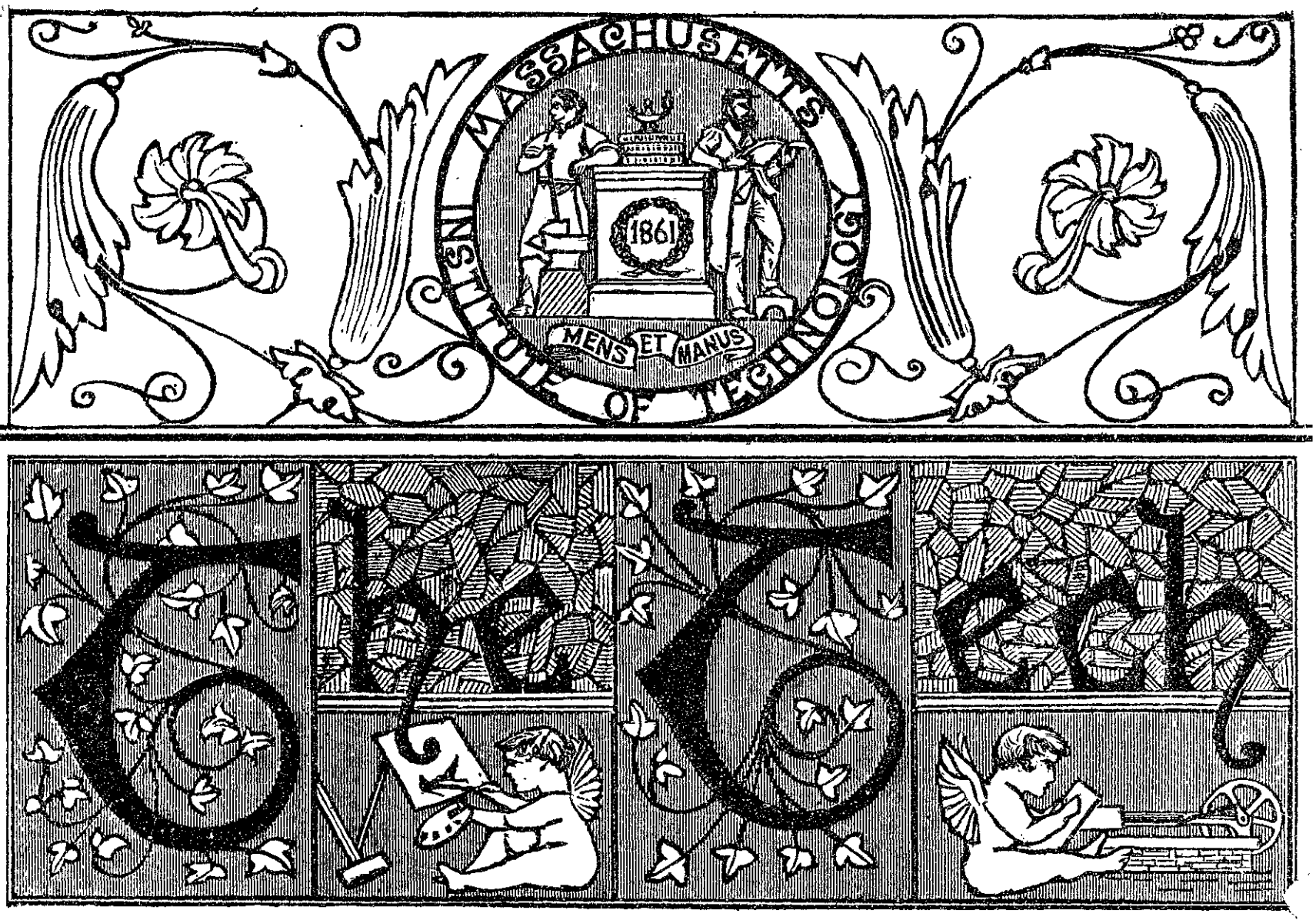

Dec. 16,
1886.
Vol. VI. No. 5

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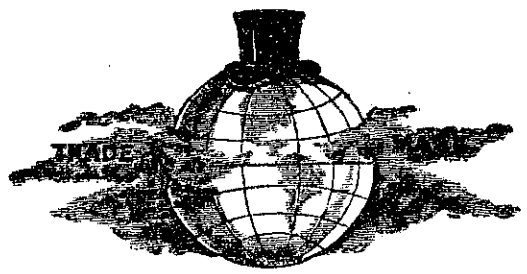

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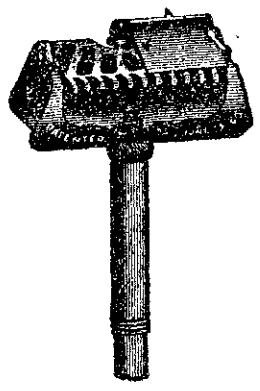

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THIS school is devoted to the teaching of science, as applied to the various engineering professions; viz., civil, mechanical, mining, and electrical engineering, as well as to architecture, chemistry, metallurgy, physics, and natural history.

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, and may be further pursued as optional studies.

Applicants for admission to the Institute are examined in English grammar, geography, French, arithmetic, algebra, modern history, 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, who have the necessary qualifications for entering the third-year class in any of the regular courses of the Institute, will be so admitted, provisionally, on the presentation of their diplomas, and will be given opportunity to make up all deficiencies in professional subjects.

