

Mass. Institute of Technology.

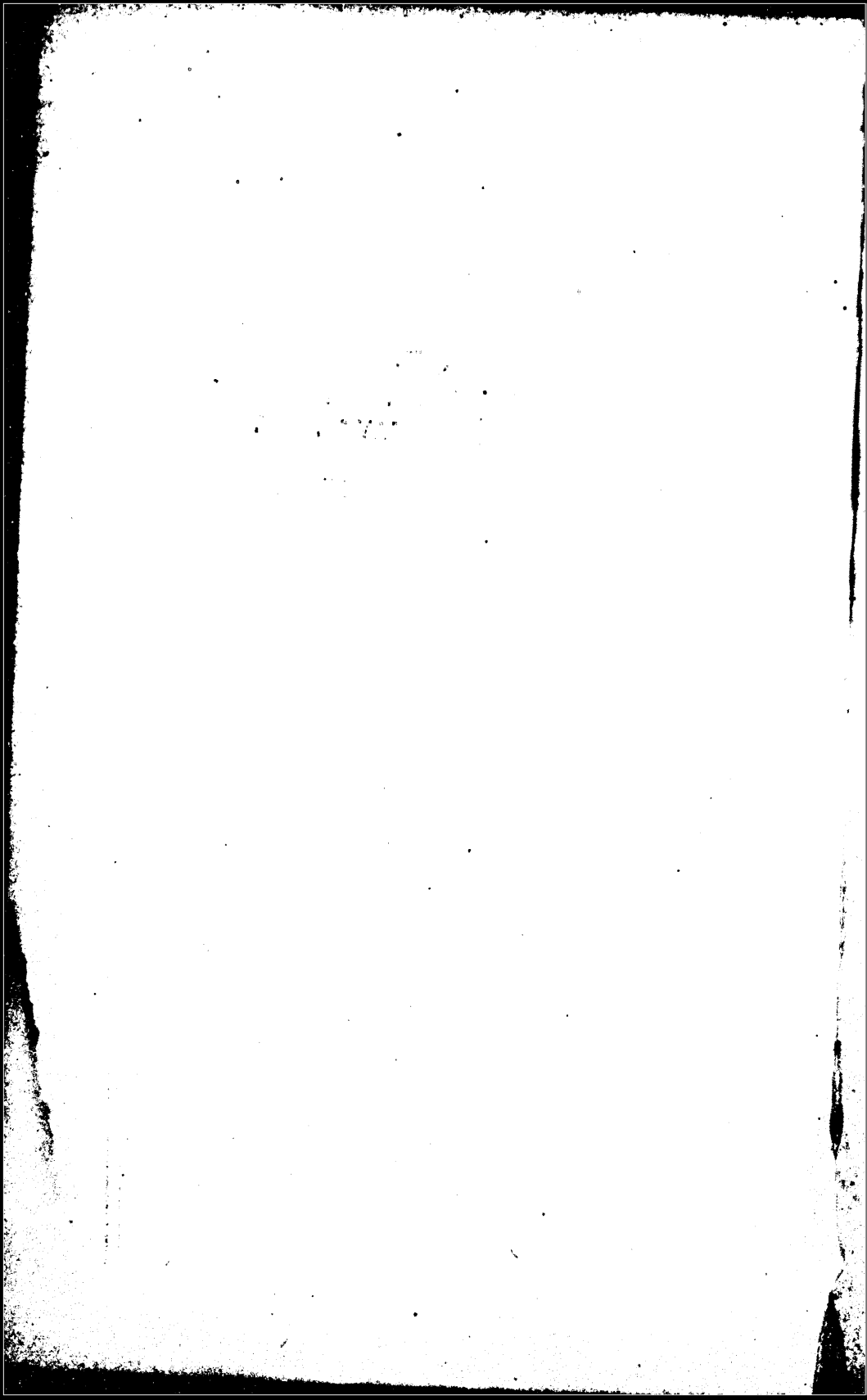
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VISITING COMMITTEES.

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TO THE CORPORATION OF THE
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

THE last school year — the twentieth in our series — has witnessed the full maintenance, and even an acceleration, of the remarkable rate of increase in the number of students attending the Institute of Technology, which has characterized the era of comparative prosperity which began in 1880.

