also are a good series of the more common minerals and ores, supplemented by a collection presented by the National Museum, a collection of building stones from many of the Maine quarries, and a collection presented by the Smithsonian Institution, together with a series of microscopical sections of building stones,

given by G. P. Merrill, M. S , Ph. D. In the same room is exhibited a series of typical fossils which illustrate the various geological horizons, together with a collection of Indian stone implements, and various curiosities presented by the friends of the Institution.

PUBLIC WORSHIP.

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

YOUNG MEN'S CHRISTIAN ASSOCIATION.

The students of the college maintain an active organization of the Young Men's Christian Association, holding meetings weekly.

Its elevating influence in the college is clearly manifest especially in the earnest and high moral and Christian life of those who constitute its membership.

EXPENSES.

Tuition is free and room-rent in Oak Hall is also free. For students in Mechanical Engineering, the cost of material and repair of tools for the course of instruction is five dollars per term.

Laboratory expenses are at cost of glassware broken, injury to apparatus, and chemicals used. A deposit of five dollars is required of students entering upon a term's work in Qualitative Analysis, and of seven dollars per term from students in Quantitative Analysis.

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

Bedding and furniture must be supplied by the students, who also furnish their own lights. Tables, chairs, sinks, bedsteads, and mattresses can be purchased at the college or at the village of Orono.

The price of board will be at cost, and will be determined from term to term. In the history of the college, the price has ranged between $2.60 and $3.15 per week. In the recent term, autumn 1892, the cost of board was $2.85 per week. Washing averages not more than sixty cents per dozen.

The cost of heating by steam of single rooms (each suitable for two occupants) is about ten dollars a room for each term. The charge for general heating (of recitation rooms and rooms devoted to general purposes) is seven dollars for the autumn term and eight dollars for the spring term. The charge for incidental expenses, including pay for services of janitor, for carrying mail, for cleaning and renovating rooms is four dollars and five dollars for the respective terms.

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

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

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

MEANS OF DEFRAYING EXPENSES.

The summer vacation, which includes the months of July and August, is at a season when farm labor is most profitable, and when students in engineering are most likely to secure remunerative employment.

The winter vacation of six weeks, too short to allow an opportunity to teach without trespassing upon term-time, is long enough to turn to profitable account by a temporary engagement. Students who fully utilize these two periods for earning money can thus cancel a large fraction of their necessary expenses.

SCHOLARSHIPS.

The Trustees make provision for the establishment of scholarships by any individual or society by payment to the Treasurer of the college of a sum not less than seven hundred and fifty dollars.

KIDDER SCHOLARSHIP.

The first scholarship under the plan indicated above has been given by Frank E. Kidder, C. E., class of 1879, of Denver, Colorado, and now yields thirty dollars a year, for a meritorious student of the Junior class.

OFFICERS OF THE ALUMNI ASSOCIATION.

PRESIDENT.

PROF. H. M. ESTABROOKE, Orono.

RECORDING SECRETARY.

FRED P. BRIGGS, Orono.

CORRESPONDING SECRETARY.

RALPH K. JONES, Findlay, Ohio.

TREASURER.

PROF. J. N. HART, Orono.

NECROLOGIST.

L. H. MERRILL, Orono.

CLASS SECRETARIES.

1872. E. J. HASKELL, Westbrook.
1873. J. M. OAK, Bangor.
1874. W. BALENTINE, Orono.
1875. E. F. HITCHINGS, Bucksport.
1876. E. M. BLANDING, Bangor.
1877. S. W. GOULD, Skowhegan.
1878. JOHN LOCKE, JR., Portland.
1879. F. E. KIDDER, Denver, Col.
1880. A. H. BROWN, Old Town.
1881. H. M. PLAISTED, St. Louis, Mo.
1882. W. R. HOWARD, Saxton's River, Vt.
1883. L. W. TAYLOR, Pittsfield.
1884. G. H. ALLEN, Portland.
1885. J. N. HART, Orono.
1886. R. K. JONES, Findlay, O.
1887. D. W. COLBY, Orono.
1888. T. G. LORD, Skowhegan.
1889. NELLIE W. REED, Stillwater.
1890. N. C. GROVER, Orono.
1891. H. G. MENGES, Bangor.
1892. G. F. ATHERTON, Cape Elizabeth.

GRADUATES.

*CLASS OF 1872.

Name and Occupation. *Residence.*

Benjamin F. Gould, C. E., Real Estate and Insurance, Hollister, California
George E. Hammond, C. E., Civil Engineer..... Elliot
Edwin J. Haskell, B. S., Silk Manufacturer..... Westbrook
Heddle Hilliard, C. E., Civil Engineer. ..... Old Town
Eben D. Thomas, B. S., Farmer and Surveyor, Grand Rapids, Mich.
George O. Weston, B. S., Farmer. ..... Norridgewock

CLASS OF 1873.

Russell W. Eaton, C. E., Agent Cabot Mfg. Co ..... Brunswick
George H. Hamlin, C. E., Professor of Civil Engineering, Maine State College, Orono
Fred W. Holt, C. E , Civil Engineer ..... St. George, N. B.
John M. Oak, B. S., Merchant..... Bangor
*Charles E. Reed, C. E., Agent Columbia Bridge Co.... Dayton, O.
Frank Lamson Scribner, B. S., Professor of Botany and Horticulture, and Director Experiment Station, University of Tennessee..... Knoxville, Tenn.
Harvey B. Thayer, B. S., Druggist..... Presque Isle

CLASS OF 1874.

William A. Allen, C. E., Chief Engineer, M. C. R. R. .. Portland
Walter Balentine, M. S., Professor of Agriculture, State College, Orono

*Deceased.

Name and Occupation. *Residence.*

William H. Gerrish, B. S., M. D., Physician . . . . . Royalton, Vt.
John I. Gurney, B. S., Florist . . . . . Dorchester, Mass.
Rodney D. Hunter, B. S , Insurance Agent. . . . . Oakland, Cal.
Louise H. Ramsdell, B. S. (Mrs. Milton D. Noyes) . . . . Atkinson

CLASS OF 1875.

Solomon W. Bates, C. E., Patent Attorney. . . . . Portland
Wilbur A. Bumps, C. E., M. D., Physician. . . . . Dexter
*Samuel H. Clapp, C. E., Teacher. . . . . Danvers, Mass.
Lewis F. Coburn, C. E., Lawyer . . . . . Eureka, Cal.
Charles F. Colesworthy, B. S., Merchant . . . Portland, Oregon
*Charles F. Durham, C. E., Teacher. . . . . Crescent City, Cal.
Alfred M. Goodale, B. S., Agent Boston Manufacturing C .,
Waltham, Mass.
Edson F. Hitchings, C. E., M S., Instructor Natural Science,
E. M. Con. Sem'y, Bucksport
Whitman H. Jordan, M. S., Director Agricultural
Experiment Station, Orono
Edward D. Mayo, M. E., Mechanical Engineer,
Minneapolis, Minn.
Albert E. Mitchell, M. E., Mechanical Engineer,
Erie R. R , Susquehanna, Pa.
Allen G. Mitchell, C. E., Ass't Engineer, P. R. R.,
Pittsburg, Pa.
*Fred L. Moore, B. S , Teacher . . . . . Visalia, Cal.
Luther W. Rogers, B. S., Merchant . . . . . Atlanta, Ga.
Minott W. Sewall, M. E., Mechanical Engineer,
Babcock & Wilcox Boiler Co., New York, N. Y.
George M. Shaw, C. E . . . . . Oakland, Cal.
Wesley Webb, M. S., Editor Farm and Home, and
President State College for Colored Students, Dover, Del.
*Edgar A. Work, C. E. . . . . U. S. Military Academy

CLASS OF 1876.

Edmund Abbott, B. S., M. D., Physician . . . . . Providence, R. I.
Charles P. Allen, B. S., Lawyer and Banker . . . . Presque Isle

*Deceased.

Name and Occupation. *Residence.*

Elbridge H. Beckler, C. E., Chief of Construction,
G. N. R. R., Helena, Mon.

Fred M. Bisbee, C. E., Road Master,
G. C. & S. Fe R. R., Cleburne, Texas

Edward M. Blanding, B. S., Editor and Publisher
Maine Industrial Journal, Bangor

Charles M. Brainard, B. S., Lumber Manufacturer. .. Skowhegan

*George H. Buker, B. S., Druggist..... Presque Isle

Florance H. Cowan, B. S., Teacher ..... Lynn, Mass.

Oliver Crosby, M. E., Prest. Amer. Hoist & Derrick Co.,
St. Paul, Minn.

Vetal Cyr, B. S., Principal Madawaska Training School, Fort Kent

James E. Dike, C. E , Civil Engineer..... ... Port Falls, Idaho

*Willis O. Dike, B. S ... ... Gorham

Horace M. Estabrooke, M. S., A. M.,
Professor Rhetoric and Modern Languages, State Coll., Orono

Arthur M. Farrington, B. S., D. V. S., Chief of Div. U. S.
Bureau of Animal Industry, Washington, D. C.

