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# The Tech.

VOL. IV.

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## THE TECH.

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IN some of our railroad papers there has lately been a discussion of a very interesting and important branch of engineering which has recently been brought to the immediate notice of educators here and in Europe. A school founded in Vienna for the education of rail-

road employes in the subjects of particular usefulness in their profession has completed its first year with great success. The school is supported by the railroads of the immediate vicinity, and the recitations are so timed that men engaged in business during the day can attend them without inconvenience. The course, quoted from the *Railroad Gazette* of Oct. 17, is as follows:—

“First Year.— Railroad Technology, Trade Geography, Political Economy, Book-keeping.

“Second Year.— Railroad Law and History, Theory of Railroad Rates, Statistics of Trade and Trade Goods, Railroad Administration, Tax

Laws and Procedure, with Electrical Engineering as an extra subject.”

At Yale, an extended course of instruction on railroad subjects is to be given by Mr Arthur T. Hadley, including “Railroads: Their History, their Business Methods, and the Social Problems connected with them.” The scheme of studies is far too large to reprint here, but it consists of a *résumé* of all that a railroad man could desire to know with special reference to his employment.

Now there are men graduating every year from the Institute who go, and have all along intended to go, into the railroad business; and until now, they have had a great advantage in so doing over most of the young men entering the same profession. They have received most excellent training as mechanical or civil engineers, and so far are on a strong basis; but now that these other schools are springing up, now that the colleges are beginning to give instruction in what is the especial province of the Institute, yet in which the Institute fails in a great degree to give instruction of any kind, we cannot hope any more to compete with these other institutions in this respect, nor any longer to send our men out thoroughly fitted to cope with those who have received the more distinctive training.

There may be a question as to the advisability of forming a new course in the Institute for men who intend to make themselves proficient in railway business. The need may not be so urgent as that which was recognized when the course in electrical engineering was organized, but it has become sufficiently prominent to demand some attention and consideration on the part of those who have charge of our professional training. There can be little objection to admitting into one or more of the existing courses some of the most important subjects in the courses at Yale and the Vienna school.

IT is with regret that we have to notice the continued want of interest at the Institute in most of those things in which so much enthusiasm is shown at our sister colleges. Lack of time, lack of time, is the ever-recurring plea when we ask the students why they do not go to the foot-ball and athletic games, the concerts of the Glee Club, class meetings, and the like.

There was a time when the Institute could put a victorious foot-ball eleven into the field, when records were broken at our athletic games, and when our tug-of-war teams could pull all comers. Now, the latter is about the only thing which can be done here. If the present condition of affairs at the Institute had existed when it was smaller, there would have been some excuse on that account; now, that excuse has disappeared. With our exceedingly large Freshman classes of the past three years, there ought certainly to be material enough from which to select a successful foot-ball eleven. As a matter of fact, out of the present Freshman class of over two hundred and fifty, not a half-dozen put in an appearance to try for the team.

As our upper classes will in the future, as in the past, probably continue to be small in numbers, it is to the Freshmen that our organizations must look for support. As yet we have not heard of any extraordinary assistance that they have given to either the Athletic Club, the Football Association, the Glee Club, or THE TECH. It is, practically, the same set of men who, each year, are the chief support of the whole of these things which should be the concern of the whole mass of students. It is to be hoped that we are not all becoming a set of dregs, who have no time for anything but their studies. We have heard of men who have graduated from the Institute and not once attended a class meeting during their whole residence here. With the exception of the torchlight, it has been our experience that our class dinners are the only occurrences which can evoke real general enthusiasm amongst us.

We know that these matters have been written about over and over again in almost every college paper; but this article is especially directed to the Freshmen. Subscribe for THE

TECH; join the Athletic Club; if you have any musical ability, join the Glee Club or the new orchestra which is now forming; if an athlete, go to work in the gymnasium, and help try to give the Institute a better showing at the next athletic games.

#### Electrical Engineering.

THIS year there will graduate from the Institute of Technology the first class that has ever completed the work in the course in electrical engineering. Although other scientific schools have already prepared men for this profession, yet the Institute is a pioneer in this branch of education. Already the electrical engineering department is one of the largest in the school, and, in spite of the fact that until a year or two ago no connected work had been done in this branch of instruction, the arrangement of studies has been wonderfully well planned, and does great honor to the Faculty, and especially to the head of the department.

We find everywhere young men who, wishing to gain a practical education, think they can find an opening in the field of electrical work. There is something about electricity and its applications which is very attractive. The uncertainty as to the true nature of electricity is to many minds a charm. A more practical reason for the popularity of the electrical department is that there has been a demand for men in the profession, and, consequently, an apparent lack of competition. This can last but a short time, and a scientific and thorough education, such as the Institute now gives, will soon be essential.

The ignorance of some of the present electrical engineers or the superficial nature of their knowledge is frequently brought to notice; but henceforth we may expect to see only the able and well educated hold positions of trust and responsibility. The field is large enough for all who go into it well prepared, and the experimental work especially offers great inducements. We cannot too strongly urge young men who possess mechanical taste and aptitude to devote themselves to electrical work, especially to the higher branches of original and experimental research.

## Doubt.

I long to go  
And clasp once more the hand that holds my chain,  
And feel her presence, whose delicious reign  
Enthralls me.

I long to stay;  
For what if Love forget the silence taught,  
And win but cold contempt? The thought  
Appalls me.

So in uncertainty,  
Whose dusky cloud my universe doth cover,  
With drooping wing my soul doth vainly hover  
Eternally. L.

## Peradventure.

MR. JOHN SELWYN sat in his easy-chair at Rivermouth toasting his feet at the open fire. It was in the latter part of October, and just the delicious hour between light and darkness, when one, as he grows old, likes to sit before the glowing coals and reminisce, if I may coin an expression. To explain a little farther, I had been spending some time in relaxation from business cares with my old college friend, and we used to delight in this quiet hour before dinner. Mr. Selwyn was one of those vigorous elderly gentlemen whose minds seem only to polish with the friction of the years, and his conversation was very charming, — like that of Josiah Quincy, whose contemporary and friend he was, in fact.

We had just come in from a six miles' walk about the beautiful shores of the Colonna where it flows into the broad Atlantic at the base of Holbachs Tower, where

“We heard the sea-maids on the outer rocks  
Splash in the falling tide, and dimly saw  
What seemed their tresses, undulating there.”