The total number of persons registered in all the departments and schools under the control of the corporation, as by the catalogue, is 706, against an aggregate last year of 557.

Omitting from consideration the students of the Lowell Free School of Practical Design, the number this year is 645, against 497 last year. Still further excluding the students of the School of Mechanic Arts, we find the number of students in the School of Industrial Science to be 579, against 443 last year; making an increase of 136, or 31 per cent.

The following table exhibits the number of students in the School of Industrial Science each year, from the opening of the Institute to the present time: —

Year.	No. of Students.
1865-66	72
1866-67	137
1867-68	167
1868-69	172

Year.	No. of Students
1869-70	206
1870-71	224
1871-72	267
1872-73	348
1873-74	276
187 75	248
1875-76	255
1876-77	215
1877-78	194
1878-79	188
1879-80	203
1880-81	253
1881-82	302
1882-83	368
1883-84	443
1884-85	579

STATISTICS OF EXAMINATIONS.

The results of the applications for admission to all classes of the School of Industrial Science thus far in the current school year, and of the examinations had there-upon, may be stated as follows:--

Forty-three were admitted without examination, either to the first year class upon presenting certificates of clear admission to some college of reputable standing, or upon the presentation of diplomas of graduation from some degree-conferring institution, classical or scientific, to the third year class, or to some department as special students; 134 were admitted upon examination, free of conditions; 47 were admitted upon examination, with one condition imposed; 29 were admitted with two conditions; 6 were admitted with three conditions; 36 applicants were rejected upon examination; 35 were admitted as special students, upon examination in the studies specially requisite to the partial courses which they proposed to follow.

The total number of applicants appears, therefore, to have been 330. Of those admitted upon examination, 26 have not thus far entered the school. In some instances, in the case of applicants heavily conditioned, this has been due to the advice of the Faculty, that a longer period be taken for preparation; in some, to a change of plans, to sickness, or other causes. The total number of applicants rejected or voluntarily withdrawing was thus 62.

These statistics are gratifying as showing a marked improvement in the preparation of candidates for admission. The number admitted free of conditions this year has been 134, as against 83 last year. The improvement noted is mainly due to a better understanding of the requirements for entrance to the Institute, and to greater care and pains taken by teachers in the preparatory schools, generally, to meet those requirements. The Institute of Technology now receives from many high schools and academies in New England a larger number of pupils than any other institution, and it has consequently become a matter both of self-interest and of pride on the part of the teachers of those schools to send up their students well-fitted for our examinations.

We have every reason to anticipate a still further progress in the same direction from year to year, as the teachers of the principal preparatory schools gain both in motive and in aptitude for fitting their pupils to meet our requirements. The chief improvement of the last two years, it goes almost without saying, has been in the better preparation given by high schools and academies in mathematical studies. Formerly it was not uncommon that, even in schools of reputation, this branch of instruction was intrusted to second-rate teachers, while all the honors were given to success in the study of the languages. Too often those who had charge of the instruction in mathematics were men who did not teach, but only heard lessons recited, which is a very different thing.

EXAMINATIONS AT DISTANT POINTS.

In addition to the entrance examinations in May and September, 1884, at Boston, examinations were held in May at Chicago, Cincinnati, St. Louis, San Francisco, and Washington, generally with the assistance of the superintendents of the city schools who have co-operated with the Faculty in the most cheerful and cordial spirit. It is believed that this course may, with mutual benefit, be continued in the future, and that the number of distant points at which an opportunity for local examinations shall be offered may well be increased the coming year. It is evident that the value of the results will not be measured by the number of applicants presenting themselves at these examinations in the first year or two, during which the system may be in operation.

STATISTICS OF RESIDENCE.

The gratifying tendency which was indicated in my last annual report, to a widening of the field from which our students are drawn, is even more noteworthy at the present time; the geographical extension of our constituency being quite as remarkable as the increase in the number of students.

Last year twenty-six States of the Union were represented on our lists of attendance. This year our students come from thirty-three States. Of the total number of 368 students in all classes of the regular courses, 235 are from Massachusetts, 41 from other New-England States, and 92 from outside New England. Of the total number of 579, including special students, 358 are from Massachusetts, 70 are from other New England States, and 151 from outside New England.