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, as well as a large amount of special apparatus for measuring power, for gauging the flow of water, for tests of belting, etc. The laboratory of applied mechanics contains two testing-machines,—one for ascertaining transverse strength, the other for tension and compression,—besides apparatus for time-tests on timber, for tests of mortars and cements, for tests of shafting, etc. 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 consist of a laboratory for general chemistry (288 places); a laboratory for analytical chemistry (108 places), together with a special room for volumetric analysis (20 places) and a balance-room with 22 balances; a laboratory for organic chemistry (30 places); a laboratory for sanitary chemistry (16 places); a laboratory for industrial chemistry (16 places); two convenient lecture-rooms; and a well-supplied library and reading-room. The laboratories are thoroughly equipped for the purposes of ordinary instruction, and they also possess excellent facilities for the promotion of original research. The Rogers Laboratory of Physics, the first laboratory in which instruction was systematically given to classes by means of elementary physical measurements conducted by the students themselves, is well provided with the needful facilities for laboratory instruction in both elementary and advanced technical physics, especially in the different branches of electrical engineering.

On the successful completion of any one of the four-year courses of the Institute, the degree of "Bachelor of Science" will be conferred. The degrees of "Master of Science," "Ph.D.," and "Doctor of Science" are open to persons pursuing advanced studies and conducting original researches. 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 fee for tuition is $200 a year. Besides this, $25 or $30 are needed for books and instruments. There are no separate laboratory fees; only payment for articles broken is required.

For information, address JAS. P. MUNROE, Secretary.

The Tech.

VOL. VI. BOSTON, DECEMBER 16, 1886. NO. 5.

THE TECH.

Published on alternate Thursdays, during the school year, by the students of the Massachusetts Institute of Technology.

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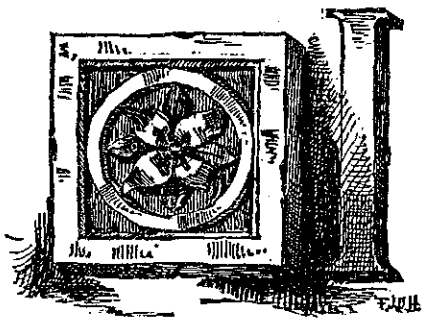


IT is hoped that by the time of our next issue that "Technique" will have made its appearance, and that we will no longer hear the anxious queries about the date of its coming out. There have been several unavoidable delays, however, and it is quite possible that the editors cannot get the annual out on time. The general appearance will be much the same as last year, although the cover and frontispiece will be of a different design. In a previous issue we spoke about the lack of financial support of last year, and expressed a hope that it would be better next year. We hope that the students all see the necessity of supporting the annual, in order to make it a permanent institution. And yet there are some whom we know who have said that they didn't see the necessity of buying any copies, as they could see those of other fellows; and as for the annual's needing the money, why, that was all bosh. It was their private opinion that the editors made money out of it instead of losing any. For the benefit of this class of fellows, we can only say what we have said before, that the previous board actually did lose by their enterprise. Another thing that we might add is this: the editors do not wish to make any money out of the annual, but merely desire to make it pay. In making their calculations, they have to see how the paper was supported the year before; and if they find that there was a surplus in the treasury, they both reduce the subscription price, and endeavor to make the annual better by adding more engravings and work.

Exclusive of this matter of financial support, "Technique" has much reason to congratulate itself. All its work, both artistic and literary, is its own. In other colleges, where there is a lack of artistic talent, the drawings of all kinds have to be made by outside parties, and this, of course, adds considerably to the expense; while at the same time the interest which one would feel in examining the drawings of a classmate, is wanting in examining and criticising these drawings. If only for the reason of supporting home talent, the fellows should be more forward with their subscriptions.

ON Saturday next will be held the first exhibition of the Athletic Club, given for the benefit of the Foot-Ball Association. The total profits will be turned over to the Foot-ball treasury, to help make up the existing deficiency. This is certainly very generous on the part of the Athletic Club, and every one should feel it his duty to encourage such an act by either entering for some event, or at least by attending and supporting his class representatives.

The management is doing everything in their power to make this exhibition successful, and is offering great inducements to competitors. The flourishing condition financially, enables them to

offer prizes this year superior to those usually contested for; and a custom will be established, commencing with this meeting, of giving a gold medal and life membership in the Club, as a special prize to any Institute student who shall break an Institute record. We expect to see a large list of entries, and hope that all classes will be well represented, so as to arouse class interest.

All those who intend to become members should join at once, in order to derive the greatest benefit from their membership.

We hope to see the usual number of young ladies present, as it undoubtedly produces a stimulating effect upon our athletes. Professors also will be welcome, their presence showing an interest in the students apart from their relations at the Institute.

ANY one who will be at the pains to look over the earlier numbers of THE TECH, will notice that evidently it was started with the idea of being the representative organ of a scientific institution. Consequently we find in it many purely scientific papers, and much that is related to, and savors of, scientific research. Gradually it has drifted away from what appears to have been its original design, until it has become a journal which might as well be published at a strictly literary institution.