There had been a few minutes' silence, which my friend ended by a slight exclamation, and then began talking: “Rather a startling experience happened to me in this room about fifty years ago. As you perhaps know, my father built this house with a wooden L and large halls running to the top after peculiar ideas of

his own about ventilation. As a matter of fact, however, all noises below came up in this way with great distinctness. One evening I had been out playing chess until quite a late hour, and, on reaching the house here, found it all dark, and, as I supposed, everybody in bed and asleep. So, entering and shutting the door as quietly as possible, I made my way as best I might to my room in the third story, and, lighting the candle, was preparing to retire when a peculiar noise attracted my attention. The house was otherwise perfectly quiet, and, after listening attentively, I perceived that the sounds came up through the hallway from the windows on the ground floor, apparently, as if some one were trying the catches. The noises increased. Doubtless some one was trying to enter the house, I thought. So, putting on my coat and taking down a couple of pistols which I had bought the winter before in Paris, but had as yet never used, I proceeded cautiously downstairs. Cautiously, but not from timidity. I am not easily alarmed, even now, and my nerves then were as firm as health and confidence could make them.

“As I neared the lower part of the house, the sounds seemed to centre and proceed from the dining-room, which was formerly this room. It was brilliant moonlight, and, as I reached the door, there, sure enough, was a man with his body half in and half out of the farther window, and of course entirely unaware of my presence. I had him so completely at the mercy of my pistol that I indulged in a little indignation before shooting him, and said gruffly, ‘What are you doing there?’

“Oh, is that you, John?’ said the man, turning around. ‘I heard these blinds rattling, and thought I would come down and fasten them back; the wind has come around to the east.’

“It was my father!

“My feelings can be more easily conceived than described. To have come so within an ace of shooting my own father, to have withheld my fire from the merest chance and whim of over-confidence, was rather a shock, I must say. I put up the pistol which had so nearly

accomplished a tragedy, and, with a rather incoherent explanation that I didn't know it was he, left the room and went to bed. Narrow escape, wasn't it?"

I thought it was, decidedly, and so expressed myself. The story produced that curious sensation within me which will be readily understood if I have been at all successful in relating it here as it was told. The conversation after that was about the characteristics which different men exhibit in emergencies, when James, the butler, came to announce that dinner was served; so we went out of the darkness into the bright light of the dining-room, and forgot housebreakers in the absorbing duties incident to dining off roast venison cooked with gravy in a chafing dish.

THADDEUS PELL.

---

In Clover.

'T WAS ere the mellow autumn moon  
Shone down on happy lovers,  
That she and I, one afternoon,  
Went seeking four-leafed clovers.

No cloud bedimmed our leafy path,  
No care our hearts came over,  
As, wandering in the aftermath,  
We looked for four-leafed clover.

A trick of Cupid's this, they say,  
To put on one leaf over,  
That lucky men may find a *kiss*  
With every four-leafed clover.

I fear her blushes did betray, —  
For how could they discover  
That I — that we — that summer day  
Found — *several* four-leafed clovers?

F. M. W., '87.

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Trip of M. I. T. Students to the Mines and Mineral Localities of Nova Scotia, July, 1884.

TOWARD the close of last term arrangements were made for a party from the Institute to visit the more prominent mines and

mineral localities of Nova Scotia, under the direction of Prof R. H. Richards. This party, consisting of five students, two assistants, and a gentleman and his wife from Cambridge, began their journey on the last day of June, leaving Boston on the International Line steamer "New Brunswick" The day was pleasant, and we had a fine sail to Portland, where advantage was taken of a short stay to stretch our legs on shore. On leaving this port in the evening, we found more of a swell outside, and before long many of the ladies had disappeared, and some of the gentlemen did not feel entirely comfortable. The next morning found us enveloped in a dense fog, which continued during the day, our only guidance being the compass and the fog-whistles. Just before noon we caught a glimpse of the coast, and soon found ourselves rounding the island of Campobello, which lies off Eastport Harbor. In shore the fog had lifted, giving us a fair view of the harbor as we entered. A stay of two hours enabled us to appreciate the good dining facilities of the Passamaquaddy House. Here also our party was increased by the addition of one more student. During the remainder of our voyage the fog was very dense, and, as we entered St. John, we saw nothing of the town till we were alongside of the pier. I think all were heartily glad to be once more on land. At the Royal Hotel, we enjoyed a warm supper and a good night's rest.

Going out upon the street in the evening, we found the town celebrating the anniversary of the union of the Provinces, which occurred seventeen years ago. This celebration corresponds very much to ours of the Fourth of July. The next morning we passed through a rather uninteresting section of country, upon the Intercolonial Railway. Moncton and Amherst were the larger places on our route. At the latter we stopped for dinner, and were there met by Mr. B. B. Barnhill, a former student of the Institute, and at that time superintendent of the Joggins Coal Mine.

At Maccan we left the train, and, after a ride of twelve miles through a desolate country and

over a hard, rough road, we arrived at the Joggins Mine, and put up at the only hotel, a true backwoods hostelry. In order to make the most of our time, we delayed our supper till after dark, and descended the cliff, the base of which is washed by the waters of the Bay of Fundy. Here we found exposed a very fine and interesting geological section sixty or more feet in height. The strata have a southerly dip of  $15^{\circ}$  to  $18^{\circ}$ , and vary in thickness from only a few inches to three feet. They consist, to a great extent, of sandstones and grit. This is said to be the best stone for grindstones found in America, and a large amount is quarried. Interstratified with the sandstone are numerous beds of coal, varying from the thickness of a sheet of paper upwards. There are also several layers of limestone, much of it so black and carbonaceous that it is easily mistaken for some other material. Fossils, such as leaves of the various coal plants, portions of sigillaria, stygmara, and calamites, are very abundant. Of the latter we obtained a large collection to ship to Boston.

The next morning, Mr. Barnhill took us down into the mine, and explained the methods of work; of these I will speak in a later article.

In the afternoon we drove to Parrsboro, a distance of about thirty miles. Most of the country through which we passed is covered with small wood, and the drive was highly exhilarating, owing to the way they make their wagon springs up there. However, there was one very interesting feature; for nine miles we rode along on the top of a ridge from ten to twenty feet above the common level of the country, and only about wide enough for the roadway. This ridge is locally known as the "Boar's Back." Geologically, it is a fine example of the kames, which are quite common in this part of America.

The next day we devoted to hunting for minerals along the cliffs of Partridge Island. This so-called island is a large mass of trap, with precipitous sides rising between one and two hundred feet above the sea. The seams and fissures

in this trap are filled with minerals, which are continually exposed by the action of atmospheric agencies. Stilbite seemed to be the most abundant, and we obtained large quantities of fine specimens. We also found considerable chabazite, with some apophyllite, analcite, etc.

The next day, through the courtesy of Supt. Leckie, we visited the Spring Hill Coal Mines, which have shafts in three seams of coal in fine working order. Though quite rainy, we enjoyed our visit. Mr. Leckie kindly furnished us with a special train.

Sunday being very rainy, we remained in the house all day.

Our chief object in visiting Parrsboro had been to cross over to Cape Blomidon, on the opposite shore. The current here is very strong, and a stiff breeze is necessary in order to cross. During our entire stay, the wind was very light, and we were obliged to give it up. We spent our last day in a sail to Wasson's Bluff and Two Islands. At the former place we found large quantities of very fine analcite crystals, and at the latter [analcite and laumontite. The rock formation at both places is trap similar to Partridge Island.