George O. Foss, C. E., Ass't Engineer, G. N. R. R.,
Helena, Mon.

William T. Haines, B. S., LL. B., Lawyer. ... . Waterville

Henry F. Hamilton, B S., D. D. S., Dentist. .....Boston, Mass.

Newell P. Haskell, B. S., Farmer ... .Orono

Edward S. How, M. E., Clerk, Treas. Department,
Washington, D. C.

Philip W. Hubbard, B. S., Nurseryman..... Alhambra, Cal.

Samuel M. Jones, M. E., Merchant ..... Springfield, Mass.

Albert A. Lewis, B. S., Clergyman ..... . Bath

Herbert A. Long, M. E., Farmer.. .....Machias

Luther R. Lothrop, C. E., Chief Engineer,
L. L. R. R., St. Paul, Minn.

Nelson H. Martin, B. S., Merchant. ... . Ft. Fairfield

Charles E. Oak, M. E., State Land Agent and
Forest Comm'r, Augusta

George D. Parks, C. E., Lawyer. ....Fort Payne, Ala.

Haywood Pierce, B. S., Mount Waldo Granite Works ...Frankfort

Frank R. Reed, C. E., Civil Engineer. .. .. Auburn

*Deceased.

Name and Occupation. *Residence.*

Henry J. Reynolds, B. S., Druggist ..... Eastport
Charles W. Rogers, M. E., Mechanical Engineer. .. Chicago, Ill.
William L. Stevens, M. E., Flour Commission Merchant, Minneapolis, Minn.
John H. Williams, B. S , Surveyor. ..... Elk River, Minn.

CLASS OF 1877.

Alvah D. Blackinton, C. E., Chief Engineer, E & W. Railway, Dunmore, Pa.
Robert B. Burns, C. E , Resident Engineer, A & P. R. R., Prescott, Ariz.
Eugene H. Dakin, B. S., Sec'y and Treas., Industrial Pub. Co., Bangor
Edward F. Danforth, B. S., LL. B., Lawyer.. .. ... Skowhegan
Augustus J. Elkins, B. M. E , Victoria Elevator Co., Minneapolis, Minn.
Alicia T. Emery, B. S.. .. .. Orono
Samuel W. Gould, B. S., Lawyer ... ... Skowhegan
*Joseph C. Lunt, B. C. E , Civil Engineer, Mex. C. R. R , El Paso, Texas
Fred F. Phillips, B. S , Manager Equitable Life Assurance Society, Bangor
*Samuel Shaw, B. M E., Architectural Draughtsman, Boston, Mass
Frank P. Stone, B. S., Druggist. .... Norway
Thomas J. Stevens, B. M. E., Druggist .... Portland
George E. Sturgis, B. C. E., Druggist..... Portland, Oregon
Charles E. Towne, B C. E., U. S. Surveyor, U. S. Dep'ty Mineral Surveyor and Mining Engineer, Rocky Bar, Elmore Co., Idaho
James W. Weeks, B. M. E., Architect. .. No. Des Moines, Iowa
Nellie E. Weeks, B. S., (Mrs. Llewellyn Spencer) ....Orono
Ivan E. Webster, B. S. .... Orono

CLASS OF 1878.

Emma Brown, B. S., Supervisor of Schools, (Mrs. Charles Gilman), Enfield
Andrew J. Caldwell, B. M. E , Mech. Engineer, New York, N. Y.

*Deceased.

Name and Occupation. *Residence.*

Cecil C Chamberlain, B. S., Lumber Merchant ... Enderlin, N. D.
Geo. E. Fernald, B. C. E., Salesman ... Chicago, Ill.
James Heald, B. S., Civil Engineer ... Seattle, Wash.
John Locke, Jr., B. S.,
Chief Clerk Freight Dept., M. C. R. R., Portland.
Frank J. Oakes, B. C. E ... Mech. Eng., New York City
John C. Patterson, B. C. E., Ass't Engineer, G. N. R. R.,
Minneapolis, Minn.
Winfield E Tripp, B. C. E., LL. B , Lawyer. .. Iron River, Wis.
Edward C. Walker, B. S., Lawyer ... Lovell
Otis C. Webster, B. S., Druggist ... Augusta

CLASS OF 1879.

Harry B. Bean, C. E. ... San Jose, Cal.
Edward J. Blake, C. E , Chief Engineer, C. B. & Q. R. R.,
Chicago, Ill.
Simon P. Crosby, B. S., Lawyer ... St. Paul, Minn.
John D. Cutter, B. S., M. D , Physician ... Tomahawk, Wis.
Wilbur F. Decker, M. E., Broker ... Minneapolis, Minn.
David A. Decrow, B. C. E., Hyd. & Mech. Engineer,
Holly M'f'g Company, Lockport, New York
Willis E. Ferguson, B. S., Nurseryman ... Glendora, Cal.
Charles W. Gibbs, C. E , Civil Engineer. . S. R. R , Ridgway Col.
Annie M. Gould, B. S., (Mrs. Loomis F. Goodale),
St. Joseph, Mo.
*Nellie M. Holt, B. S , Teacher.. ... Orono
Frank E. Kidder, C. E., Architect. ... Denver, Col.
Mark D. Libby, B. C. E., Lawyer ... Kingman, Kan.
*Charles S. Loring, B. M. E., Machinist ... Lewiston
George P. Merrill, M. S., Ph. D., Curator Dept. of Geology,
Nat. Museum, Washington, D. C.
John W. Meserve, B. M. E., Engineer,
Yale and Towne M'f'g Co., Stamford, Conn.
Arthur L. Moore, B. S., Farmer... ... Limerick
Charles A. Morse, C. E., Resident Engineer, A. T. & S. F. R. R.,
Pueblo, Col.
Fred D. Potter, B. M. E., Engineer and Contractor,
New York, N. Y.

*Deceased.

Name and Occupation. *Residence.*

Alton J. Shaw, B. M. E., President and Superintendent Shaw Electric Crane Co., Muskegon, Mich.
Percia A. Vinal, M. S., (Mrs. Albert White).. ... ...Orono
Geo. O. Warren, B. S., Farmer..... .....Fryeburg
Herbert Webster, B. S., Nurseryman. ... .Alhambra, Cal.

CLASS OF 1880.

Horace W. Atwood, B. S., D. V. S., Real Estate Broker, Brockton, Mass.
James M. Bartlett, M. S., Analytical Chemist, Agricultural Experiment Station, Orono
Albert H. Brown, B. S., Banker.. .... Old Town
Marcia Davis, B. S., (Mrs. Joseph D Stevens) . .. Denver, Col.
Fred B. Elliot, B S., Farmer and Stock Breeder . ...Bowdoinham
Sarah P. Farrington, B. S., (Mrs. George P. Merrill), Washington, D. C.
Charles W. Fernald, B. S., Merchant ....So. Levant
Fred W. Fickett, M. S., Recorder Municipal Court, Galveston, Texas
George W. Lufkin, B. C. E., Ass't Engineer W. & N. R. R., Coatesville, Pa.
Frank A. Mansfield, M. S., B D., Clergyman .. .. Boston, Mass.
Annie A. Matthews, B. S., Teacher ... . Stillwater
Henry W. Murray, B. C. E., Farmer and Teacher.... Napa, Cal.
Franklin R. Patten, C. E , Engineer B. & O. R. R. Philadelphia, Pa.
Charles T. Pease, B. S., Civil Engineer..... .. Rico, Colo.
James F. Purington, B. S., Railway Postal Clerk ... . Bath

CLASS OF 1881.

Henry H. Andrews, M. E., Bank Cashier ... .. Callaway, Neb.
Henry W. Brown, M. S., Professor Metaphysics, Literary Institute, New Hampton, N. H.
Clara L. Buck, B. S., (Mrs. Thomas W. Hine), Phœnix, Arizona
Fannie E. Colburn, B. S., Teacher, (Mrs. Arthur L. Fernald), Omaha, Neb.
Edward H. Farrington, M. S., Agricultural Chemist, Experiment Station, University of Illinois, Champaign, Ill.