This is by no means a reflection on THE TECH. Every college needs, and has, just what is to be found in its pages. Our men are eager to see the latest Institute locals; they like a little pleasant and light literary entertainment such as can be easily looked through in a careless half-hour. To interest and amuse is mainly the province of THE TECH.

But at the same time there is a wide and honorable field outside, open to a journal which should represent the position of the Massachusetts Institute of Technology in the world of science.

Our corps of professors are men distinguished in the special field which they represent, and articles from their pens, and researches conducted under their guidance, will meet with attention and respect from all who are interested in the subjects discussed.

Science is eminently progressive. The knowledge of last year is old to-day, and has been succeeded by new experimental results, and further acquisitions. Viewed in this light, of how much value will not the pages of our projected *Quarterly*, containing as they will a complete record of all advanced work in the different departments, be to the alumni of our Institute. To them we look for a cordial support, by subscription and by contribution.

The undertaking is one of no little magnitude, and requires a certain amount of faith and confidence, which, we trust, is not misplaced. Introductory circulars have been addressed to the alumni of the Institute and to the students, which have already excited much interest and support. It is to be hoped that all the students will feel sufficient *esprit de corps* to aid in the success of this undertaking by their subscriptions and also by their contributions.

The Faculty have given their kindest encouragement to this work, as have also many generous patrons, who have shown in a substantial manner from the beginning their interest in those pursuits which lie within the scope of our institution.

IN looking over the lists of officers, etc., of our various athletic, literary, or social organizations, our attention is at once called to the fact that the same names appear over and over again, the many positions being held by a comparatively small number. These men are selected for their ability, enterprise, popularity, or willingness to devote the time and powers required. In the lower classes experiments have to be tried, and time is necessary to develop and bring to the front the men who will represent them. As the classes advance in maturity, there are more offices open to them, and their number being less, the choice is limited, so that the many honors received by the same men does not seem so surprising. If a man successfully fills a position, it is natural that he should be chosen for other positions requiring the same

powers. These men are sure to be successful in after life, as the qualities which they possess are useful in any condition of life or circumstances.

There is another class of men who should not be forgotten in this discussion. We refer to those who enter into every enterprise with spirit, and help and support the officers in their undertakings. These men are necessary for the success of their leaders, and though standing in the background, are very important factors.

These two classes comprise all those who deserve mention as being responsible for the prosperity of our institutions, and should be recognized as such by all of us.

WE clip the following from the *Dartmouth Literary Monthly* : —

"I am sure that the men at Tech must lose much that tends to throw a charm and glamour over college life,— those customs and feelings that shut the college from the outside, and make within its little boundaries a world of its own. Of course there are many exceptions, but there seems to be a general spirit of indifference, throughout the institution, of one man toward another. They meet in recitation, and come and go, and that is all. A few close friendships are formed, but there is none of that merry companionship that defies conventionality and restraint. They are bound together by a sympathy of work only; and when that work is ended they scatter, and little is left of the true old college spirit that calls gray-bearded men back from the remotest corners of the earth to the spot where they formed their sincerest friendships, and where the happiest, freest, truest portion of their days was spent."

There is a delicious vagueness in mentioning "the men at Tech," that makes us uncertain whether the editorial really refers to our TECH or some other Tech. Assuming, however, that we are the Techs meant, we would like to say a few words in reply. The statements made are, as a rule, very just, but it strikes us that they are just a little overdrawn, and that the darker side of our life here is shown up too strongly. We are in no wise differently situated from Columbia, and their college life is not considered so different from that of other colleges. It is true, though, that the great amount of work required here, seldom less than twenty-six hours of recitations and lectures a week, with nearly as much time required outside for preparation, has a sobering influence on the fellows, so that the times when we can all meet together for pleasure, are few and far between. Also, we feel the want of dormitories. But to say that only a few close friendships are formed, and that there is no "merry companionship," is going a little too far. We should say that as many close friendships were formed at the Tech as at any other institution or college in the country; and we feel sure that if the editor of the *Dartmouth Lit.* could only look in on some of the meetings of the societies of '87, '88, and '89, that he would see plenty of "that merry companionship that defies conventionality and restraint."

Taking it all in all, though, the criticism of the *Lit.* is very fair, and we can only regret that we are debarred by lack of time and opportunity from the college life. Many of the Techs come here simply to learn their profession, and have but little time for anything else; but they are men just the same as any other college men, and they make as close friendships, and enjoy themselves as much, when they have the time, as any others.

We have recently received a copy of "The Songs of Harvard" which we would like to recommend to any wishing to get the latest book of student songs. All the songs are fresh and pretty, and the book contains none of the old ones which we have heard from our infancy. The book was compiled and published by two Harvard men of the class of '89, and they deserve great credit for their enterprise.

THE Catalogue for 1886 is now out, and we give below a short summary of it, with the changes which have been made in the various courses.

There are altogether 69 officers of instruction, divided as follows: 24 professors, 27 instructors, and 17 assistants. The number of students in the School of Industrial Science is as follows: Graduate, 21; Seniors, 57; Juniors, 87; Sophomores, 98; Freshmen, 198; Specials, 175: making a total of 636. School of Mechanic Arts: Second year, 7; First year, 15; Specials, 16: total, 38. School of Design, 63. The sum in all departments is 747—an increase of 17 over last year. The increase would probably have been larger if the standard of the entrance-papers had not been raised, and the age of the applicant changed from 16 to 17 years.