That night we went to Spring Hill Junction, Mr. Leckie again giving us a special train, and the next day visited the Londonderry limonite mine, walking from the station, a distance of two miles, in a pouring rain. The iron occupies a seam passing directly through a hill, and is worked from both sides directly along the seam, and also by a shaft sunk from the summit. We inspected the workings by riding in on a car, and then ascended to the summit by the elevator. During the afternoon we visited the foundries, and were shown the processes of tapping and charging.

The next morning we drove out to Maitland, a distance of twelve miles, to see the "bore" as it enters the Shubenacadie River. In the appearance of this phenomenon we were considerably disappointed. As the tide came up the river against the current, it at no time rose more than two feet above the general level of

the water, and sometimes was almost obliterated. By measuring a distance along the shore and taking the time of the passage of the "bore" through this distance, we estimated its speed at about eight miles per hour. The surface of the river now became very rough and turbulent, and the ferry-boat, in crossing, was tossed about like an egg-shell. The vertical rise of the tide was very rapid, being about twenty-six inches in eight minutes. Its entire rise is about fifty feet at this point.

The next day we went to New Glasgow, and visited the Albert Coal Mines, where an extensive explosion took place three years ago, by which some seventy men lost their lives. After the explosion the workings were at once flooded with water to extinguish the fire. This water has never been pumped out, and, consequently, the bodies of the men have never been recovered. The old workings having all been abandoned, the company has sunk slopes and begun working on new seams.

The next day we visited another coal mine, going up from Stellarton on the company's engine. After inspecting the works, we returned, and went to Pictou, where we dined, and spent most of the afternoon in a delightful sail around the harbor.

We returned to Truro for the night, and next morning went to the gold mines at Oldham, which we reached by a four-miles' drive from the nearest station. Here we visited several pits, some of which were being worked and others not, the manner of working being very desultory and loose. The miners, after having made a little "pile," cease to work until that is spent and they want more. This is not conducive to the best methods of working.

Sunday and Monday we spent at Halifax. Monday morning, in charge of Dr. Honeyman, the local geologist, we visited the glaciated area near the fort, where are exposed some of the finest striations known. In the afternoon, Mr. Gilpin, inspector of mines, gave us much information regarding the mines of Nova Scotia, and kindly showed us over the Province buildings.

The next day we visited the Mt. Uniacke

gold mines, which we reached by an extremely rough ride of four miles from the station. These mines we found in successful operation, and producing a very rich ore.

Going to Winsor that night, we visited the gypsum quarries there, collected some very fine selenite, spent some little time the next morning looking at the quarries, and then came by railroad and a nine-mile wagon drive through a very pretty country to Margaretville. Here the shores along the bay are cliffs of trap, and we found quantities of laumontite, with some other zeolites. This was our last point of interest, and the next morning we turned our faces homeward, touching at Annapolis, on the way to St. John, where we went on board the steamer for Boston.

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#### The Republican Torchlight Procession.

THE final demonstration in Boston of the Presidential campaign was the Republican torchlight procession, which took place the night before election. In it the Institute, as has been its custom, took part. The daily papers have described sufficiently the events of the evening in general, and it devolves upon THE TECH to add some account of the affair, considered with special reference to friends of the Institute.

The committee, to whom a mass meeting of students had given control, provided uniforms, each consisting of a loose robe of gray cloth, trimmed with cardinal, representing, as nearly as possible, the Institute colors, a close-fitting breast-piece, gray, displaying the year of the class to which its wearer belonged, a mortar-board cap in the same colors, with a white tassel falling from its brilliant cardinal surface, and a torch; officers were distinguished by swords and an interchange of colors in breastplate and cap.

The regiment, headed by its own drum and fife corps and the Boston Cadet Band, formed near the gymnasium. '85, as Senior class, occupied the place of honor on the right of the line, followed in order by '86, '87 and '88, numbering, in all, about four hundred. Marching

to its place in the column on Commonwealth Avenue, the command was joined by two barouches, containing a number of '84 and '85 men. The head of the column started a few minutes after eight o'clock; the line of march was Commonwealth Avenue, north side, to West Chester Park, return south side to Dartmouth, and through Dartmouth, Boylston, Berkeley, Columbus Avenue, Chester Park and Square, Washington, Worcester, Tremont, Eliot, Washington, Hanover, Court and Tremont to Park Street.

During the countermarch on Commonwealth Avenue, nothing of note occurred; the greatest interest was centred at the Brunswick Hotel, where Mr. Blaine reviewed the procession, and it was here that every one endeavored to appear at his best. The Institute companies made some good wheels from Dartmouth Street to Boylston, and preserved excellent lines while passing in review, cheering without halting; opposite the Rogers Building, however, the crowd had pressed forward so far that the lines were somewhat broken, though still in good condition. While passing this block, the attractive uniforms and soldierly appearance of the Institute regiment called forth many favorable comments from strangers as well as from the friends collected in and about the Institute buildings. Attention was also paid at many places in the line of march by applause, and by the letters M. I. T., conspicuously displayed. In short, the Institute regiment was generally considered to be one of the best appearing in the procession. Considerable amusement was afforded by the surgeon, armed with a huge saw, and by the chaplain, whose "prayer-book" contained several good selections, such as "Papyrographs must go." These personages, as well as the rest of the staff, carried colored conductors' lanterns.

Through the South End and business district many residences, stores, and offices were illuminated, and the streets were bright with an almost continuous display of Bengal lights and Roman candles, increased by the glare of the torches. The route was passed over mainly in column of companies, with no long

halts. About two hours and a quarter were required for the fourteen thousand participants to pass a given point. At the Tremont House the procession was reviewed by Gov. Robinson, and from here to Park Street, the sidewalk was lined with horsemen. Passing these, the Institute regiment, with constantly decreasing numbers, continued its march to its place of dismissal in front of the new building, which it reached about half past eleven.

Transparencies, in considerable numbers, were carried by the Institute, their sentiments varying through a wide range. The principal one was a massive affair, on which appeared the name of the school, the presidential preferences, as canvassed, viz., Blaine, 371; Cleveland, 156; St. John, 18; Butler, 1; Belva, 1; and the inscription, —

THE FACULTY —

"Who first invented work, and bound the free  
And holiday-rejoicing spirit down."

Unfortunately, this transparency, at first borne at the head of the regiment, proved too much for one man power, and was relegated to a barouche farther back. Deprived of this distinguishing feature, the first Institute companies were mistaken for butchers, bakers, Harvards and Chinamen.

Observers have said that the tendency of the Techs was to over-sedateness. It may be said that this tendency was due to the fact that each one entered the procession with the combined idea of enjoyment and good appearance, and all found that enjoyment could be secured without the sacrifice of order, and without descending to rough and ungentlemanly actions. The cheering was not so effective as could have been wished, owing to the distance between companies, which prevented united action in this matter. Class cheers were, however, heartily given.