The following table shows the number of students of each specified class from each State or territory or foreign country:—

	STUDENTS OF THE REGULAR COURSES.					Special Students.	Aggregate School of Industrial Sciences, 1884-5.	Aggregate School of Industrial Sciences, 1883-4.
	Fourth Year.	Third Year.	Second Year.	First Year.	Total Students of the Reg. Courses.			
Massachusetts	23	36	53	123	235	123	358	288
Maine	1	1	5	4	11	8	19	19
New Hampshire	..	1	5	5	11	6	17	17
Connecticut	..	1	2	5	8	10	18	11
Vermont	..	2	..	1	3	1	4	6
Rhode Island	1	1	..	6	8	4	12	4
New York	1	2	1	7	11	5	16	15
Pennsylvania	1	1	2	6	10	6	16	8
New Jersey	2	2	2	4	2
Ohio	..	3	1	8	12	8	20	9
Illinois	1	3	3	5	12	9	21	14
Indiana	..	1	..	..	1	3	4	2
Wisconsin	1	1	1
Michigan	1	1	..	1	..
Iowa	..	1	2	..	3	2	5	4
Minnesota	1	1	2	4	6	5
Kansas	..	1	1	..	2	..	2	2
Nebraska	1	1	..	1	..
Colorado	1	1	..
Nevada	1	..	1	..	1	1
California	2	2	1	3	1
Oregon	1	1	..	1	..
Montana	1
Delaware	1	1	1	2	1
Maryland	..	2	..	3	5	3	8	9
Dist. of Columbia,	2	2	3	5	3
Virginia	1	1	2	..	2	3
North Carolina	1	1	..	..	2	..	2	3
South Carolina	1	1	1
Georgia	1	1	2	1	3	1
Alabama	1	..	1	1	2	..
Kentucky	1	1	..	2	4	1	5	2
Tennessee	2	2	1	3	..
Missouri	2	2	2
Texas	1	1	..
Prov. of Quebec	2	..	2	..	2	2
“ Ontario	..	1	..	1	2	..	2	..
New Brunswick	1	..	1	2	3	3
Nova Scotia	1	..	1	..	1	..
Scotland	..	1	1	..	2	..	2	1
Cuba	1	1	..	1	..
Japan	1	1	..	1	..
South America	1
India	1
	30	60	85	193	368	211	579	443

Among the gratifying features of this table is the appearance of students from not less than eleven Southern States, to an aggregate of 33, against eight States, with an aggregate of 22 students, last year.

Believing, as I do, in the almost boundless possibilities of industrial growth in that portion of our country, it is with keen delight that I see so many of the generous youth of the South turning from the rhetorical and dialectical exercises which so engrossed the educational interest of the generations past, to qualify themselves, by scientific and technological study and practice, to lead and direct the development of the industrial energies and the natural resources of that fair land. I rejoice to add, that, in manliness of character, sobriety of conduct, and strictness of attention to the prime object of their residence here, these young gentlemen do honor to the States from which they come.

PROPORTION OF OLD AND OF NEW STUDENTS.

The table following exhibits, for each year of the school's history, the distribution of the total number of students among two classes: first, those students remaining whose names are found upon the catalogue of the year preceding that for which the statement is given; and secondly, those students whose names appear as new names upon the catalogue of the year to which the statement relates.

It will appear from this table, that the rapid increase noted last year in the number of students remaining over from year to year still continues; the number for 1879 having been 102; for 1880, 121; for 1881, 136; for 1882, 173; for 1883, 231; while that for 1884 is 311.

YEAR.	(1) Total No. of Students.	(2) No. of Students in the Catalogue of the previous year who remain in the Institute.	(3) No. of New Students entering before issue of Catalogue.	(4) Of those in column (3) the following number were regular first year Students.	(5) No. of New Students not of the regular first year class.
1866-67	137	34	103	58	45
1867-68	167	79	88	54	34
1868-69	172	82	90	50	40
1869-70	206	90	116	63	53
1870-71	224	109	115	71	44
1871-72	261	122	139	82	57
1872-73	348	173	175	112	63
1873-74	276	171	105	59	46
1874-75	248	159	89	35	54
1875-76	255	139	116	65	51
1876-77	215	130	85	31	54
1877-78	194	96	98	47	51
1878-79	188	99	89	34	55
1879-80	203	102	101	34	67
1880-81	253	121	132	62	70
1881-82	302	136	166	86	80
1882-83	368	173	195	114	81
1883-84	443	231	212	140	72
1884-85	579	311	268	186*	82

PROPORTION OF REGULAR AND OF SPECIAL STUDENTS.