The Sophomore Class have chosen courses as follows: Mechanical Engineering, 26; Electrical Engineering, 24; Civil Engineering, 22; Architecture, 8; Chemistry, 6; Mining Engineering, 5; General Course, 4; and Physics, 1.

A change has been made in the second year by the substitution of Political Economy for English History, and in the fourth year of each course certain options have been added, so that the student may make a specialty of certain parts of his course. The most important of these options are those in Mechanical Engineering, it now being arranged so that a specialty can be made during the last year of one of the following: Marine Engineering, Locomotive Construction, and Mill Engineering.

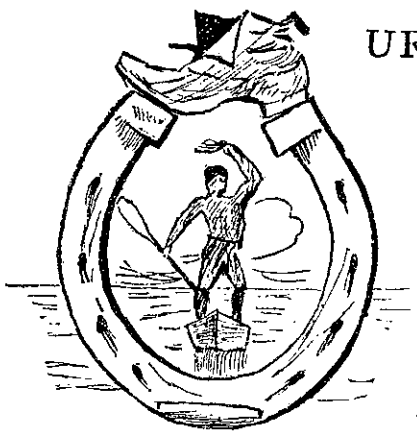
A five years' course has also been added, by which the student is allowed to take fewer studies at any one time than are prescribed for the four years' course, and thus a more extended study of professional subjects is possible.

The courses now include Civil, Mechanical, Mining, and Electrical Engineering, Architecture, Chemistry, Natural History, Biology, Physics, and a General Course.

PRESIDENT and Mrs. Walker will receive the students of the Institute who remain in Boston during the Holidays, on Christmas afternoon, from four to seven o'clock, in the new building.

From Lowell to Boston by Water.

(A Sequel to "Canoeing on Winnipesaukee.")



OUR party, minus the surgeon and minstrel, having left Lake Winnipesaukee early on a July morning, arrived at Lowell a couple of hours later.

The three remaining canoes had been sent by freight, so an expressman was hired, and canoes and canoeists were piled into the wagon to be carted across the city. We were hailed with the usual pet names which street-urchins were wont to fling at us.

"Salvation Army bums" seemed to be their favorite,—probably on account of our "Tech" hats.

Managing to stand their taunts without being jugged for murder, we soon arrived at the banks of the powerful Merrimac, just above the second rapids.

Our first rapids were before us, and by far the worst we encountered.

Ilex took the water first, and with the exception of one or two jars on rocks, she came through all right; next came Vera, scraping once or twice; and last, but by no means the least, came the "Ship," which grounded, and hung for a short time, but finally slid off. Thus the first rapids were shot in safety.

We pushed rapidly along and into Lawrence with the Ship bringing up the rear, looking like a cat-boat with her enormous sail. Upon our arrival at the falls, we found that the lock-gates would not open to our entreaties — the lock-

master having gone up town to buy a clean collar, or something of that sort; thus we were obliged to carry over the gates, in order to avoid the falls. While making this carry we met two Boston canoeists, whom we will call Charley and Jack, and with whom we spent several pleasant days of cruising.

Our first night was spent in a small chowder-house on the river-bank; and although we had gotten so accustomed to sleeping with a coffee-pot for a pillow and a bag of nails to lie upon, we were completely broken up by the hardest floor we ever experienced.

The next day being Sunday, we consoled ourselves with the reflection that "better the day, better the deed," and applied ourselves strictly to the paddles. Late in the afternoon a fine breeze sprang up, so Vera and Ilex lashed alongside the Ship, and were towed into Newburyport by her sail. It was a struggle to get out of the river, for the tide ran in like a mill-race, and it was only with difficulty that we could paddle against it. We camped at an island in the river. Around the camp-fire we told stories, and it being the evening of the Sabbath, such hymns as "Nearer, my God, to Thee," "Month of May," "Salisbury," and "Sweet Bye and Bye," were indulged in.

Morning found us up with the sun (*?*), and laying in some "feed," we took up our route through Plum Island River.

Having stopped near Ipswich Light to eat our mid-day meal, at about two o'clock we started once more, and while in the middle of Annisquam Bay, we were struck by one of the most furious thunder-showers we had ever been exposed to. The Commodore and Purser, together with Charley and Jack, put for shore. It being perfectly calm before the rain, they were afraid of wind afterward. Careful sailors they.

> "When the rain comes before the wind,
> Topsail sheets and halliards mind."

Celvar and Ilex went on in the rain as far as Coffin's Beach, where they hired a closed hotel for half a dollar.

The rain soon ceased, and Vera and Charley and Jack came along.

Our new companions had among their stores a pint each of whiskey and brandy. Now, these *shore-birds* were wet and cold, so Charley and Jack took some of the whiskey; but the Commodore and Purser thought that the brandy was weaker, and, "betwixt the twain," they sucked the bottle clean. While drying out our wet duffle around the stove, several ghosts enjoyed a Spanish fandango in South Sea Island bathing-costumes. The Purser insisted upon sitting by the stove, the heat of which, together with the brandy, formed a combination which soon made him feel like *throwing up* the trip.