The thanks of the school are due President Walker for his hearty co-operation with the committee, to the committee itself for valuable time spent and services rendered, and to the colonel of the regiment, Charles R. Richards, '85, to whose popularity, energy, and executive ability much of the success of the Institute's share in the procession is due.

### Foot-Ball.

SATURDAY, Oct. 18, the eleven went to Williamstown, and were defeated by the Williams eleven. The afternoon was rainy, and the grounds were unfit to play upon. In the first inning neither eleven scored. In the second, Williams made two touchdowns, from one of which a goal was kicked.

The score: Williams, 10; Tech, 0.

On the following Saturday, Harvard played a return game on the Union grounds. Harvard won an easy victory, as was expected, but made no larger score than in the game two weeks previous, although the Techs presented a much weaker team than then, five of the men being substitutes. The Techs kicked off, and the ball was soon rushed to their goal, but Harvard failed in repeated attempts for touchdowns. For a while it seemed as though the Techs might keep the Harvard score down to a low figure, but they soon became rattled, and Harvard rapidly made point after point. In the latter part of the inning, the Techs rushed the ball well down to Harvard's end of the field, and Twombly made an attempt for a goal, but failed. The second inning was but a repetition of the first. At the end, the score was, Harvards, 43; Techs, 0. Ladd, Twombly, Pratt, and Fletcher did the best work for the Techs, especially by their good tackling. The team suffers a great loss in its captain, P. Winsor, who is obliged to stop playing on account of ill health.

### Communications.

*(The editors do not hold themselves responsible for opinions expressed by correspondents.)*

TO THE EDITOR OF THE TECH: Four years ago, Prof. Howison severed his connection with the Institute of Technology, and closed a service which had been of value to every student, a credit to himself, and an honor to the school. Had his departure meant merely a change in the *personnel* of the Faculty, the issue would have long since been dead; but when we consider Prof. Howison as a man equal in ability to the

greatest of his coadjutors, and of such a character that, while teaching subjects distasteful to a large number of his pupils, he retained not only the respect but the esteem of every student, we recognize in the event the abolition of logic and philosophy from the curriculum of the school.

In the revolt against the system of the classics, the iconoclastic scientist of to-day rejects everything that bears the mark of age.

To say that these studies do not directly produce dollars, is to deride rhetoric, grammar, history, and other necessities of common education, as well as botany, zoölogy, and higher branches of learning.

To say that the Institute has no time to devote to more work, is to beg the question of a higher grade of entrance.

Repeat the old saw, that logic is intellectual gymnastics, and we will answer that it is only by gymnastics that the body is trained and strengthened systematically and proportionally.

Grant that Aristotle and Plato are dreamers that have long since passed away, that Descartes, Kant, and Hume are theorists who are dead, the fact remains that without their speculations modern thought could not exist. From their pregnant ashes have arisen men like Huxley and Darwin, Thompson and Spencer.

The aim of education is not to make encyclopedists, but thinkers. It is certainly absurd to graduate from a seat of highest learning men who have never thought of the infinite in contradistinction to the limited, save as the impossible numerator or denominator of a ridiculous fraction; who have spent years in the study of the attributes of time and space, but think only of these concepts as *a priori* self-existent entities.

The Institute may be forgiven for temporizing in past financial straits; but as it never has abandoned its motto of doing well what it does at all, so let it not rest until, in these days of its prosperity, it replaces what must always be the foundation of every perfect scheme of thought.

## Department Notes.

The fourth-year miners have been on a number of geological excursions recently with Prof. Crosby.

The third-year miners have finished their fall field-work in surveying, of making a contour of South Boston.

At a meeting of the New England Cotton Manufacturers' Association, held at the Institute, Friday, Oct. 24, Assistant Professor C. H. Fisher read a paper on the influence of varying conditions of moisture and electricity in the atmosphere upon the manufacture of cotton.

The Utica Steam Gauge Company, of Utica, N. Y., has presented the Institute (Mechanical Engineering Department) with a steam gauge and apparatus for testing steam gauges, consisting of a standard square inch valve, hydraulic pressure piston and connections. The gift has been placed in the mechanical laboratory, to which it is a valuable addition. The department has also received a low-water detector, presented by the Ashcroft Manufacturing Company; this company has kindly loaned one of its combination gauges for the illustration of fourth-year mechanical lectures.

The architects got to work very soon after the term began. The problem of an art museum was assigned to the Seniors. There are but three who are taking this series of problems, which, when the course is fully settled, will correspond to the work of the regular fourth year. The problem is to be completed as soon as possible, no time being set for it to be handed in, — a course justified by the small number of those who are taking the advanced work. The second-year men are working up a problem similar to the one which was assigned first last year. It consists of a drawing of a Boston dwelling-house, rendered in color, with details. A supplementary problem is to be a sheet of dormers and wrought-iron work from the vicinity. Every moment when the sun shines is improved by the sketchers, who must have both problems done by Thanksgiving day.

## Former Classmates.

'85.

Oakes Ames, with Ames Plow and Shovel Company, North Easton, Mass.

Harry P. Barr, in Manchester Cotton Mills, Manchester, N. H.

B. F. Copeland, farming at West Dedham.

F. H. Cutter, in Electrical Department of the Boston and Albany Railroad.

Lansing O. Kellogg, at Sheffield Scientific School, New Haven.

T. M. Kellogg, in Boston office of McKim, Meade & White, architects, of New York.

Isaac W. Litchfield, with Metropolitan Telephone Company, New York.

Arthur D. Little, in Rumford Paper Mills, at Rumford, R. I.

W. E. Spaulding, in First National Bank, Nashua, N. H.

'86.

A. H. Brown, with Thomson-Houston Electric Manufacturing Company, Lynn, Mass.

W. H. Ellis, Ute Creek, Colfax County, New Mexico.

Miss Alice M. Getchell, married to W. H. Kerr, '83, Durham, N. C.

C. C. Pierce, with John Roach & Son, New York.

Edward Shove, in office of Granite Mills, Fall River, Mass.

F. E. Wetherbee, in the Engineer Department, Boston and Lowell Railroad.

By an unfortunate error, a poem, "I saw," clipped from the *Columbia Spectator*, was inserted in the last TECH among our general reading matter, without being credited to the *Spectator*.

The great delay in publishing the first number of THE TECH was due to the trouble of the printers in procuring the paper upon which it is printed. While we hope that this delay will not again occur, still, in consideration of the amount of work required of the editors, we must ask the tolerance of our subscribers if it does happen.

## List of Publications, M. I. T.

MASS. INSTITUTE OF TECHNOLOGY. Condensed Information, with reference to the Mass. Institute of Technology. Pph., 8vo, pp. 16. Boston, 1884.

— Schedule of the Regular Courses of Study of the School of Industrial Science, 1884-1885. Pph., 8vo, pp. 11.