Name and Occupation. *Residence.*

Oliver C. Farrington, M. S., Ph. D., Teacher, Cape Elizabeth
Charles H. Fogg, B. C. E., Civil Engineer.... Greensburg, Pa.
Aldana T. Ingalls, B. C. E. Placer, Montana
*Robert J. Johnson, B. C. E., Civil Engineer .....Butte, Mon.
Clara A. Libby, B. S., Millinery and Fancy Goods... Augusta
Horace F. McIntyer, B. M. E., Miller ... Waldoboro
Charles L. Moor, B. C. E., Book-Keeper... ..Hartland
*Benjamin F. Murray, B. C. E., Farmer ..... Stillwater
Edwin W. Osborn, B. C. E., Chief Clerk Gen. Supt's Dept., N. P. R. R., St. Paul, Minn.
Oscar L. Pease, B. S., Station Agent, So. Pac. R. R., Gila Bend, Arizona
Harold M. Plaisted, M. E., Patent Solicitor and Engineer, St. Louis, Mo.
Alice I. Ring, B. S. .. Orono
Mary L. Ring, B. S., (Mrs. H. H. Andrews) .. .. Callaway, Neb.
*Roscoe L. Smith, B. S., Farmer.. ... Lewiston
George W. Sturtevant, B. C. E., Civil and Hydraulic Engineer, Chicago, Ill.
Frank S. Wade, B. S., M. D., Physician ...New Richmond, Wis.
*Walter A. White, B. C. E., LL. B., Lawyer.....Newport
*John B. Wilson, B. S., Medical Student.. ... .Orono
Levi A. Wyman, B. C. E., Real Estate Lawyer and Civil Engineer, Ellsworth

CLASS OF 1882.

Charles S. Bickford, B. S., Associate Editor, Telegraph, Brunswick
Jacob L. Boynton, B. S. ..... Lynn, Mass.
Charles W. Brown, B. M. E., Draughtsman, Patent Office, Washington, D. C.
Stephen J. Buzzell, B. C. E., Civil Engineer... ... Old Town
Oscar H. Dunton, M. E., Medical Student.. .... Cincinnati, Ohio
Walter Flint, M. E., Professor of Mech. Engineering, State College, Orono
George R. Fuller, B. S., Lawyer..... Southwest Harbor
Charles C. Garland, B. S., Banker and Dealer in Pine Land, Minneapolis, Minn.
Joseph F. Gould, B. S., City Attorney..... Old Town

*Deceased.

Name and Occupation. *Residence.*

Thomas W. Hine, B. S., Banker.. ..... Phœnix, Ariz.
Will R. Howard, B. S., Teacher Vermont Academy,
Saxton's River, Vt.
Alonzo L. Hurd, B. S., M. D., Physician.. ... .. Somers, Conn.
Alfred J. Keith, B. C. E., Shoe Manufacturer . ... .. Old Town
Frank I. Kimball, C. E., Supt. Carbon Coal Co....Greensburg, Pa.
James H. Patten, B. S., M. D., Physician ... ... Clifton
Frederick M. Reed, B. M. E., Draughtsman,
B. & S. M'f'g Co., Providence, R. I.
Gleason C. Snow, B. S., Farmer ... . North Orrington
Avery P. Starrett, B. S., Farmer... ..... Warren
Frank H. Todd, B. C. E., Civil Engineer N. P. R. R.,
W. Duluth, Minn.
Eben C. Webster, B. S., Treasurer Webster Paper Co.. .. Orono
Willard A. Wight, B. C. E., Supt. Gas and
Electric Light Works, Trinidad, Col.
Daniel C. Woodward, B. M. E , Draughtsman.. ..Madison, Wis.

CLASS OF 1883.

James H. Cain, B. S.... ..... Orono
Jonathan V. Cilley, B. C. E., Inspector General of Railroads,
Buenos Ayres, Arg. Rep., S. A.
Frank E. Emery, B. S., Asst. Prof. of Ag. N. C. College,
Agriculturist to Exp't Station, Raleigh, N. C.
Arthur L Fernald, B. S., Merchant..... Omaha, Neb.
Bartholomew P. Kelleher, B. S., M. D., Physician..... Orono
Lucius H. Merrill, B. S., Analytical Chemist,
Agricultural Experiment Station, Orono
Jennie C. Michael, B. S., Teacher ..... Phœnix, Ariz.
Charles W. Mullen, B. C. E., Civil Engineer... ... Old Town
Truman M. Patten, B. C. E., Civil Engineer .. Sioux Falls, S. D.
Harry W. Powers, B. S., Manufacturer... .... Orono
Charles E Putnam, B. C. E., Civil Engineer,
Franklin Park, Boston, Mass.
Lewis Robinson, Jr., B. M. E., M. D., Physician South Brewer
George A. Sutton, B. C. E., Farmer.. ..... Orono
Levi W. Taylor, M. S., Prin. Com. Dept. M. C. Institute,
Pittsfield

CLASS OF 1884.

Name and Occupation. *Residence.*

George H. Allan, B. S., Lawyer..... Portland
*Will H. Burleigh, B. C. E. ..... Vassalboro
Mary F. Conroy, B. S., (Mrs. A. R. Saunders)
Tacoma, Wash.
Leslie W. Cutter, B. C. E., Contractor and Builder..... Bangor
Harriet C. Fernald, M. S., Librarian, State College..... Orono
Elmer E. Hatch, B. S., Farmer.. ..... Etchetah, Mon.
John E. Hill, B. C. E., Civil Engineer. ..... Lander, Wyo.
Joseph G. Kelley, C. E., Civil Engineer.. ... ... Eugene, Oregon
Edwin F. Ladd, B. S., Chemist, Experiment Station and
Professor of Chemistry, State College, Fargo, N. D.
Clarence S. Lunt, B. C. E., City Editor Commercial..... Bangor
Fred L. Stevens, B. S., Student of Veterinary Science,
New York, N. Y.
William Webber, M. E., Draughtsman, McCormick H. M. Works,
Chicago, Ill.

CLASS OF 1885.

George W. Chamberlain, B. S., Principal Grammar School, Calais
Asher Dole, B. C. E., Civil Engineer.. ... ... Superior, Wis.
Orion J. Dutton, B. S., Broker. . .. . Boston, Mass.
Henry T. Fernald, M. S., Ph. D., Professor of Zoology,
State College, Pa.
Elmer O. Goodridge, M. E., Mechanical Engineer T. & H. E. Co.,
Lynn, Mass.
George L. Hanscom, B. S., Clergyman .... Sheldon, Iowa
James N. Hart, C. E., Professor of Mathematics and Astronomy,
State College, Orono
Frank E. Hull, C. E., Civil Engineer B. & A. R. R..... Warren
Austin H. Keyes, B. C. E., Principal High School, Auburn, R. I.
William Morey, Jr., B C. E., Examiner of Surveys,
General Land Office, Washington, D. C.
Joseph P. Moulton, B. S., Farmer... ... ... Springvale
Leonard G. Paine, M. E., Mechanical Engineer..... Searsport
Elmer E. Pennell, B. M. E., Machinist. . ... Saccarappa
Louis W. Riggs, B. M. E , Ph. B., Instructor Science
and Mathematics, Englewood, N. J.

---

* Deceased.

Name and Occupation. *Residence.*

Fremont L. Russell, B. S., V. S., U. S. Inspector, Vanceboro and Veterinarian to Me. Agric'l Exp. Station, Orono

CLASS OF 1886.

Bert J. Allen, B. C. E., Principal Pratt Free School, No. Middleboro, Mass.

Josiah M. Ayer, B. C. E., Ass't Engineer, B. & M. R. R., Somerville, Mass.

George G. Barker, B. M. E., Draughtsman, McCormick H. M. Co., Chicago, Ill.

George F. Black, C. E., Road Master Mountain Div., M. C. R. R., Portland

John D. Blagden, B. C. E., Observer, Weather Bureau, Kno t's Island, N. C.

Heywood S. French, C. E., Civil Engineer. ...Newtonville, Mass.

Edwin D. Graves, C. E., Civil Engineer, with Berlin Iron Bridge Co., E. Berlin, Conn.

Ralph K. Jones, B. S., with Kellogg Seamless Tube Co., Findlay, Ohio

Elmer Lenfest, B. C. E., Civil Engineer .....Snohomish, Wash.

James F. Lockwood, M. E., Draughtsman.. ....New York, N. Y.

George F. Lull, M. S., Chemist, Penobscot Chem. Fibre Co., West Great Works

Willis H. Merriam, B. C. E., Lawyer..... ... Spokane, Wash.

Elmer E. Merritt, M. E., Merchant.. .....Salt Lake City, Utah

Arthur D. Page, B. C. E., Civil Engineer..... St. Cloud, Minn.

Irving B. Ray, B. C. E., Merchant ..... Boston, Mass.

Sidney S Twombly, B. S., V. S., Consulting Veterinarian, Exp. Station, Logan, Utah

CLASS OF 1887.

John H. Burleigh, B. C. E., Civil Engineer, Sewerage System, Newtonville, Mass.

Luis V. P. Cilley, B. C. E , Civil Engineer, Buenos Ayres, Argentine Republic, S. A.

Bertrand E. Clark, M. S., Law Student, Boston University, Boston, Mass.