After a comfortable night at Coffin's Beach we went up the Squam River, arriving at Gloucester after a hard paddle against wind and tide.

Just as we were entering Gloucester Harbor the Commodore missed his watch, and remembered that he had left it in the house at the beach. We ate a square meal at the city, and then the Commodore, accompanied by the Purser, drove over to Coffin's Beach, and by good luck regained the lost time-piece.

After hauling the canoes up on a float-stage, and making it our rendezvous, we *saw* Gloucester.

In the afternoon we went out to the schooner "Mystery," and made a bargain with her master to take the four canoes and eight fellows to Boston for the petty amount of two dollars. It being our intention to sleep on the vessel that night, we purchased a huge watermelon, and in the evening sang, and ate the melon.

Arising in the morning after a painful specimen of our special artist's snoring capabilities, we lent a hand and soon had the boat shipshape. Soon afterward we got the "Mystery" under weigh, and with light winds, interspersed with calms, by way of variety, forged slowly ahead. Finally it breezed up, and we arrived off the Brewsters early in the afternoon.

Here, with feelings of real regret and many adieux, we separated.

After three hundred miles of paddling, and

feeling as if we could enjoy three hundred more, we sought our respective homes, there to tell huge fish stories, and air our knowledge about one of the grandest sports in existence — canoeing.

Out of the dusty city and its cares
Bear me my bonny boat,
Beneath the azure canopy of heaven,
Where fleecy cloudlets float.

How sweet to listen to the ocean's voice,
Singing its ceaseless lay,
And watch the white-winged vessels speeding on
Across the sunlit bay.

And thus sing I of sweet mem'ries past,
Before the summer wind,
And also think of the time, at last,
When "Techs" must 'gin to grind.

The First Iron Works in America.

IN Saugus, Mass., — a small town not far from Boston, — on the right-hand bank of the narrow and tortuous Saugus River, there is a mound, overgrown with turf, which would probably attract no attention from the casual passer-by. If, however, one has the curiosity to examine it, it will be noticed that beneath the turf there is not loam or gravel, but slag and cinder; in fact, this mound is the old slag-dump of the first iron-works of America, and of these, this is all that remains at the present day,

Iron ore was discovered in Saugus, which was then a part of Lynn, at a very early date, but no attempt to work it was made until 1643. At that time, however, the great want in the country of iron tools and iron ware induced several enterprising men to attempt the establishment of a furnace. One of the leaders in this venture was Thomas Dexter, who, it will be remembered, purchased the peninsula of Nahant, from the Indians, for the price of — a suit of clothes!

In 1642, Hon. Robert Bridges, another of the projectors of the enterprise, took some specimens of the Saugus iron ore to London, where he succeeded in forming a company, called "The Company of Undertakers for the Iron Works," consisting of a number of wealthy gentlemen. This company advanced the sum of one thousand pounds for commencing the work; land was purchased on the western bank of the Saugus River and a foundry erected, where the heap of slag before mentioned can still be seen. John Winthrop, Jr., the son of the Governor, also engaged in the enterprise, and this same year a number of persons came from England to take part in the works, either as foremen or workmen.

The establishment of this iron-foundry was highly approved by the General Court, who assisted the undertakers by much favorable legislation, giving them large grants of land, exemption from taxation, and many other privileges; in consideration of which they were to furnish inhabitants of the colony with bar-iron, at a price not exceeding twenty pounds per ton.

The iron-works soon began to get into a flourishing condition. In a letter to his son, dated August 4, 1648, Mr. Winthrop says: "The iron-work goeth on with more hope. It yields now about 7 tons per week." In another letter, two months later, he states that "the furnace runs 8 tons per week, and their bar-iron is as good as Spanish."

The undertakers gave one Joseph Jenks permission to erect a forge, near the furnaces, to work the iron there produced. Jenks was an inventive genius. He constructed a fire-engine for the selectmen of Boston, which was the first ever made in this country; he took out a patent for an improved scythe for cutting grass, like which are the scythes in use to-day; and it was at this forge that were made the dies for coining the pine-tree shillings.

For several years the iron-works were carried on with much vigor, and furnished most of the

iron used in the colony. But the want of ready money and the liberal way in which the company construed the privileges granted by the Court, caused their failure. Their troubles, like those of many modern enterprises, began in lawsuits. A superintendent of the works raised the dam in the river, causing the water to flow back upon adjoining lands. The owners of the lands which had been thus injured began suits against the company, some of which were protracted for more than twenty years. At last, the plaintiffs hired a person to cut the dam and destroy the works. This was done one night in the year 1671, when the pond was full. The works were very much injured; they were never entirely re-built, though continued on a smaller scale for some time longer. Thus came to an end the first industry of this kind in America.

A tradition handed down from one of the men employed at the works explains why they were beset with so much trouble from the inhabitants of the neighborhood. It is to the effect that after the works had done considerable business, the people became alarmed through the apprehension that the quantity of charcoal used would occasion a scarcity of wood; and, urged on by their fears, threw so many obstacles in the way of the company that the business was eventually broken up. R. I.

A Break!

Break, break, break!
Up in the laboratory:
His anguish swells as the chemist tells
His sad, monotonous story.

Ah! well for the careless Fresh,
Who smashes retorts at will,
That little he knows how much he owes
Till he sees his breakage bill.