SOCIETY OF ARTS. Abstract of the Proceedings of the Society of Arts for the 22d Year, 1883-84. Pph., 8vo, pp. 130. Boston, 1884.

CLASS OF '84 First Annual Directory, June, 1884. Pph., 12mo, pp. 11. Boston, 1884.

ATKINSON, W. P. (Prof.). On History and the Study of History. Cloth, 12mo, pp. 107. Roberts Bros., Boston, 1884.

CROSS, CHAS. R. ('70). The Determination, History, and Present Standards of Musical Pitch. *Proc. Soc. Arts, M. I. T.*, 1883-84, 107-111.

— Lockwood's Electricity. Review. *Science*, III. (1884), 729.

— Fiske's Electricity. Review. *Id.*, IV. (1884), 19.

GALE, HORACE B. ('83). Experiments on the Efficiency of Incandescent Electric Lamps. *Van Nostrand's Eng. Mag.*, XXXI. (1884), 57-63.

LYLE, CAPT. D. A., U. S. A. ('84). The Rise, Progress and Methods of the U. S. Life-saving Service. *Proc. Soc. Arts, M. I. T.*, 1883-84, 56-72.

MINOT, CHAS. SEDGWICK ('72). Researches on Growth and Death. *Proc. Soc. Arts, M. I. T.*, 1883-84, 50-56.

— Development of the Thyroid and Thymus Glands and the Tongue. *Science*, III. (1884), 725.

— The Organization of an International Scientific Association. *Id.*, IV. (1884), 80.

NICHOLS, W. R. ('69), with L. M. Norton. Laboratory Experiments in General Chemistry, compiled for the use of Students of the Mass. Institute of Technology. Pph., 12mo, pp. 58 and viii. Printed, not published. Boston, 1884.

NILES, W. H. (Prof.). Report of the Meteorological Committee. *Proc. Soc. Arts, M. I. T.*, 1883-84, 1:2, 113.

NORTON, L. M. (Certif. '75). See W. R. Nichols, above.

RICHARDS, ELLEN H. ('73). Guides for Science Teaching, No. XIII. Boston Society of Natural History. First Lessons on Minerals. Pph., 16mo, pp. 50. Boston, 1884.

RUNKLE, J. D. (Prof.). Report on Industrial Education. Pph., 16mo, pp. 34. Boston [1884].

WOODBIDGE, S. H. (Instr.). The Heating and Ventilation of the New Building of the Mass. Institute of Technology. *Proc. Soc. Arts, M. I. T.*, 1883-84, 119-130.

## Noticeable Articles.

THE discussion of the burning question of the House of Lords is carried on in an article by the learned Mr. Freeman, in the *Contemporary* for October, entitled "Reform of the House of Lords," and by another in the *Fortnightly* for October, entitled "The Lords as a Senate," by Percy Greg. Prof. Seeley prints a second paper on Goethe in the *Contemporary*. Mr. Swinburne, the poet, writes of Charles Reade in the *Contemporary*, and Mr. Courtney of Charles Reade's novels in the *Fortnightly*. Lady Verney, in an article in the *Contemporary* entitled "The Americans painted by Themselves," gives a very uncomplimentary account of American womankind, for which we have to thank Mr. James and Mr. Howells, and the authors of "Democracy" and "The Breadwinners," who give her the opportunity.

That patriotic and benevolent Irish lady, Miss Charlotte O'Brien, gives in the *Nineteenth Century*, in a paper entitled "The Emigrant in New York," the results of personal observation and experience.

Sir John Lubbock writes in the *Contemporary* of "A National School of Forestry," a subject which will soon have to receive attention in this country, where we are so wastefully destroying our forests, and drying up the rivers that depend on them.

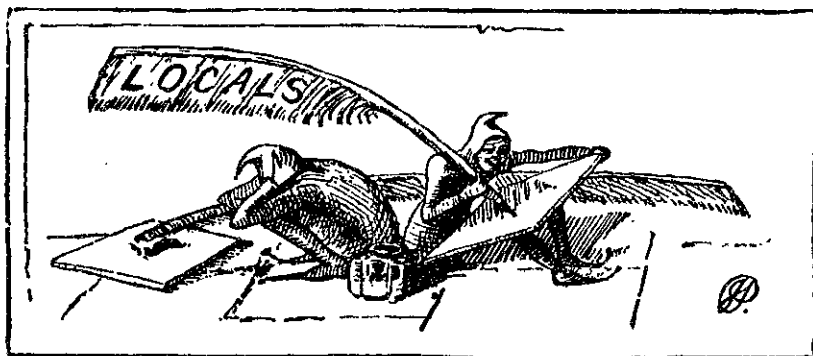
The *Atlantic* for November has a paper on "Crude Science in Aryan Cults," which is interesting in connection with the English lessons of the second year, and a good paper by Brooks Adams, grandson and great-grandson of a President, entitled "The Embryo of a Commonwealth," on the settlement of Massachusetts, which will come in very well in connection with the Constitutional history lessons of the third year.

The epithet "tough," applied to old Hobbes in the last number, was my own, and not, as printed, a part of the title of the article.

W. P. A.

In its November number, the first of a new volume, *The Century* begins several enterprising features, which are to be continued during the year. The most important of these are a series of papers on the civil war, by Gens. Grant, Longstreet, McClellan, Beauregard, Rosecrans, Hill, Admiral Porter and others, and a new novel by W. D. Howells.

*The Century* will publish, during the coming year, a novel by Henry James, a novelette by Grace Denio Litchfield, and short stories by "Uncle Remus," Frank R. Stockton, H. H. Boyesen, T. A. Janvier, H. H., Julian Hawthorne, and other well-known writers. Contributions will be made by E. V. Smalley, Lieut. Swatka, Principal Grant, Prof. Langley, Mrs. Van Rensselaer, Col. George E. Waring, Jr., E. C. Stedman, Edmund Gosse, George W. Cable, John Burroughs, and others, on all leading subjects that may properly come within the province of a monthly magazine.



"I told you so."

Rainy, as usual, election day.

Recovered from election night yet?

Did you win or lose on the election?

No more torch-lighting for four years.

Why not lay a sidewalk in the rear of the N. B.?

The popular Mr. Bunce, '84, was a recent visitor at the Institute.

The Freshman's hands already begin to show the marks of nitric acid.

It is rumored that the Freshmen are about to subscribe in a body for THE TECH. The rumor is too good to be true.

The unfavorable weather necessitated a postponement of the athletic sports, which were to have taken place Nov. 1.

The foot-ball team has been accused of not having any sand. They certainly had plenty of mud at the Williams game.

By accessions, since our schedule was prepared, the number of students at the Institute this year has been increased to 712.

Messrs. Barr, Dawes, Fiske, Little, and Spalding, of '85, who have left the Institute, returned to take part in the procession.

AT THE FOOT-BALL GAME. — *Urchin (to companion)*: "It's 'I beg you pardon,' they're all the time saying, and then they hit each other a crack in the head."