Edwin V. Coffin, B. C. E., Clerk..... Harrington

Name and Occupation. *Residence.*

David W. Colby, B. S., Ass't in Chemistry, State College ...Orono
Alice A. Hicks, M. S., (Mrs. George F. Black).. ... ...Portland
James D. Lazell, B. M. E., Engineer and Contractor,
Roanoke, Va.
Charles A. Mason, B. C. E., Civil Engineer . .....Delta, Idaho
Henry A. McNally, B. C. E., Observer, Weather Bureau,
Montgomery, Ala.
Fenton Merrill, B. C. E , Civil Engineer, G. N. R. R.
Davenport, Wash.
Addison R Saunders, B. M. E., Architect .....Tacoma, Wash.
Cassius A. Sears, B. C. E., Lumber Manufacturer. . ...Fort Kent
Charles H. Stevens, B. M. E., Lumber Manufacturer,
Grand Falls, N. B.
Charles F. Sturtevant, C. E., Civil and Hyd. Engineer,
St. Louis, Mo.
Frank E. Trask, C. E., Civil and Hyd. Engineer. ...Ontario, Cal.
Charles T. Vose, B. C. E., Ass't Engineer, M. C. R. R ..Portland
Howard S. Webb, B. M. E., Instructor in Shop Work,
Maine State College, Orono
John S Williams, B. S., LL.B., Lawyer ... .Guilford

CLASS OF 1888.

Hiram B. Andrews, B. C. E , Draughtsman. .. Somerville, Mass.
*George S. Batchelder, B. M. E., Draughtsman.....Bangor
Charles D. W. Blanchard, B. C. E., Civil Engineer. ..Old Town
John R. Boardman, B. S., Gen. Sec'y Y. M. C. A..... Gardiner
Francis S. Brick, B. S., Principal Powers Institute,
Bernardston, Mass.
Harry Butler, B. S., Medical Student . ... . Philadelphia, Pa.
Dudley E. Campbell, C. E., Principal Grammar School,
Newport, R. I.
Fred L. Eastman, B M. E., Draughtsman .....Lynn, Mass.
Edward H. Ellwell, Jr., B. S., Journalist, Portland Transcript,
Portland
William J Hancock, M. S., Professor Natural Science,
Starkey College, Eddytown, N. Y.
John W. Hatch, M. S., Student in Theology, Boston University,
Boston, Mass.

*Deceased.

Name and Occupation. *Residence.*

Claude L. Howes, M. E., Ass't Engineer Thompson-Houston Electric Co., Boston, Mass.
Harry F. Lincoln, B. S., Electrician ..... Millbury, Mass.
Thomas G. Lord, M. S., Farmer ..... Skowhegan
Ralph H. Marsh, B. S , Medical Student. ..... Lincoln
Seymore F. Miller, B. C. E., Ass't Engineer, P. S., & S. H. R. R., Kamilche, Wash.
William Philbrook, B. C. E., Washburn Shop, Polytechnic Institute, Worcester, Mass.
Seymour E. Rogers, B. M. E., Draughtsman ..... Greeley, Col.
George E. Seabury, B. M. E., Draughtsman, H. & E. Iron Co., Bangor
Frank L. Small, B. M. E., Draughtsman, in charge of Indian Training Shop, A. & M. Institute, Hampton, Va.
Frank A. Smith, B. C. E., Civil Engineer ..... St. Cloud, Minn.
Nathaniel E. Wilson, B. S., Chemist State Experiment Station, Reno, Nev.

CLASS OF 1889.

Fred P. Briggs, B. S , Assistant in Natural History, Maine State College, Orono
Charles G. Cushman, B. M. E., Pres. and Manager The Cushman Iron Co., Roanoke, Va.
Joseph W. Edgerly, Jr., B. C. E., Civil Engineer, Me. Shore Line R. R., Princeton
Jere S. Ferguson, M. S., M. D., Instructor University of the City of New York, New York, N. Y.
George G Freeman, B. S., Law Student and Supervisor of Schools, Cherryfield
George M. Gay, B. S., Clerk ..... Boston, Mass.
Eben R. Haggett, B. S., Lumber Merchant..... Newcastle
Nellie L. Leavitt, B. S., Teacher..... Deer Lodge, Mon.
John Reed, B. C. E., Civil Engineer, C. & M. R. R., Gorham, N. H.
Nellie W. Reed, B. S., Teacher..... Stillwater
*Fred Stevens, B. M. E., Draughtsman..... Winter Harbor
Gilbert S. Vickery, B. C. E., Civil Engineer..... Boston, Mass.
*Mark E. White, B. C. E., Civil Engineer, B. & A. R. R., Ashland
Mortimer F. Wilson, B. S..... Orono

*Deceased.

CLASS OF 1890.

Name and Occupation. *Residence.*

Frank O. Andrews, B. M. E., Draughtsman,
Harris St. Eng. Co., Providence, R. I.
George H. Babb, B. M. E., Instructor, Kamehameha
School, Honolulu, H. I.
John Bird, 2d, B. M. E., Supt. The Cushman Iron Co., Roanoke, Va.
Ralph H. Blackington, B. S., Clerk..... Rockland
Geo. I. Bowden, B. C. E ..... So. Penobscot
Hugo Clark, B. C. E., Law Student. ..... Lincoln
Alphonso J. Coffin, B. S., Sec'y and Treas. the Cushman
Iron Co., Roanoke, Va.
Walter E. Croxford, B. M. E., Draughtsman. .Charlestown, Mass.
Fred T. Dow, B. M. E., Draughtsman, T. & H. Elec. Co.,
Lynn, Mass.
Albert W. Drew, B. M. E., Draughtsman, Bath Iron Works..Bath
Harris D. Dunton, B. M. E., Draughtsman,
Hoist & Derrick Co., St. Paul, Minn.
Horace P. Farrington, B. M. E., Teacher, Man. Training,
St. Paul, Minn.
George P. Gould, B. S., Supt. of Schools..... Old Town
Nathan C. Grover, B. C. E , Ass't in Civil Engineering,
Maine State Colloge, Orono
Allen C. Hardison, B. C. E., Civil Engineer. .. Santa Paula, Cal.
Chandler C. Harvey, B. C. E., Civ. Engineer.... .. Fort Fairfield
Samuel H. T. Hayes, B. S., Farmer..... .. Oxford
Everett F. Heath, B. M. E., Principal Academy..... Monmouth
Edward H. Kelley, B. S., Journalist..... New York, N. Y.
George E. Keyes, B. M. E , Teacher ..... Orland
Hannah E. Leavitt, B. S., (Mrs. Walter Flint) ..... Orono
Elmer L. Morey, B. C. E., Civil Engineer .. .. Norfork, Va.
Edmund N. Morrill, B. S., Chemist, American Lead Co.,
Canon City, Col.
John W. Owen, Jr., B. C. E., Civil Engineer, G. N. R. R.,
Helena, Mon.
John V. Peirce, B. M. E., Draughtsman, Thomson-Houston
Electric Co., Lynn, Mass.
William Bridgham Peirce, B. M. E , Law Student. ..... Bangor
William Barron Pierce, B. M. E., Draughtsman,
McCormick H. M. Co., Chicago, Ill.

Name and Occupation. *Residence.*

George M. Pillsbury, B. S., Night Supt. Pulp Mill, Lisbon Falls
Fred G. Quincy, B. M. E., Lumber Surveyor..... Masardis
Joseph R. Rackliffe, B. C. E., Ass't Engineer
C. B. & Q. R. R., St. Joseph, Mo.
Paul F. Reed, B. C. E. ..... Flagstaff, Ariz.
Frank W. Sawyer, B. S., Medical Student..... Milford
Clarence B. Swan, B. M. E., Merchant..... Old Town
Chester J. Wallace, B. C. E., Civil Engineer, Jamaica Plain, Mass.
Winfield S. Webb, B. C. E., Civil Engineer, P. R. R., Gallitzen, Pa.
Ralph H. Wight, B. C. E., Civil Engineer
K. & G. B. & W. R. R., Green Bay, Wis.
Charles S. Williams, B. S., Post Graduate,
Harvard University, Cambridge, Mass.

CLASS OF 1891.

Ralph J. Arey, B. C. E. ..... Winslow, Ariz.
William M. Bailey, B. C. E., Eivil Engineer
City Sewerage System, West Newton, Mass.
Edmund Clark, B. S., Chemist. ..... Munhall, Pa.
Charles Clayton, B. S. ..... Bangor.
Wallace R. Farrington, B. S., Ass't Editor
"New England Homestead," Springfield, Mass.
William R. Farrington, B. C. E., Civil Engineer ..... Portland
John H. Flanagan, B. M. E., Mech. Engineer, Harris, Corliss
Eng. Co., Providence, R. I.
Joseph C. Graves, B. M. E., Draughtsman .. Middletown, Conn.
Bert A. Hall, B. C. E., Civil Engineer,
A. & P. R. R., Prescott, Ariz.
Cyrus Hamlin, B. S., Student, Long Island Medical School,
Brooklyn, N. Y.
Prescott Keyes, Jr., B. C. E., Principal High School...Bar Harbor
Charles H. Kilbourne, B. S., Salesman.. ..... North Waterford
Robert W. Lord, B. M. E., Machinist. ..... Boston, Mass.
Hugo G. Menges, B. M. E., Draughtsman..... Dex er
True L Merrill, B. M. E ..... Greensburg, Pa.
Fred C. Moulton, B. S., Gypsy Moth Commission..Malden, Mass.
William N. Patten, B. C. E., Civil Engineer ..... Boston, Mass.
Henry V. Starrett, B. S..... Warren
John W. Steward, B. M. E., Manufacturer..... Skowhegan

Name and Occupation. *Residence.*

Charles N. Taylor, B. C. E., Civil Engineer, City Sewerage System, Newton Centre, Mass.