Still another table which has been prepared exhibits both the absolute number of regular and of special students, as by the catalogue of each successive year, and also the proportion existing between these two classes.

It will be seen that the proportion of regular students has, since 1881, risen from 54 to 64 per cent,—a highly gratifying result; while still further progress in this direction is reasonably to be anticipated as the effect of causes manifestly operating in the school. At the same time the Faculty will not cease to encourage the coming to the Institute of certain classes of special students whose means or family circumstances or whose age at the time of entrance will not permit them to take the full regular four years' course. Among such special students have always

* In addition, seven students are repeating the first year.

been found some of our best scholars ; and from them have come some of our most successful engineers, chemists, and architects.

YEAR.	No. of Regular Students.	No. of Special Students.	Total No. of Students.	Percentage.	
				Regular.	Special.
1865-66	64	8	72	Per cent.	Per cent.
1866-67	110	27	137	89	11
1867-68	124	43	167	80	20
1868-69	105	67	172	74	26
1869-70	125	81	206	61	39
1870-71	143	81	224	71	29
1871-72	180	81	261	64	36
1872-73	235	113	348	69	31
1873-74	182	94	276	68	32
1874-75	170	78	248	66	34
1875-76	182	73	255	69	31
1876-77	134	81	215	71	29
1877-78	117	77	194	62	38
1878-79	103	85	188	60	40
1879-80	110	93	203	55	45
1880-81	140	113	253	54	46
1881-82	164	138	302	55	45
1882-83	219	149	368	54	46
1883-84	272	171	443	60	40
1884-85	368	211	579	61	39
				64	36

COURSES OF INSTRUCTION.

I repeat my remark of last year, that the fortunes of the Institute, the changing conditions of the national industry, the varying tastes and predilections of individuals, and, to a certain extent, the tendency of students to move together combine to produce not a little fluctuation in the numbers of students within the several courses and departments. The following table exhibits the number of persons who have graduated within each of the several courses at each successive year since the first diplomas were conferred in 1868:—

YEAR.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	Total.
	Civil Engineering.	Mechanical Engineering.	Mining Engineering.	Architecture.	Chemistry.	Metallurgy.	Natural History.	Physica.	General Course.	
1868	6	1	6	..	..	..	..	..	1	14
1869	2	2	..	..	1	..	..	..	1	5
1870	4	2	2	..	1	..	..	..	1	10
1871	8	2	5	..	2	..	..	..	..	17
1872	3	1	5	..	3	..	..	..	..	12
1873	12	1	3	1	7	..	..	..	1	25
1874	10	4	1	1	..	..	..	..	2	18
1875	10	7	6	1	1	..	..	1	2	28
1876	12	8	7	..	5	1	2	3	3	41
1877	12	6	8	4	2	..	..	..	..	32
1878	8	2	2	3	3	..	..	..	1	19
1879	6	8	3	1	3	..	1	1	..	23
1880	3	..	3	..	1	..	..	..	1	8
1881	3	5	6	3	8	..	1	..	2	28
1882	2	5	5	3	6	..	1	1	1	24
1883	3	7	4	1	3	..	..	..	..	18
1884	5	6	13	..	12	..	..	..	..	36
Total	109	67	79	18	58	1	5	6	15	358

In the following table appears the distribution of the 175 regular students of the three upper classes, among the several courses. In one instance the significance of the numbers given to the courses will be seen to be changed from what it is in the table just preceding; viz., in this, that Course VI. is no longer Metallurgy, but is now Electrical Engineering.

YEAR.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	Total.
	Civil Engineering.	Mechanical Engineering.	Mining Engineering and Metallurgy.	Architecture.	Chemistry.	Electrical Engineering.	Natural History.	Physica.	General Course.	
4th year class,	7	7	8	2	4	1	..	..	1	30
3d year class,	9	20	8	2	6	15	..	..	..	60
2d year class,	13	27	12	5	10	14	1	1	2	85
Total	29	54	28	9	20	30	1	1	3	175

THE WORK OF SPECIAL STUDENTS.