One of the best friends of THE TECH in the Faculty displayed his chemical proclivities so early as to earn for himself, while in college, the nickname of  $PO_5$ .

The supply-boy in the assay laboratory evinces great solicitude as to whether he serves out to the students "common salt" or "salt  $NaCl$ ," — "salt nakle" he calls it.

There is considerable talk about the need of a co-operative society at the Institute. Why does not some energetic spirit take hold and push the enterprise?

To the Athletic Club. The national standard of physical measurements, suggested at Philadelphia, does not refer to personal examination by gymnasium superintendents.

*Outing* is one of the best publications that we receive. The November number is particularly interesting. Subscribers will find it in the binders on the table in the reading-room.

The advance sheets of the register of students has been posted on the bulletin for the correction of errors. It is to be hoped that the catalogue will be published sooner this year than last.

The theatre party, which took place at the very first of the term, consisting of about twenty-five members of '87, who attended "Nunky," was such a success that a second would probably "take" well among Institute theatre-goers.

The practical illustration of Mr. Woodbridge's lectures on heating and ventilating, by visits to buildings where the different methods are in actual operation, will not begin until the cold weather necessitates the heating of the buildings.

In the last number of THE TECH we omitted to state that the places of Messrs. Lund and Underwood in the Quantitative Laboratory are now filled by Mr. William B. Lindsey, '81, and Mr. Prescott, formerly of the Freshman Laboratory.

A traveller asked a railroad station keeper at the Hoosac Tunnel for a pencil to mark some packages with. The man, in response, brought out a big lumber pencil. When asked what it was made of, he said he wasn't sure, but thought it was a graphite of lumbago.

The following instructors, perhaps inspired by the courage due to numbers, have "gone and got married" during vacation: Prof. C. P. Otis, Assistant Professors A. E. Burton and S. W. Holman, and Messrs. G. H. Barton, F. W. Clark, and W. H. Pickering. THE TECH offers its heartiest congratulations.

Why not have a hare-and-hounds run during this fine fall weather?

We came across the freshest Freshman the other day. When solicited to subscribe for THE TECH, he declined, on the ground that he could see it, every issue, in the reading-room, and would then have the money to subscribe for some other paper. Fortunately, the whole class is not animated by this spirit, else the future of THE TECH would look rather dark.

The Lowell Free Courses of Lectures, which begin Nov. 10, are as follows: "Analytic Geometry," Prof. Runkle; "Structural Geology," Asst. Prof. Crosby; "Chemistry of the Aniline Colors," Asst. Prof. Norton; "Plane Trigonometry," Asst. Prof. Wells; "Phenomena and Laws of Electricity," Prof. Cross; "Old French," Asst. Prof. Luquiens; "Principles and Instruments of Electrical Measurements," Asst. Prof. Holman; "Fermentation and its Relation to Putrefaction, Digestion and the 'Germ' Theory of Disease," Asst. Prof. Sedgwick.

NOTICE.—All Freshmen expecting to take the course in sub-basement engineering are respectfully requested to hand to Mr. J. G. Hadley a report of their doings and whereabouts, as well as the way they spend their Sundays, in order that it may be known whether they are doing their duty. All reports of work should be on the twenty-four-hours-for-thirty-days basis. For instance, beginning with Oct. 1, they will count the hours in order until Nov. 1, and so on. This method has been tried with success in South Africa. The main points to be given with exactness are:—

Who are you?

What are you working at?

What are you working on?

What are you working over?

What are you working under?

What are you working through?

How long do you expect it will take you?

What time did you begin?

What do you expect to do day before yesterday?

Who was your nigger last year?

Where did you do it?

## The College World.

DURING the week we have to chronicle two changes in the examination system, at two of our principal colleges. At Harvard, the percentage required for promotion has been raised from a general average of forty per cent to fifty. This new standard will also be required to pass off all conditions. The amount required to simply pass an examination remains the same as heretofore.

At Yale, the Faculty have voted that semi-annual examinations shall take the place of annuals; that is, that the December examinations shall be final for the work that they cover, and the June examinations shall only be on the second term's work. This is, practically, the same as what our Sophomores vainly petitioned for last spring. In that case, we think that the rejection of the petition by the Faculty was on the whole better for the Sophomores, as the examination on the first term's work often helps them to pass the examination on the harder work of the second term.

The chief reason assigned by the Yale Faculty is the unsatisfactoriness of the examination papers on the studies of the first term.

Bowdoin and Cornell having done away with Saturday recitations, there is no longer an American institution which inflicts this flagitious custom.—*Ex., via Cornell Era.* How about the Institute? And we don't find the custom so very flagitious either.

Many of our exchanges make their appearance this year with new covers. Some are very gaudy, some very artistic and pretty. THE TECH will have to look out for its laurels in the matter of covers.

The *Cornell Era* is one of the best edited papers that comes to our table. Its articles are certainly rather heavy; but it is not for THE TECH to criticise in that direction.

The *Williams Argo* is as bright and interesting as ever. We always like to read the *Argo*, when we have time; but an editor at the Institute does n't have much time to spare.

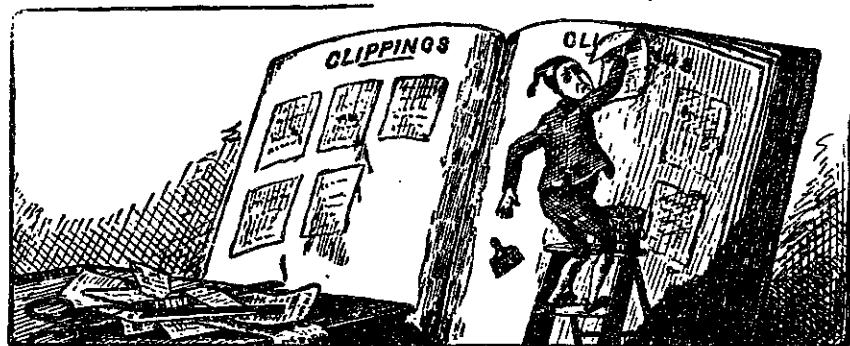
GENERAL COLLEGE NEWS.—Every member

of the Amherst Faculty is a graduate of that college. — Vanderbilt has given \$500,000 to the College of Physicians and Surgeons in New York for a new building. — Phillips Andover Academy sent sixteen men to Yale this year. — Brown University is hoping to soon have a new gymnasium. — Cornell recently received a gift of \$50,000 for the endowment of a chair of Moral Philosophy. — Bowdoin expects to have a strong crew for the next intercollegiate regatta.