George E. Thompson, B C. E., Civil Engineer, Bangor & Aroostook R. R., Orono

William A. Valentine, B M. E , Teacher. .. .. Bethel

CLASS OF 1892.

George F. Atherton, B. C. E , Instructor in shop, State Reform School, Cape Elizabeth

William H. Atkinson, B C. E..... . ... Brunswick

Mortimer L. Bristol, B. M. E., Draughtsman, Colt's Armory, Hartford, Conn.

William R. Butterfield, B. C. E. .. .. Milford

Roscoe C. Clark, B. M. E .... Bethel

Ernest W. Danforth, B. C. E , Draughtsman.. .. Concord, N. H.

Herbert E. Doolittle, B. C. E. ... ... Northfield, Mass.

Mellen E. Farrington, B. M. E., Draughtsman Amer. Proj Co , Lynn, Mass.

Robert H. Fernald, B. M. E., Student in Architecture, Inst. of Technology, Boston, Mass.

John C. Gibbs, B. M. E.... .... Boston, Mass.

Arthur C. Grover, B. C. E., Civil Engineer, Sewerage System, Newton, Mass.

Warren E. Healey, B. M. E., Draughtsman, Y & T. Mf'g Co., Stanford, Conn.

William C. Halden, B. M. E., Teacher in the Manual Training Department of the City Schools, St. Paul, Minn.

George Maguire, B. C. E., Civil Engineer, Sewerage System, Newton Centre

Charles M. Randlett, B. S., Medical Student... ... .. Richmond

Stanley M. Timberlake, B. C. E., Civil Engineer, Sewerage System, Newton Centre

Frank S. Tolman, B. C. E., Teacher at Academy ... .. Hampden

Joseph A. Tyler, B. C. E.. Civ. Eng. Boston Iron Works, Cambridge, Mass.

NON-GRADUATES.

Average period of attendance, one and a half years.

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

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

[Corrections for a revised list are solicited.]

CLASS OF 1872.

Name and Occupation.	*Residence.*
John T. Bowler, Register of Deeds	Bangor
William H. Cary, The Cary Odgdon Company	Chicago, Ill.
Edward F. Fisher	San Diego, Cal.
William H. George.	
William L. Harlow, Farmer	Buckfield
George L. Macomber	Windom, Minn.
Charles C. Norton	Buffalo Meadows, Washo County, Nevada
William B. Oleson, Clergyman and Principal Training School,	Honolulu, Sandwich Islands
Frank W. Rollins, Clerk	Stillwater, Minn.
Oren S. Sargent, M. D., Physican	Lawrence, Mass.
*Marcus P. Shorey	Old Town
Benjamin F. Watson, Farmer	Levant

CLASS OF 1873.

William H. Claffin, Merchant	Boston
Joseph E. P. Clark, Book Business, 1017 Walnut St., Chicago. Ill.	
*John Jackson	Alfred
Samuel Lane, Merchant	Houlton

*Deceased.

Name and Occupation.	*Residence.*
Wilbur F. Lovejoy, Book-Keeper	Winn
*Thomas P. Pease, Surgeon, U. S. A.	Bridgton
Clarence Pullen, on Editorial Staff, The Sun	New York, N. Y.
Frederic A. Ransom	Chicago, Ill.

CLASS OF 1874.

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

CLASS OF 1875.

Gustavus Bellows, Farmer	Freedom
Leander H. Blossom, Farmer	Turner
John H. Carver, Clerk	No. 9 North Union St., Somerville, Mass.
William B. Dole, Mechanic	Bangor
George N. Gage, Physician	E. Washington, N. H.
*Benson H. Ham, Farmer	Bridgewater, Mass.
Alton A. Jackson, M. D., Physician	E. Jefferson
Manley Jackson, Organ and Sewing Machine Business,	Chelsea, Mass.
Freeland Jones, Real Estate and Insurance Agent	Caribou
Ora Oak, Merchant	Perris, San Diego County, Cal.
Sidney S. Soule, Farmer	Freeport
Louis C. Southard, M. S., Lawyer, Boston,	Residence, North Easton, Mass.
*George W. Spratt	Bangor
Charles H. Spring, Wool Grower, Buenos Ayres, Arg. Rep., S. A.	

*Deceased.

CLASS OF 1876.

Name and Occupation.	*Residence.*
Francis H. Bacon, Architect,	96 Washington Street, Boston, Mass.
Russell A. Carver	Dixfield
Frank P. Gurney, Farmer	Brookhaven, Miss.
*Frank A. Hazeltine, Farmer	Dexter
Eugene L. Hopkins, Wholesale Fruit Dealer	Seattle, Wash.
James W. Linnell, Farmer	Exeter
George J. Moody, Lawyer	Montesano, Wash.
Webster Mudgett	Albion
Edward B. Pillsbury, Manager Postal Tel. Co	Boston, Mass.
Randall H. Rines, Merchant, (Rines Brothers)	Portland
Walter F. Robinson, Civil Engineer, G. N. R. R.	Helena, Mon.
Edward C. Shaw, with American Watch Co	Waltham, Mass.
Frank E. Southard, Lawyer	Augusta
Frank P. Whitaker, Physician	Hermon

CLASS OF 1877.

Charles F. Andrews	Biddeford
Fred S. Bunker, (A. B., Harvard)	City Hospital, Boston, Mass.
*Edson C. Chase	Stillwater
William W. Dow, Printer	Rehoboth, Mass.
James T. Emery	Stillwater
Charles M. Freeman	Portland
*Frank H. Goud, Clerk	Fort Fairfield
Austin I. Harvey, M. D., Physician	Newport
Menzies F. Herring, Editor and Publisher	Dexter
Ardean Lovejoy	Orono
Fred B. Mallett, Lumbering Business	Minneapolis, Minn.
Fred L. Partridge	Stockton
Fred H. Pullen, First Officer Ocean Steamer.	
*Frank E. Reed	Springfield
Woodbury D. Roberts, Merchant	Cheney, Wyo.
Thomas B. Seavey, Clerk	Chicago, Ill.
Henry C. Townsend, Farmer	Fort Fairfield
Clara E. Webb, Teacher	Unity
Fred S. Wiggin, Farmer	Presque Isle
William B. Whitney	Iowa

*Deceased.

CLASS OF 1878.

Name and Occupation. *Residence.*

Charles H. Benjamin, M. E., Professor of Mech. Engineering, Case School of Applied Science, Cleveland, Ohio
Eugene M. Berry..... Sumner
*Nathaniel A. Crocker..... W. Enfield
Charles C. Elwell, C. E., (1890) Div. Eng. B. & O. R. R., Philadelphia, Pa.
Howard H. Hartwell..... Montpelier, Vt.
John E. Haynes..... South America
Fred H. Hinckley, Clerk in U. S. Land Office..... Eureka, Nev.
Richard S. Howe ..... Fryeburg
Samuel C. Jameson, Merchant..... Providence, R. I.
William S. Jameson. Dealer in Sugar Machinery, Guadalajara, Mex.
Edgar H. Lancaster, Mechanic in R. R. Shop..... Old Town
*Alvra W. Leathers ..... Dover
James Lunt..... Banger
Herbert A. Mallett, Lumberman ..... Stillwater, Minn.
Silas H. Miller..... Fairplay, Colorado
Frank J. Perkins, Merchant..... Old Town
Charles F. Plumly, Merchant..... Lincoln
John O. Richardson, Merchant..... Old Town
A. Judson Small..... No. Lubec
Albert H. Stewart, Piano Regulator..... Boston, Mass.
Edson Warriner, Watchmaker and Jeweler..... Fryeburg
*Erastus G. Weeks, Merchant..... Jefferson

CLASS OF 1879.

Daniel Allison..... San Francisco, Cal.
Arthur P. Brown, Principal High School..... Bradley
Benjamin V. Carver, Machinist..... Hartford, Conn.
Frank Clergue, Lawyer ..... Bangor
Byron H. Cochrane..... Woonsocket, R. I.
Fred A Colburn, Clerk and Scaler..... Stillwater, Minn.
James W. Cousens, Merchant and Postmaster..... Stillwater
John A. Curtis, Civil Engineer..... Delta, Col.
George A. Dustin, Machinist and Trader..... Dexter

*Deceased.