For my beakers, great and small,
Go sailing into the crock
With a savage smash, while crucibles crash
With never the slightest knock.

Break, break, break,
Whatever may broken be;
But the dessica*tor* I dropped on the floor
Will never come back to me.

A Trip to Worcester.

MANY of the fellows who glory under the distinction of "Techs," have, I dare say, visited Worcester; but I doubt if any have ever spent a day at sight-seeing more profitably than did our party of thirteen, which, under the guidance of Dr. Norton, made an inspection of several of the industries of that vicinity. Besides getting a day off from school, we had ample opportunities for appreciating the difference between theory and practice, and for getting vivid impressions of the scale and proportions on which industrial processes are carried on.

The Worcester Gas Light Company was our first objective point. It may seem strange that we should go so far to visit a gas-plant, when Boston affords such good facilities in that direction; but these particular works have a special attraction inasmuch as the Company, in connection with the old process, have built an annexed plant for the manufacture of the so-called water-gas, the same which was the cause of so much perplexity to our State legislators a winter or two ago.

The water-gas of the chemist is made by passing steam over hot charcoal, and is a simple mixture of carbon monoxide and hydrogen; this has no illuminating qualities. The water-gas of trade is the theoretical gas, although anthracite coal is used instead of charcoal, enriched with volatile hydrocarbons, in order that it may possess luminous properties.

The use of this gas for illuminating purposes is prevented by the State, on account of the large per cent of carbon monoxide, a poisonous combustible, which it contains. The State, however, allows a certain per cent of this carbon monoxide to be present in illuminating gases, as it is one of the products of coal distillation, and therefore present to some extent in the gas of the old process.

Owing to the small quantity of monoxide present in the latter gas, it has been found practicable to mix with it a large volume of the water-gas, and still keep within the limit of the law; and this is just what the Worcester Company does. With two thousand cubic feet of coal-gas

they mix one thousand feet of the water-gas, and then subject the mixture to the old modes of purification.

This gives a gas which, so far as I can learn, is no cheaper to the consumer, but which is produced with much less trouble to the manufacturer. This Company sells gas for $1.80 per thousand feet. The plant itself, compared with the old furnace, is quite simple, and in it the process is realized in a very short time. A tall tower, lined with fire-brick, is first heated to redness. During this heating the fumes of combustion pass out at the open top. When the right temperature is reached, the opening at the top is closed, steam is blown through the hot coals of the furnace and into the base of the tower, where it meets a spray of petroleum, which, volatilizing at the high temperature, adds its enriching qualities (now in the form of permanent gases); and as a result, carburetted water-gas passes out at the top of the tower, and is conducted into a second tower to undergo a process known as scrubbing.

The heating of the tower and the manufacture of the gas alternate at intervals of twenty minutes. In case of an accident to the gas-reservoirs, a set of these towers could supply an immediate demand, and thus obviate the necessity of reverting to the primeval candle. This would be almost an impossibility with the old process. Mr. Hinman, State Inspector of gas, who was one of the party, succeeded in making our visit here very interesting.

After a short but muddy interval, we knocked at the door of W. C. Cutter & Co., Copperas Works. We soon gained admittance, and were conducted at once into the crystallizing room. This Company makes use of the pickling liquor, already rich in iron, and the waste iron wire, of a neighboring factory.

The process consists simply of dissolving the iron in the acid liquor to saturation by the assistance of steam, and afterward allowing the liquid to cool in large shallow tanks. During the cooling the clear green crystals settle out and collect on the sides, bottom, and on immersed sticks, until finally the tub has assumed the appearance of a broken geode of wonderful beauty and proportions. The mother liquid is then drawn off and returned to the wire for further saturation, and the crystals are shoveled out and dried. During the drying and packing the crystals oxydize and get broken up, so that when they get in the market they have lost the clean bright appearance which they possess in the crystallizing vats.

The crystals on the bottom of the vat contain all the impurities and settlings of the mother liquid, and so are unfit for the market, but are used in a neighboring plant owned by the same company for the manufacture of venetian red. To accomplish this, the copperas is mixed with lime roasted in a muffler furnace, then mixed with pulverized gypsum, and the whole ground to an impalpable powder. The result is a red powder containing about twenty per cent of iron oxide, and to which it owes its virtue as a coloring matter. It is put on the market for about a cent and one-half per pound. While the machine is in operation a fine red dust fills the air, which settles out on everything within reach, and the men look more like the early red warriors than civilized knights of labor.

For some years past many experiments have been made, and much time and money expended, for the purpose of finding a practicable means of using the products of our great oil regions for purposes to which fuel, heretofore only in a solid state, has been applicable. As a direct result of such experiments we have the development of a process by which wrought-iron can be melted and cast without destroying any of the qualities which class it as such; and this is accomplished in a furnace heated by the combustion of petroleum. The metal is called "Mites Iron," and the process has been patented abroad, where it originated, and in this country. The right of Massachusetts is controlled by Mr. Bowker, who has a small trial plant in operation at Worcester. It was not our good fortune to see the furnace in operation, but then, we had even a better chance to see its construction. It is a long, low structure, not much over two feet high, with a proportionally large chimney at the

rear end; a strong draught being necessary for the combustion of the fuel.