The numbers of the Freshman classes at some of the principal colleges, as far as we have been able to learn from our exchanges, is as follows:—

Massachusetts Institute of Technology . . . . .	267
Harvard . . . . .	230
Cornell . . . . .	224
Yale . . . . .	219
Columbia . . . . .	150
Lehigh . . . . .	134
Princeton . . . . .	130
University of Wisconsin . . . . .	105
Amherst . . . . .	104
Dartmouth . . . . .	98
Lafayette . . . . .	92
Brown . . . . .	70
Williams . . . . .	55
Union . . . . .	46
Rutgers . . . . .	40
Trinity . . . . .	32
Bowdoin . . . . .	30

THE wheelmen of the Institute would do well to assemble and hold a number of runs, before the cold weather prevents all further riding until next year. A bicycle club, organized simply for sociability in touring, has one conspicuous advantage over other societies, namely, the absence of assessments; and there is nothing more favorable to the development of that friendly feeling so desirable in colleges, than occasionally assisting a fellow-student to put himself and his machine together after a disaster. The roads are generally at their best during the fall, and home work least pressing; while the constant extension of good roads in the new Roxbury Park offers an inviting field to 'cyclists from the "Hub."



At the party:—  
 Slow, is n't it?  
 Very, very.  
 Let's go home?  
 Can't. I'm the host. — *Berkleyan.*

A weather-vain — the leaky umbrella,  
 From the small end of a horn — when toss'd  
 by a bull.

"*Fortuna fortes juvat,*" said the dairyman, as he disposed of a lot of aged butter at a goodly profit.

A BUSINESS VIEW. — *Aunty*: Do you say your prayers in the morning, too, Johnny?

*Johnny (scornfully)*: Of course I don't. Anybody can take care of himself in the day time.— *Life.*

*Old Farmer (to engineer making preliminary survey)*: "You say that this road is going right through my barn? Why, I can never put up with that; it will take all my time opening and shutting the doors."

*Fanitor (to his wife, who has hung the water pail on the gas-jet)*: "Bridget, me darlin', did Mr. Levystrauss tell ye to put this pail on the gas?"

*Bridget*: "No, Pat; but he was afther sayin' that the gas was laking, shure!" — *Washington Hatchet.*

*Board-School Visitor (examining scholar)*: — "Where is the north pole?"

"I don't know, sir."

"Don't know! Are you not ashamed that you don't know where the north pole is?"

"Why, sir, if Sir John Franklin and Dr. Kane and Capts. Vares and Markham couldn't find it, how should I know where it is?" — *Ex.*



THE GREAT CONTEST BETWEEN THE GIANTS.

"It is reported that the Faculty and students of the M. I. T. are not in accord upon the present political issues." — Boston Herald.

"WHAT are you in here for?" asked the visitor at the penitentiary. "'Cause I was put in," growled the poor prisoner savagely. "Yer did n't think I came in here 'cause I liked it, did yer?" — *Burlington Hawkeye*.

ILLUSTRATED LECTURE IN GENERAL CHEMISTRY. — *Professor*: "I will now treat," etc.

*Smithe* (who has been dozing under the influence of recent potations, half aroused by the familiar sound): "Good f'r you, ol' boy."

ON A GEOLOGICAL EXPEDITION. — *Prof.* (showing *Soph.* a specimen of a rock): "That is a good specimen, Mr. —."

*Soph.*: "Yes, it is nice" (gneiss).

*Prof.*: "You are mistaken, sir; it is only granite."

*Soph.* (afterwards repeating to a friend): "The Professor showed me a specimen, and I told him that it was nice, and he said, 'No, it is very good.'"

According to the *Railway Review*, an interesting experiment has recently been tried in Russia in regard to using petroleum refuse as fuel in locomotives, apparently with good results. Heretofore, the petroleum has been too costly for such a purpose; but several recent inventions have made its use in certain regions economical.

The etymological lectures of Prof. Atkinson to the second year have had a good effect. With their aid, the class philologist has recently discovered the derivation of the word *kazoo*. Kazoos, as is well known, pertain to torchlights, and in ancient mythology all light or fire is considered as emanating from the sun-god, — the supreme deity of the Persians and other religious sects, — who corresponds to the Greek divinity Zeus. *Ka* being evidently a relic of the agglutinative stage of language, we have only to compare the roots *Zeus* and *zoos*.

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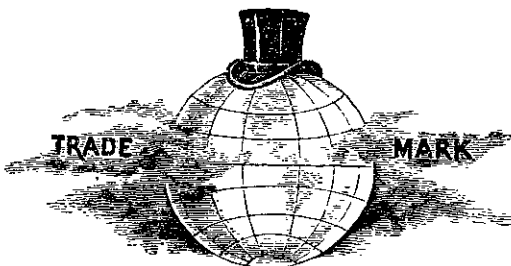
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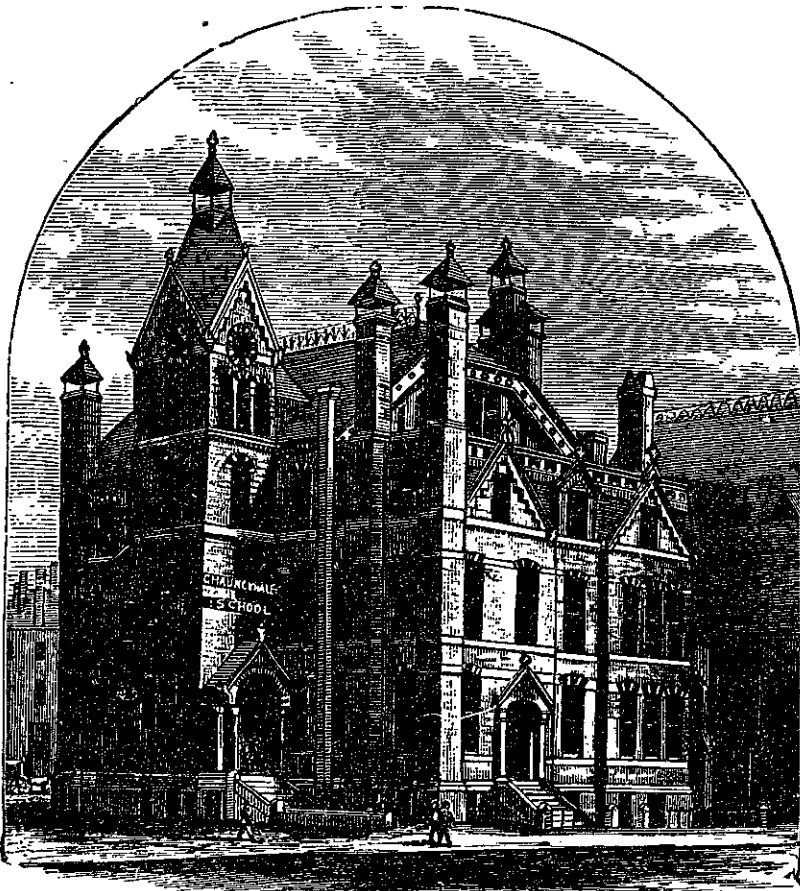
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The last catalogue of the Institute (page 59) lays due stress on the importance of students' entering fully prepared. **Chauncy-Hall School** has long fitted pupils for the Institute, and for the last ten years has made thorough preparation a specialty. For the standing of its candidates, reference is made to the **President and Faculty.**

The very large teaching force at Chauncy Hall enables students intended for the Institute, for college, and for business, to be specially trained in separate classes. Particular oversight of the "Institute class" is held by the Junior Principal, Mr. M. Grant Daniell. In Geography and Grammar, this class is under the charge of Mr. O. F. Bryant, Associate Principal, who has been connected with the school over twenty years; in Mathematics, it is taught by Mr. R. F. Curtis, head of the mathematical department; in History and Literature, by Mrs. A. F. Harris, head of the literary department; and in French, by Monsieur A. H. Solial.