Name and Occupation.	*Residence.*
Loomis F. Goodale, C. E., Chief Engineer, St. L. Keokuk & N. W. R. R., Chic. Burl. & Kan. City Ry.,	St. Joseph, Mo.
Edwin A. Hawes, Mechanic	Ontario, Cal.
*Edwin C. Johnson	Gorham
John N. Knapp	Bradley
Oliver S. Jones, Farmer.	Corinna
Albert Y. Merrill, Lawyer, Judge of Probate	Aitkin, Minn.
Asa C. Morton, Clerk	Bangor
Harry W. Peakes, Merchant.	Charleston
David S. Plummer, Book-keeper	Boston, Mass.
*Eugene G. Smith	Richmond
William N. Titus, Lawyer, Boston .	Residence, Woburn, Mass.
Howard E. Webster, Lumberman	Orono
Arthur L. Wellington.	Covina, Cal.
Charles M. Wilson	San Francisco, Cal.

CLASS OF 1880.

Charles M. Allen, Teacher Pratt Institute	Brooklyn, N. Y.
Edwin N. Atwood	Portland
Granville Austin, Salesman	Boston, Mass.
Sylvester A. Brown, Clerk	Boston, Mass.
*Ada M. L. Buswell, Teacher	Minneapolis, Minn.
Charles E. Cheney, Piano Tuner,	Portland
Woodbury F. Cleveland, M. D., Physician.	Eastport
Samuel H. Dyer.	Portland
Osgood E. Fuller, with Akron Felt Works.	Akron, O.
Harry H. Goodwin, Editor.	Dension, Tex.
John B. Horton, Dealer in Steam and Gass Supplies,	Lincoln, Neb.
Daniel S. Jones, Watchmaker and Jeweler.	Veteran, Colo.
*Charles W. Nash.	Addison
Willis L Oak, Clerk	Presque Isle
Fred W. Powers, President Forest City Creamery	Portland
Emily I. Ramsdell, at Marston's Studio	Bangor
*Mortier C. Randall.	Stillwater
William J. Rich, Chemist, Cambria Iron Co.	Johnstown, Pa.
Charles S. Simpson, Civil Engineer and Country Surveyor,	Florence, Wis.

*Deceased.

Name and Occupation.	*Residence.*
Frank A. Spratt, A. B., Principal of High School,	Olneyville, R. I.
Daniel Webster, Express Agent	Bangor
Arthur Wentworth	Orrington

CLASS OF 1881.

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

CLASS OF 1882.

Joseph B. Bartlett, Farmer	Ashland
Charles E. Chapin, Salesman	Boston, Mass.
Charles C. Dunn, Farmer	Ashland
Charles W. Fenlason	Woodland
*John J. Greenlaw, Merchant	No. Fryeburg
William H. Hatch, Grocer	Lisbon
Wesley J. Jameson, Clerk	St. Paul, Minn.

*Deceased.

Name and Occupation.	*Residence.*
Frederick A. Kenniston, Salesman	Brockton, Mass.
Frederick O. Kent	Bremen
Walter H. Nason, M. D , Physician	Hampden
Atta L. Nutter, Principal Shaw School	Boston, Mass.
Parker J. Page	Boston, Mass.
*Henry K. Poole	Bremen
Louis K. Tilley, Farmer	Castle Hill

CLASS OF 1883.

George R. Currier, Government Clerk	Washington, D. C.
Arthur T. Drummond, Farmer	Sidney
William E Emery, M. D., Physician	Surry
Norman F. Kelsea, Clerk	Brockton, Mass.
Edwin P. Kendall, Farmer and Miller	Bowdoinham
*Henry W. Longfellow, Clerk	Machias
*Charles S. Murray, Teacher	Chincutague, Va.
George A. Rich, A. B., on Editorial Staff, Journal	Boston, Mass.
Everett F. Rich, Clerk, Bangor Savings Bank	Bangor
Ralph Starbird, Lumber Dealer	San Francisco, Cal.
Ralph R. Ulmer, Lawyer and Clerk of Court	Rockland
Frank C. Webster, Clerk, American Express Co.	Lewiston
Frank G. Webster, Clerk	Bangor
Lewis H. White, M. D., Physician	Lincoln Center

CLASS OF 1884.

Edward S. Abbott, M. D., Physician	Bridgton
Edward M. Bailey, Merchant	Bangor
Joseph B. Bartlett	Nottingham, N. H.
William A. Berry	Hampden
James A. Dunning	Stockton, Cal.
Freeland Ellis, Clerk	Worcester, Mass.
Eugene E. Folsom, Machinist, A. W. Watch Co., Waltham, Mass.	
Evie M. Hamblen, Teacher	Frankfort
Robert S. Leighton	Steuben
*Gilbert Longfellow, Jr.	Machias
Cephas R. Moore, Merchant and Postmaster	Anson
William R. Pattangall, Manager Granite Company	Machiasport

*Deceased.

Name and Occupation.	*Residence.*
Robert C. Patterson, Ass't Cashier G. N. R. R.	St. Paul, Minn.
Charles S. Pendleton, Farmer	Elmore, Minn.
Herbert L. Rich, Ins. Nat. Sci. Lassell Acad'y,	Auburndale, Mass.
Flora M. Ricker, (Mrs. P. J. Page)	Boston, Mass.
Warren J. Ridley, Conductor, Street R. R	South Boston, Mass.
Elmer A. Savage, Manager Herenden M'f'g Co.	Milwaukee, Wis.
Mertie Sawyer	Hampden
Charles F. Smith, Real Estate Dealer	Boston, Mass.
*Horace G. Trueworthy	Orono
*Jotham Whipple, Jr	Solon

CLASS OF 1885.

James W. Bishop, Farmer	Milo
Frederick H. Butler, C. E., Civil Engineer B. & A. R. R.,	Hampden
John I. Chase, Clerk	Los Angeles, Cal.
Harry W. Davis, Banker	Church's Ferry, No. Dakota
Fred W. Dickerson	Belfast
Samuel W. Hill, Seaman	Machias
Willard A. Libby, Clerk	Denver, Col.
*Frank E. Manter	Milo
Dennis D. Merrill, Steam Laundry	Auburn
Carl H. Prince, Farmer	Turner
Elisha C. Vose, U. S. Weather Bureau and Journalist,	Chicago, Ill.

CLASS OF 1886.

Eugene C. Bartlett	Bridgewater, Mass.
Charles L. Libby, Supt. Tool Works	Bridgeport, Conn.
Charles H. Merriam, Lawyer	Spokane, Washington
Dudley W. Moor, Jr., Real Estate Dealer	Toledo, Ohio
Harry E. Powers, Machinist	Richmond
Harold E. Trueworthy, Farmer	Houlton

CLASS OF 1887.

Alton D. Adams, Manager Commercial Electric Co.,	Indianapolis, Ind.
John W. Allen	Riverside, Cal.
Alice Benjamin	Oakland

*Deceased.

Name and Occupation.	*Residence.*
Irving M. Clark, Civil Engineer	Seattle, Wash.
Jennie L Dority	Wells
*Wm. J. Harris	Groton, Mass.
Austin D. Houghton, Supt. Ind. Dept. Clark University,	Atlanta, Ga.
James S. Kennedy	Ludlow
William L. Perham	Paris
Wm. P. Sherburn	Dover
Frank L. Tucker, Farmer	Andover, Mass.
Charles W. Wentworth, Lawyer	No. Windham
Rodney A. B. Young, Medical Student	Baltimore, Md.
Alfred S. Ruth, Resident Engineer, P. S. & G. H. R. R.,	Summit, Wash.

CLASS OF 1888.

Charles W. Breed, Clerk	Philadelphia, Pa.
Albion H. Buker	Rockland
James K. Chamberlain, Plumber and Sanitary Engineer	Guilford
*Frank P. Collins	Fort Fairfield
Fred T. Drew	Orono
George K. Hagerthy	So. Hancock
Fred H. Kirkpatrick, Civil Engineer	Richmond, Va.
Edwin B. Lord, Printer and Publisher	Stillwater
Alphonso F. Marsh, Druggist	Old Town
Frank J. Page	Great Works
Henry F. Perkins, Mechanic	Oakland
Nathan A. Ring, Manufacturer	Orono
Charles C. Rolfe, Teacher and Farmer	Maysville Centre
Abram W. Sargent, Parlor and Sl. Car Dept. N. Y., N. H. & H. R. R.,	New York, N. Y.
Joseph S. True, Merchant	Intervale
Ernest H. Turnbull	St. John, N. B.

CLASS OF 1889.

Benjamin R. Clark, Merchant	Haverhill, Mass.
George G. Fernald, Grain Dealer	Wilton
*Arthur M. Folsom	Old Town
Charles B. Gould, Clerk	Bangor

*Deceased.