The fuel, a heavy, residual oil, is burned in a series of thin, shallow pans at the very front of the furnace, the upper one being supplied directly from the tank by means of a pipe, and the lower ones by the overflow of the upper.

The wrought-iron, in convenient form, is placed in large crucibles, and these set down into the chambers, which open from the top of the structure, and through which the hot air and fumes of combustion pass on their way to the chimney; thus the reducing gases come in direct contact with the iron.

In about three or four hours the metal is melted, and then, the fireman tells us, some chemical is added which preserves the identity of the wrought-iron, and on which the success of the whole method depends. What this addition is we were unable to find out, as that is the secret of the process.

After a thorough examination of the furnace, the foreman showed us some of the castings. He took a small curved one, something the shape of a half horseshoe, placed it on an anvil, and hammered it out straight with the greatest ease. He then put the piece in a forge, heated it, and then hammered an end over on itself, and readily made a weld; thus proving that the casting had all the properties of wrought-iron.

It is supposed that a very minute quantity of metallic aluminum is added, and that this reduces its melting point materially.

The temperature reached by the furnace is about 6,000 degrees. The advantages of a cheap process for accomplishing these results will be readily appreciated by all interested in the iron business and its many branches.

On our way home we stopped off at South Framingham, and visited the Para Rubber Works, an immense establishment, employing over twelve hundred hands. This is a modern plant, and probably the best in the country. The connected buildings are arranged in a circle, and are all of low structure. This company manufactures all kinds of rubber shoes and boots, also gossamer waterproofs.

The crude rubber comes from Para, in large, ham-shaped lumps. It is first boiled, and then worked into long, rough strips, by means of heavy corrugated rollers, allowed to season, and then worked again between rollers until it has lost all its elasticity, for otherwise it could not be worked or rolled into sheets. The rubber now has a dark, gummy appearance, and this is the stage at which the sulphur, whiting, and other bodies, in large proportion, are worked in, and then the mass is rolled, by large calenders, into a wide and thin continuous band, from which the parts of the shoe are afterward stamped. At this stage the rubber is soft and gum-like, so that two surfaces brought together will adhere so firmly that they cannot be separated without tearing: to prevent this, the surfaces are separated by means of a layer of cloth, to which it does not adhere. These rolls, some of them plain, others stamped with the pattern of the sole or upper, are carried to another department, and then are cut up by men, using hand-stamps, into the different forms required for the formation of the shoe. These stamped patterns are laid away between the leaves of a large cloth book, and in this manner are carried to the girls in the next department. Boot-heels and other heavy parts are stamped out by machinery. Before the girls is placed a rack full of lasts; to these lasts they successively apply the rubber cuts from the cloth book.

The formation of the shoe is progressive, and they may be seen in all stages of completion. Seams are made by simply lapping two edges, and pressing them together by running a little wheel along the line of contact.

The racks holding the covered lasts are now placed on a large iron frame, borne on truck-wheels, care being taken that the rubbers do not touch each other. The frame is now run into another building, and then into a hot-chamber, when the last process, that of vulcanizing, takes place.

During this heating, the sulphur previously added to the rubber asserts itself, an action takes place, the rubber changes its properties, and a vulcanized product is the result.

After cooling and varnishing, the rubbers are then packed for the market.

The last impressions which my mind received were from the tones of a colored vocalizer, who shouted, "Cars for Boston on the second track!"

D.

The Cheerful Grinder.

Oh! in genius I don't believe;
'Tis grind that makes the man:
I would not for the world deceive,
And so confess *my* plan,
As simply grind, grind, grind.

Let others try to make a dash
In athletics, or in letters,
'Tis but a meteoric flash,
And leaves them still in fetters
To the men who grind, grind, grind.

No star, or rout, or revel
Shall tip me off my level;
My mid-night oil I'll burn,
And dryest science learn,
With cheerful grind, grind, grind.

Then when the awful Semmies come,
I will not fear to know my doom;
A glorious row of happy C—s
Will fill my anxious heart with ease,
Yet still I'll grind, grind, grind.

THE last number of *The Tuftonian* is much above the average in its general make-up. It has revived the plan of holding a convention of New England college editors, which was so favorably considered last year, in a short editorial. THE TECH will heartily co-operate with *The Tuftonian* in bringing about such a convention, and thinks the time and place proposed very appropriate.

When the Bowdoin *Orient* gives up its unpleasant discussions with the Colby *Echo*, it will be much more readable. Four of its editorials in the last number are largely re-prints from the Colby organ, making that issue more of an echo than a college paper.

The pages of the Cornell *Era* are as interesting and instructive as ever. The editorial department is very ably conducted, abounding in short, spicy articles, readable and to the point. The literary department is, perhaps, a trifle heavy, and its college news short.

The *Journal of the Franklin Institute* is what we expect the TECHNOLOGY QUARTERLY to be,—deep, strong, scientific, and able.

The Williams *Fortnight* is certainly in every way one of the best college exchanges on our table. At present, it and the Amherst *Student*, of which we have an equally high opinion, are soiling their otherwise attractive pages in a most disgraceful wrangle, which originated in the disputed foot-ball game. We earnestly trust that both these esteemed exchanges will at once cease this squabble, so unworthy of them both, and settle down to the good journalistic work of which they are both well capable.