The 211 special students in the School of Industrial Science cannot be classified systematically; but the following table exhibits the number of special students pursuing each particular branch of study, according to the attendance papers filed by them and approved by the Faculty:—

NUMBER OF SPECIAL STUDENTS ATTENDING EXERCISES IN THE FOLLOWING DEPARTMENTS OF STUDY OR PRACTICE.	
Architecture	42
Biology	23
Chemistry	83
Civil Engineering	20
Drawing	43
Descriptive Geometry	37
English	78
French	26
Geology	17
German	84
Mathematics	109
Mechanical Engineering	55
Military Drill	28
Mining and Metallurgy	11
Physics	89
Shop Work	56
Zoölogy	6
Total number of entries, by special students	807
Total number of special students	211
Average number of entries	3.8

CORRESPONDING NUMBERS FOR 1883-84.

Total number of entries, by special students	596
Total number of special students	171
Average number of entries	3.5

It may be of interest to note the numbers of students, either regular or special, pursuing certain leading branches of study, in each of the four years, which are as follows:—

	First Year.	Second Year.	Third Year.	Fourth Year.	Total.
Mathematics	225	137	72	..	434
Chemistry	243	35	21	15	314
English	212	106	77	..	395
French	205	..	..	..	205
Physics . . . . .	..	148	91	5	244
German . . . . .	..	126	89	2	217
Shopwork* . . . . .	..	78	32	14	124

* Exclusive, of course, of the students of the School of Mechanic Arts. The corresponding number last year was 95.

THE CORPS OF INSTRUCTORS.

An increase in the instructing staff of the Institute has of course been required, to meet the demands of the large incoming classes. The number of instructors of all grades, excluding those persons who are announced as lecturers for the year, is 57, against 48 last year. The number of professors is 14; of associate professors, 3; of assistant professors, 11; of instructors, 15; and of assistants, 14.

The following table shows the number of teachers of each recognized grade, in each year since the foundation of the school.

YEAR.	Professors.	Associate Professors.	Assistant Professors.	Instructors.	Assistants.	Total.
1865-66	10	..	..	..	..	10
1866-67	12	..	..	2	..	14
1867-68	12	..	1	2	2	17
1868-69	13	..	..	6	1	20
1869-70	16	..	1	6	2	25
1870-71	18	..	2	7	5	32
1871-72	21	..	2	11	1	35
1872-73	23	..	2	9	1	35
1873-74	20	..	3	10	4	37
1874-75	20	..	3	7	3	33
1875-76	23	..	..	6	8	37
1876-77	21	..	..	4	10	35
1877-78	20	..	..	3	14	37
1878-79	18	..	..	7	12	37
1879-80	16	..	..	7	8	31
1880-81	15	..	2	6	7	30
1881-82	17	..	3	6	11	37
1883-83	16	..	3	10	11	40
1883-84	15	..	8	15	10	48
1884-85	14	3	11	15	14	57

The changes among the professors and associate and assistant professors, during the year, have been mainly in the way of additions to the existing staff. In one instance only has the change been in the nature of loss. Professor John M. Ordway, after a continuous service of fifteen years, has left the chair of Industrial Chemistry and Metallurgy,

to accept the charge of a more extensive department in the new Tulane University of New Orleans. Professor Ordway's unremitting labors and unflagging zeal have identified him in a peculiar degree with the Institute of Technology.

In view of Professor Ordway's retirement, it was not deemed desirable to appoint any person to undertake the double charge which had rested upon him. The instruction in Metallurgy has devolved upon Professor Richards and Mr. F. W. Clarke, assisted by Mr. Henry M. Howe as lecturer for the current year; while the other portion of Professor Ordway's work has devolved upon Dr. Norton, who has been appointed assistant professor of Organic and Industrial Chemistry. The instructing staff in the chemical department has been further strengthened by the appointment of Mr. Thomas E. Pope, late professor in the Iowa Agricultural College, a former student of the Institute, as assistant professor of Analytical Chemistry.

Mr. Linus Faunce, a graduate of the Institute in the class of 1877, and subsequently engaged in the engineering department of the New York & New England Railroad, has been appointed assistant professor of Drawing, and placed in charge of the drawing of the first year, and of the instruction in Descriptive Geometry.

Mr. Alfred E. Burton, a graduate of Bowdoin College, subsequently employed upon the United States Coast Survey, has been appointed assistant professor of Topographical Engineering.