Name and Occupation.	*Residence.*
Elmer E. Greenwood, Resident Engineer K. & M. R'y Co.,	Peabody, West Va.
Temple Grosvenor	Canterbury, N. B.
Lewis F. Johnson, Student Yale University	New Haven, Conn.
Cora A. Leavitt (Mrs. Frank L. Parker)	Norridgewock
John E. Littlefield, Lumberman.	Bangor
Albert L. Lyford, Prin. Com. Dept., Maine Wesleyan Seminary,	Kent's Hill
*Maude A. Matthews	Stillwater
Clara Rogers, Teacher	Hampden
William H. Sargent, Book-keeper	South Brewer
Frederick L. Thompson, Instructor Physical Culture,	Philadelphia, Pa.
Norman Tripp, Travelling Salesman	Helena, Mon.
Fred H. Webb, Mechanical Engineer.	Skowhegan
Ambrose H. White, with Otis Brothers & Co.	Arlington, N. Y.

CLASS OF 1890.

Carroll D. Cargill.	Livermore Falls
Charles A. Dillingham, Merchant.	Old Town
Allie M. Hastings.	Rockland
George W. Hodgdon.	Rumford
Leon H. Jones, Draughtsman	Boston, Mass.
Irving C. Kenniston, Sheep Raising.	Belmont, Ariz.
John W. Lewis, Clerk.	Newburyport, Mass.
Herbert B. Rowell.	St. Paul, Minn.
Gilman H. Webber, Book-keeper.	Boston, Mass.

CLASS OF 1891.

Arthur W. Andrews.	Saco
Leslie A. Boadway, Merchant.	Madison
James W. Davis, Civil Engineer L. L. & M. S. R'y,	La Porte, Ind.
Henry E. Fernald, Medical Student	Brunswick
Robert W. Fuller, Prin. Gram. School.	Natick, R. I.
William A. Harlow	Milford
Edwin W. Hodgdon, Druggist	Whitinsville, Mass.
Byron C. Hodgkins, Clerk.	Stillwater
Joseph M. Jackson, Electric Engineer.	Boston, Mass.

*Deceased.

Name and Occupation.	*Residence.*
Charles H. Maling, Book-keeper	Brewer
Edwin R. Merrill, Draughtsman	Columbus, O.
Aldert M. Miller, Merchant	Rockland
*William A. Morris	Bangor
Jay P. Norton	York Corner
Arthur M. Otis	Grafton
Robert M. Packard	Rockland
Clifford I. Pillsbury	Rockland
Clarence Scott, Law Student	Old Town
Leonard A. Tirrill, Draughtsman	Lynn, Mass.
Alden P. Webster	Orono

CLASS OF 1892.

George A. Bailey	Dexter
Frank A. Bourne, Student of Architecture,	Institute of Technology, Boston, Mass.
Bertrand J. Clergue, Student, Institute of Technology, Boston, Mass.	
Edwin T. Clifford	Leeds
Charles E. Cobb	Patten
George C. Hamilton	Dexter
Ernest S. Hatch	Lovell Centre
Jacob F. Hersey	Patten
Willard E. McKechnie	Princeton
Calvin H. Neally, Teacher, Business College	Portland
Warren R. Page	Hampden
Harry M. Prentiss, Postal Clerk	Belfast
Job Prince	South Turner
George F. Rich, Law Student, University	Ann Harbor, Mich.
Harry S. Thompson	Dexter
Laforest C. Williams	Athens

CLASS OF 1893.

Clarence L. Chapman	Newburgh
Edwin T. Hamlin, Student, Cornell University	Ithaca, N. Y.
William C. Hammett, Cadet, U. S. Mil. Academy, West Point, N. Y.	
Charles I. Haynes	Bangor
Chesley M. Johnston, Student, Tufts College	College Hill, Mass.
John R. Morris	Bangor

*Deceased.

Name and Occupation.	*Residence.*
Harry O. Robinson, Student, Tufts College,	College Hill, Mass.
Ralph K. Smith	Bangor
Lizzie L. Smith	Veazie
Pearly R. Wilson	Solon
Thomas J. Young	Athens

CLASS OF 1894.

*Judson B. Blagden	Bluehill
*Charles F. Bradford	Union
Merritt L. Fernald, Student and Ass't in Herbarium,	Harvard University, Cambridge, Mass.
Ralph E. Horn, Theological Student	Canton, N. Y.
James R. Small	Camden
Abbott C. Smith	Bangor
George H. C. Steward	Marlboro, Mass.

CLASS OF 1895.

Mabel R. Jordan	Stillwater

EXAMINATION QUESTIONS FOR ADMISSION, 1892.

ARITHMETIC.

1. What are the prime factors of 594? What are the common prime factors of 144 & 180?

2. A man paid 2-5 of his money for a farm, 1-3 of what remained for repairs, 1-3 of what then remained for stock, 1-2 of what then remained for utensils, and then had left $650. How much had he at first?

3. Reduce 56.37 1-2 to a common fraction in it's lowest terms. Reduce 37 13-80 to a decimal.

4. A circular park is 165 yards in diameter, how many acres does it contain?

5 The valuation of taxable property in a certain country is $35.460,850, and the rate of taxation is 25 mills; the cost of collection being 3 per cent and 8 per cent of the tax being uncollectable, what will be the net revenue to the treasury?

6. A note of $565.80 dated June 3d, 1864, was paid Nov. 28, 1869, with interest at 8 per cent. What was the amount paid?

7. What is the difference between the true discount and the bank discount of $359.50 for 90 days without grace at 12 per cent?

8. Extract the square root of 133,225.

9. Extract the cube root of 41,063,625.

ALGEBRA.

State what text-books in algebra you have studied, and how much.

1. Solve $2x-[3x-\{m-(2x-\overline{3m+4})\}-(5x-2)]=0$.

2. Express in *factors* the L. C. M. and G. C. D. of $8x^3+27$, $16x^4-72x^2+81$, and $6x^2+5x-6$.

3. Reduce to a simple fraction $\left(\frac{2x+y}{x+y}-1-\frac{y}{y-x}-\frac{x^2}{x^2-y^2}\right)\div\frac{x^2+y^2}{x^2-y^2}$.

4. Simplify

$$2\sqrt{125}-\sqrt[4]{\frac{25}{16}}+\sqrt[3]{81}+512^{\frac{1}{3}}-\sqrt[3]{192}-7\sqrt[6]{9}+2\sqrt[3]{320}+3\left(\frac{30}{9}\right)^{\frac{1}{2}}.$$

5. Reduce to a fraction with a rational denominator $\frac{2\sqrt{3}-3}{1+\sqrt{3}}$.

6. Solve the equation $(x-1)^{\frac{4}{3}}-10(x-1)^{\frac{2}{3}}+9=0$.

7. Simplify $\left(\frac{a^{x+y}}{a^{y}}\right)^{x}\div\left(\frac{a^{y}}{a^{y-x}}\right)^{x-y}$.

8. Solve the equations $\left\{\begin{array}{c} x^2+3y^2+6x-7y-25=0 \\ x-y=1 \end{array}\right\}$

9. If $a:b=c:d$, prove $3a^2+b^2:3a^2-b^2=3c^2+d^2:3c^2-d^2$. State the principles of proportion used.

10. Expand $\left(\frac{x}{2}-3y\right)^5$ by the Binominal Theorem.

GEOMETRY.

1. Of two oblique lines drawn from the same point in a perpendicular, cutting off unequal distances from the foot of the perpendicular, the more remote is the longer.

2. If two parallel lines be cut by a third straight line, the exterior interior angles are equal.

3 The area of a regular polygon is equal to one-half the product of the apothem by its perimeter.

4. Show that the straight line which bisects the external vertical angle of an isosceles triangle is parallel to the base.