In thus receiving instruction from different teachers, each a specialist of long experience, an earnest pupil may be sure of sound and symmetrical training. This method of dividing the work of preparation for the Institute has been satisfactorily practised at Chauncy Hall for years.

The school is at 259 Boylston Street, opposite the Art Museum, within two minutes' walk of the Institute building.

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Besides the above distinctly professional courses, the Institute offers scientific courses of a less technical character, designed to give students a preparation for business callings. A four years' course in biology, chemistry, and physics has been established, as preparatory to the professional study of medicine.

Modern languages are taught so far as is needed for the ready and accurate reading of scientific works and periodicals, and may be further pursued as a means of general training.

The constitutional and political history of England and the United States, political economy, and international law are taught, in a measure, to the students of all regular courses.

Applicants for admission to the Institute are examined in English grammar, geography, French, arithmetic, algebra, and geometry. A fuller statement of the requirements for admission will be found in the catalogue, which will be sent without charge on application.

A clear admission paper from any college of recognized character will be accepted as evidence of preparation, in place of an examination.

Graduates of colleges conferring degrees are presumed to have the necessary qualifications for entering the third-year class in any of the regular courses of the Institute, and will be so admitted provisionally, on the presentation of their diplomas.

The feature of instruction which has been most largely developed in the school is laboratory training, shop-work and field practice, to supplement, to illustrate, and to emphasize the instruction of the recitation and lecture room.

Surveying instruments are provided for field work in civil and topographical engineering. Extensive shops have been fitted up for the use of both hand and machine tools; and a laboratory of steam engineering has been established as a part of the instruction in mechanical engineering. Several steam boilers and steam engines of various types are available for experiments and tests. The department of mining engineering and metallurgy has the use of laboratories in which the milling and smelting of lead, copper, silver, and other ores, in economic quantities, are regularly performed by the students themselves. The classes in architecture supplement the work of the drawing and designing rooms by the examination of structures completed or in course of erection, and by practical experiment in the laboratory of applied mechanics, testing the strength of materials and working out problems in construction. The Kidder Chemical Laboratories, just completed, contain desks for four hundred and twenty-six students, and afford the best modern facilities for the study of general, analytical, and organic chemistry. The Rogers Physical Laboratory has been greatly extended in every department during the past year, especially in respect to facilities for instruction and research in electrical science.

On the successful completion of any one of the four-year courses of the Institute, a degree of bachelor of science will be conferred. The Institute is also empowered to confer the degree of doctor of science. Special students are allowed to enter special divisions of any of the courses, on giving evidence that they are prepared to pursue with advantage the studies selected.

The Institute of Technology, as a recipient of a portion of the United States grant to colleges of agriculture and the mechanic arts, gives instruction in military tactics.

The fee for tuition of students taking the full course is \$200 a year. Besides this, \$25 or \$30 are needed for books and instruments. There are no separate laboratory fees. Only payment of articles broken is required.

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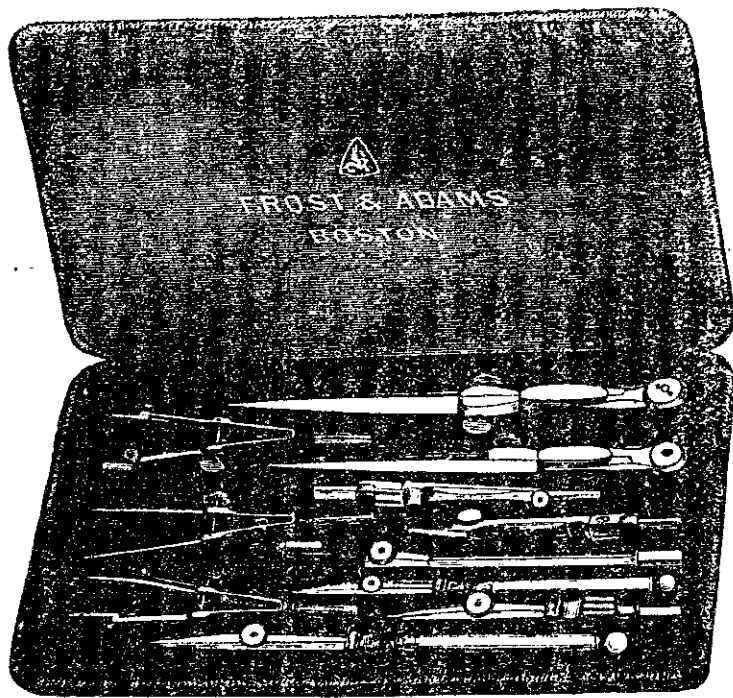
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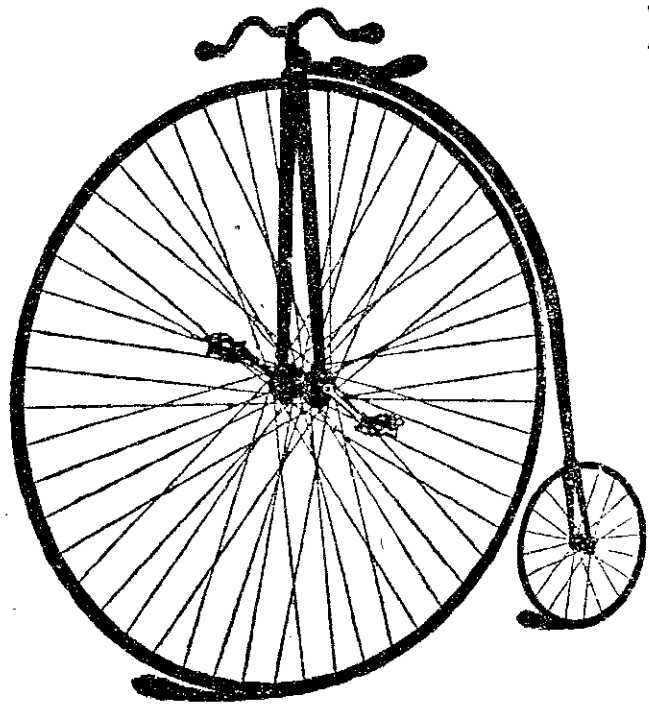
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