In the department of Mechanical Engineering, three of the instructors of last year have been promoted to the grade of assistant professors, as follows: Mr. Peter Schwamb, in Mechanism; Mr. Charles H. Fisher, in Mechanical Engineering; Mr. Cecil H. Peabody, in Applied Mechanics. Mr. Schwamb has, also, in accordance with the recommendation of the Faculty, been announced as Director of the School of Mechanic Arts. Professor Schwamb has conducted the various services of the school, thus far in the school year, with intelligence and sound judgment.

THE SUBSIDIARY SCHOOLS.

The School of Mechanic Arts and the Lowell School of Practical Design have done their work efficiently during the past year. The number of students in the former school is purposely restricted; the number of students in the latter school shows some increase: but no large accessions are to be anticipated until it shall be within the means of the Corporation to provide a separate building for this school on the new land. The attention of the Corporation has recently been called to the desirability of such action in the near future, through a report of the visiting committee, Mr. Atkinson, chairman.

LABORATORIES AND RECITATION ROOMS.

After the enormous extensions of the year 1882-83, the changes in laboratories and recitation rooms made during the past year seem slight; yet, without such a comparison, they would be seen to constitute a very important addition to the accommodations and facilities at the disposal of the Institute.

The great increase in the number of students in Mechanical Engineering has required that the story of the Rogers Building, heretofore shared by the Civil and Mechanical Engineering departments, should be surrendered to the latter almost entire, one room being reserved for the temporary use of the School of Mechanic Arts, and another for blowpipe analysis. All the rooms, halls, etc., on this floor, upon the Newbury-street side of the building, have been thrown into one great drawing-room, of the size of Huntington Hall, which has been provided with 130 drawing-tables.

The Civil Engineering department, thus crowded out of the Rogers Building, has found temporary, but most agreeable and commodious, offices and drawing-rooms on the east side of the second story of the new building, where it

is anticipated this department will remain until provided for, more amply and more favorably still, through an extension of the "lantern story" of the Rogers Building, incidental to a removal of the present unsatisfactory and unsightly roof.

In the basement of the new building a photometric room has been parted off in the main eastern hall for the use of the department of Physics. In the large room at the Newbury-street end of the building, a room 30 x 20 feet has been set apart as a laboratory for the Architectural department, where experiments can be made with limes, mortars, and cements, and problems be worked out in the actual materials of construction.

The western third of this large hall has been partitioned off as a storeroom (40 x 30 feet), for the supplies and apparatus of the Chemical department; while the former supply and apparatus room has been fitted up in the best manner for the department of Industrial Chemistry.

Still another addition has been made to the ample chemical laboratories of the Institute, through fitting up room No. 34 on the third floor of the new building as a laboratory of Sanitary Chemistry, instruction in this subject having been introduced as an option in the third and fourth years of the chemical course.

This laboratory will relieve the analytical laboratory in certain lines of work, and will also afford facilities for special students who desire to learn the methods of analyzing air and water, of detecting adulteration in milk, bread, and other articles of food, of testing illuminating oils, and of making special chemical investigations in matters relating to public health. The laboratory has been attached to the department of Professor Nichols, whose investigations in these lines are too well known to require an allusion here. Mrs. Ellen H. Richards has been appointed instructor in Sanitary Chemistry.

The most important, however, of all changes, since the

last annual report, in the buildings of the Institute, has been that effected in the Rogers Building, by which the entire rear half of the basement, including the former third and fourth year chemical laboratories, has been remodeled and renovated, so as to answer the purposes of the department of Mining and Metallurgy in a degree which, a year ago, would hardly have been deemed possible by any member of the Corporation or of the Faculty.

It has long been almost a foregone conclusion that, in the course of time, the mining and metallurgical laboratories would be removed to some other spot, perhaps to the new land at the foot of Garrison Street. A careful survey of the basement of the Rogers Building, however, during the past year, satisfied the executive committee, that, with some structural changes, the space there available could be so utilized as to meet the present and prospective wants of this department. In consequence, the front and the rear half of the basement having been separated by a fire-proof wall, the large staircase from the first story to the basement was removed, thus preventing the upward escape of laboratory fumes, while affording space for ample lavatory, toilet, and supply rooms; partitions and platforms no longer required were thrown down; new arrangements for ventilation and for the introduction of water and steam were effected; a system of storage-vaults was constructed underground, outside the main wall of the building upon the eastern side; the chimney-flues were lined far up with fire-brick; all the furnaces were rebuilt from the floor upwards; all the old machinery was taken out, and thoroughly overhauled and repaired, so far as it could be made to answer the purpose satisfactorily; while new machines, to at least an equal extent, were introduced.