5. Two circles are to each other as the squares on their radii.

6. Problem, to describe a circle in a given triangle.

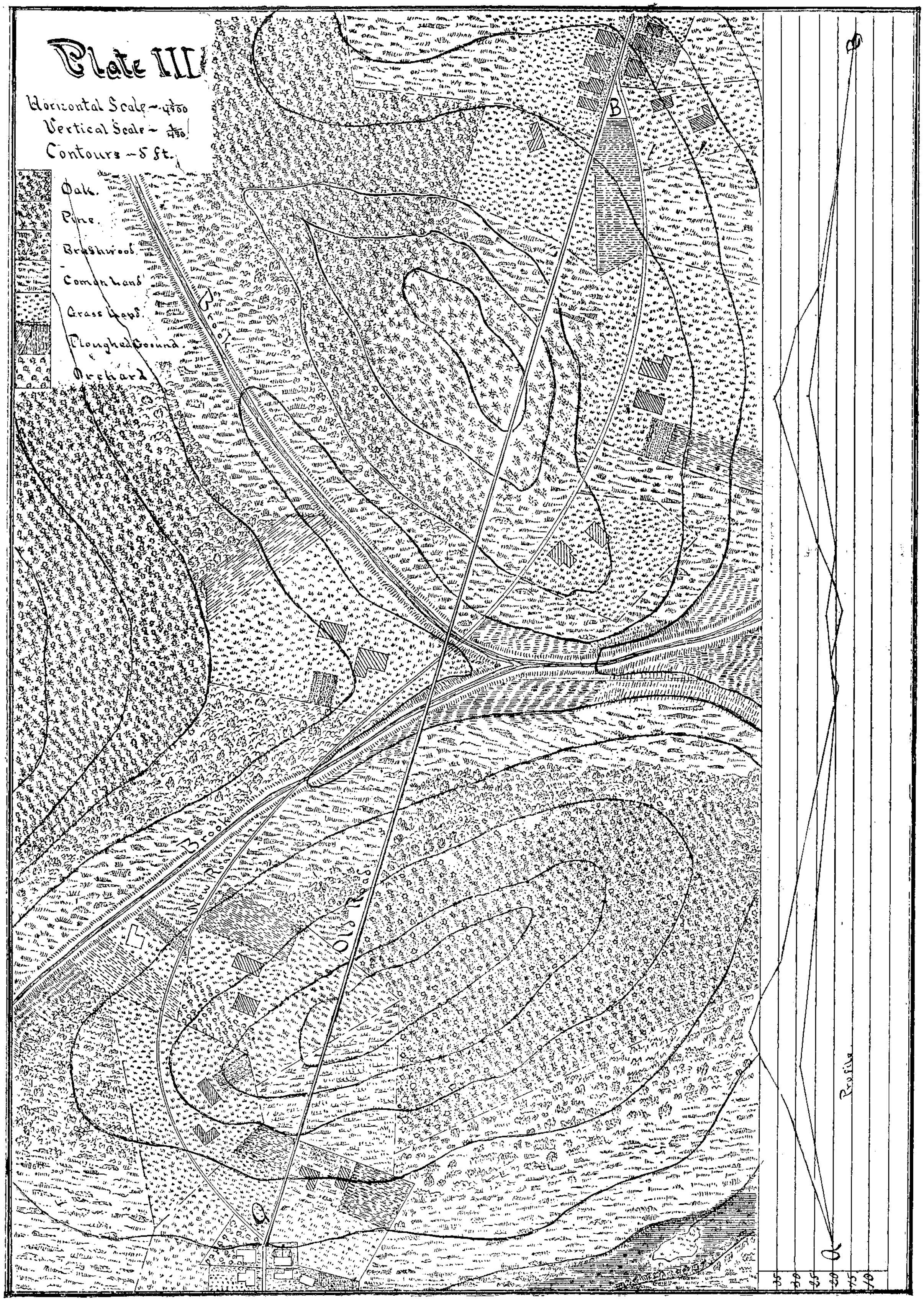


Plate III
Horizontal Scale ~ 4800
Vertical Scale ~ 1/480
Contours ~ 5 ft.
Oak.
Pine.
Brushwood.
Common Land
Grass Land
Ploughed Ground
Orchard
Brook
Brook
New Road
Old Road
B
A
Profile
35
30
25
20
15
10

BOOK-KEEPING.

1. How does the double entry system of keeping accounts differ from single entry?

2. Describe the Day Book, Journal, and Ledger used in double entry.

3. Enter the following items in Day Book in proper form and carry through Journal and Ledger:

Orono, Me., May 1st, 1892, Wm. Page commences business this day with an inventory of lumber valued at $4,000. Cash on hand, $2,500.

May 2d, Sold Charles Harris on acct. 10 M. hemlock boards at $9.00.

May 3rd, Sold 5 M. lathes at $3.00 for cash.

Sold James Smith on his note for 30 days, 50 M. pine boards at $30.00.

May 4th, Bought of Charles Smith on acct. 50 M. No. 2 dressed flooring at $25.00.

Paid cash to George Morrison for labor in yard, $5.00.

4. Give rules for closing the Ledger.

5. What does the Proof Sheet show?

6. What does the Balance Account show?

7. Under what conditions may a personal account be closed into loss and gain.

8. Describe a Bill Book and state its use.

9. Give a form of a promissory note on time.

10. Give form for a bank check.

ENGLISH GRAMMAR.

1. Define
   a. An Abstract noun. Illustrate use of.
   b. A Verbal noun. " "
   c. The Antecedent of a pronoun. In what particulars does a pronoun agree with its antecedent?

2. Form the possessive, singular and plural, of the following words:
   lady, *Jones*, *boy*, *chimney*.

3. Define Comparison of adjectives.
   Compare *bad*, *little*, *loving*.

4. Write a synopsis of the verb *bear*, using first person singular.

5. Write a complete analysis of the following sentences:

"In that calm *syrian* afternoon, *Memory* a pensive *Ruth*, went *gleaning* the silent fields of childhood, and found the scattered *grain* still *golden*, and the morning sunlight fresh and fair."

6. Parse underscored words.

7. Write

a. A simple sentence.

b. A complex "

c. A compound "

8. Correct the following sentences, and *give reason for each correction:*

a. "There are many noble women, but none nobler than her."

b. "Order is heaven's first law."

c. "Lift up your hearts to the supreme ruler of the Universe."

d. "Neither olive oil nor alcohol are so heavy as distilled water, but milk and sea-water is heavier."

LITERATURE.

ESSAY ON WARREN HASTINGS.

1. Give an account of the early boyhood of Warren Hastings.

2. Describe the condition of India during the first years of Hastings residence in that country.

IVANHOE.

3. Describe the home of Cedric the Saxon.

4. Describe the character of Rebecca the Jewess.

JULIUS CAESAR.

5. Give an account of:

a. The death of Caesar.

b. The death of Brutus.

HISTORY OF THE UNITED STATES.

1. State the circumstances that led to the discovery of America by Columbus.

2. What European nations planted colonies within the present limits of the United States?

3. Give the details of the founding of three of these colonies.

4. What were the causes of the War of the Revolution? State the principal events of this war.

5. What territory did the United States comprise at the close of the Revolution? What territory has been acquired since, and how has it been acquired?

6. What circumstances led to the framing and adoption of the Constitution?

7. State the causes and the leading events of the second war with England.

8. Give a sketch of the history of slavery in the United States.

9. State the causes and some of the principal events of the Civil War.

10. Name the Presidents of the United States.

GEOGRAPHY.

1. Define Geography. Name the departments of the subject and define each.

2. Define latitude, longitude, great and small circles, equator, and zones.

3. Name the grand divisions of water and land on the earth.

4. Name the five most important governments, and loca e their possessions.

5. Name the political divisions of North and South America.

6. Locate Newfoundland, Yucaton, Gibralter, Alaska, Madagascar, and the Isthmus of Panama.

7. Locate Pamilco Sound, Straits of Magellen, Bay of Biscay, Gulf of California, Itasca lake.

8. Name the important river systems of the United States and of Maine.

9. Locate five prominent cities, mountain chains, lakes, bays, and islands of North America.

10. Locate the Suez Canal, Congo Region, and Oklahoma Ty.

PHYSICAL GEOGRAPHY.

1. Distinguish between descriptive and physical geography, and name three subjects treated exclusively by each.

2. State facts about the earth; as, size, shape, motion, around and distance from the sun.

3. Explain by use of diagram the causes of change of seasons.

4. Distinguish between magnetic inclination and declination, and state the cause of each.

5. Give a description of a volcanic eruption.

6. State three reasons for believing the interior of the earth to be hot.

7, 8. Discuss the physical features of each Grand Division as to mountains, plains, and coast-lines.

9. State two causes modifying the climate of a place.

10. Discuss the formation of a coral island.

11. How are intermittent springs formed?

12. Give a full account of the drainage of Europe.

13. Explain by diagram the causes of high and low tides.

14. Why is the moon more active in causing tides than the sun?

15. What causes air currents? What water currents?

16. Why do not all currents flow north or south?

17. How are water-spouts formed?

18. Make drawings of three varieties of clouds.

19. State what race predominates in each Grand Division.

20. Trace the changes in the center of civilization from the Christian era to the present time. How does Physical Geography account for these changes?

CALENDAR.

1892—Feb. 7,	Tuesday, Second Term commences.
June 22, 23,	Thursday and Friday, Examinations.
" 24,	Saturday, Prize Declamations by Sophomores.
" 25,	Sunday, Baccalaureate Address.
" 26,	Monday, Prize Essays by Juniors.
" 28,	Wednesday, Commencement.
" 30,	Friday, Examination of Candidates for Admission.
	Vacation of nine weeks.
Aug. 29,	Tuesday, Examination of Candidates for Admission.
	First Term commences.
Dec. 21, 22,	Thursday and Friday, Examinations.
	Vacation of seven weeks.
1893—Feb. 6,	Tuesday, Second Term commences.