As the result of these alterations and additions, which were effected at a cost of between six thousand and seven thousand dollars, the accommodation for students in the mining and metallurgical laboratories has been increased

nearly threefold, while the quality of the work that may be done has been, if not proportionately, at least very greatly improved. The storage-vaults will allow the ore of many mines to be kept in stock; while the building, viewed as a fire-risk, has actually been improved by the changes recited. These laboratories now stand, in their scope, capacity, and equipment, unrivalled and unapproached. In the assaying-room, twenty students can work at once with fire; while the furnace-room contains furnaces sufficient in number and size, to enable almost any variety of ores to be treated economically, in quantities from twenty-five to a thousand pounds. A water-jacket furnace, having the capacity to smelt a ton of lead or copper-ore in a day, has been presented by a friend of the Institute since the term began, and is now in place. The laboratory for crushing and separating machinery contains four full suites, with a great variety of special and novel apparatus.

The past year has seen the demolition of the low brick annex on the main square of the Institute, which was erected eight years ago, to serve the purposes of the woman's laboratory and of the mechanic art shops. By the erection of the building at the corner of Clarendon street the space occupied by the annex had become in excess of that which the Institute might, under the grant of the State, lawfully cover with structures of any kind; and it had, moreover, become painfully unsuitable and inadequate to the increasing needs of the school.

In removing this from the face of Institute square, however, we must not be ungrateful for the good service it rendered in the earlier days of poverty, doubt, and difficulty, nor forget by what labors and sacrifices even this now discarded shelter was purchased for two of the infant departments of the school.

This account of the development of the Institute, and the multiplication and extension of its services and offices,

would not be complete without the statement that the growing appreciation of technological education throughout the community, and the fast-increasing resort of students to our halls, make the more imperative the need that has been so long and so painfully felt, for the ample, liberal endowment, in perpetuity, of this school of industrial science, with revenue-bearing funds.

Down to this time, the munificence of the friends of the Institute has mainly been directed towards rearing these costly buildings, and equipping them with the best appliances of scientific investigation and practice, and towards meeting the current charges of maintaining our varied services through the period of outlay and experiment. The future has not yet been provided for. The establishment of the William Barton Rogers Memorial Fund, in 1883, formed alike a worthy monument to the illustrious founder of the Institute, and a notable and noble addition to its permanent resources. But the need of early and large endowments, above all that have heretofore been so generously contributed, is urgent and imperative. Shall funds be wanting to place this school, whose unsurpassed usefulness among the educational institutions of the country stands acknowledged by the unprecedented accession of students from every part of the land, upon an assured basis, and to give it the means fully to meet the growing demands of the community?

Large additional endowments are needed,

1. As a reserve against hard times, against the occurrence of financial disaster, and even against the possibilities of temporary internal mismanagement. It is a perilous position for an educational institution that it should depend so largely upon tuition fees as to draw one-half of its revenue from this source. Yet five-sixths of the income of the Institute of Technology will be thus derived the current year.

2. As a basis for free scholarships for a large number of deserving students, whose means would be severely taxed

to meet the expenses of their maintenance, even were the charges of their tuition remitted. With an aggregate attendance of nearly six hundred in the School of Industrial Science, we ought to have at least sixty free scholarships, whereas but five have thus far been provided.

3. As a means to reducing somewhat the very high tuition fees now necessarily exacted from all students.

4. To place it in the power of the corporation to raise the compensation of the professors and other instructors of the school, to correspond, if not with the incomes of successful practitioners in the several scientific professions, at least with the salaries of professors and instructors in the leading classical colleges.

5. To enable the corporation and faculty, through the long future of the school, to meet promptly and fully all the progressive demands of industrial education, as well as, through original research and investigation, to pay back each year some part of that great debt which the arts owe to science.

All of which is respectfully submitted.

FRANCIS A. WALKER, *President.*