The Dartmouth *Literary Monthly* is second to none of its kind. It is calculated to interest everybody. The opening article, on An Universal Language, is worthy of special notice. In a short editorial it deplores the lack of college spirit at the Tech.

The last number of the *Troy Polytechnic* is a particularly good one. Its editorials are well written and to the point, and its literary articles not quite so dry and scientific as usual. A communication, replying to certain adverse criticisms made on the *Transit*, is particularly interesting, and very much to the point.

The inaccuracy we mentioned as belonging to the *Dartmouth*, seems to have disappeared in the last issue, and its reports of foot-ball games, giving the scores, are correct. It contains a very good editorial replying to certain adverse criticisms on foot-ball and athletics in general, which were made by the *Tuftonian* a little while ago.

Noticeable Articles.

THE August number of the *Fortnightly* contains a paper on the Higher Education of Woman, by Mrs. E. Lynn Lynton, the novelist, which has given great offense to some of the advocates of woman's rights, who accuse the writer of taking a mere mercenary dollars-and-cents view of the higher education. It does not seem to me that this is quite just to Mrs. Lynton's paper, taken as a whole, and that she does in it raise a much-needed note of warning against the effects of the feverish excitement, which is one feature, of the present phase of the woman's education movement, and against many of the crude and false views on the subject which are prevalent now. That the feverish excitement is doing harm, there can be no doubt; instances come to the observation of every one at all acquainted with the subject; and it would seem as if the danger must be greater in England, where the chief and almost the only educational motive-power is the competitive-examination system,—a system against which the most eminent scholars and men of science seem to protest in vain. But that bad methods of education do harm, is as true of boys as of girls, and is no argument against giving girls any more than against giving boys the best possible education. Now, it would seem as if the very best test to be applied to distinguish good from bad education, is the principle that the former cannot possibly be harmful to the bodily health. A higher education, therefore, that breaks down the health of girls, is to be condemned, not because it is higher, but because it is bad. Either this is the alternative, or we must conclude with the Mahometans that women really have no minds to be educated,—a view much in conflict with facts, with the fact, for instance, that one of the most eminent of American mathematicians is at the present moment a woman.

The efforts for the higher education of women are no doubt often discredited by the claims of fanatics, who would mix up men and women indiscriminately together, and overlook the difference of sex which nature herself has established. Against this Mrs. Lynton and all sensible women ought to protest. But it will be time to determine what women are good for when girls shall have equal opportunity with their brothers to develop what capacities are in them. The way in which the higher opportunities for study have been, heretofore, monopolized by the stronger sex will be looked back upon, hereafter, as an illustration of the semi-barbarism of the age that tolerated it. That nervous and excitable girls may be injured by over-study is very true; but it is equally true that a little, and indeed not a little, but a good deal, healthy, intellectual stimulus would do the semi-dead dolls of society a world of good. When the mistakes, incident to every new experiment, have all been made, it will be found that the highest and best possible education is as good for one sex as for the other.

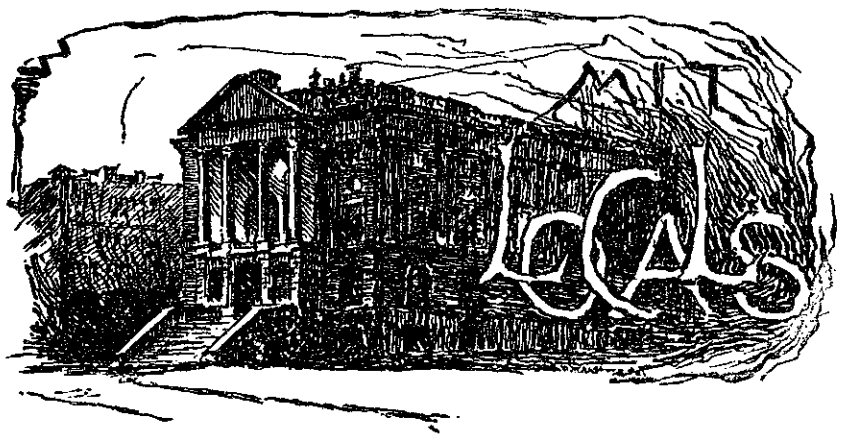
In the same number there is a good paper on Hawthorne's Romances, by W. L. Courtney, from which I will extract a single passage: "It is the gift of the higher forms of literature to possess a distinct atmosphere of their own, the influence of which we instinctively recognize as we read. There is the atmosphere, for instance, which surrounds Mr. Morris's *Earthly Paradise*,—the heavy, sensuous air of some island of the Sirens, where reigns the indolent and delicious passivity of an eternity of the lotus-flower. Or there is the eager and nipping air which surrounds much of the work of Carlyle,—an air which bites shrewdly, and which can only be inhaled in gasps. Or there is the quiet, summer-like, peaceful atmosphere which Emerson distills,—the air of a complacent optimism, when we feel that it is good to have been born, and that 'all things work together for good to those who love God.' Far otherwise is the atmosphere which surrounds the work of Hawthorne; and no one who has once breathed it can forget its peculiar quality. In whatever time, place, or circumstances his tales are perused, instantly there rises the suggestion of a chilly and spectral air,—the air of some gleaming moonlight, when all the shadows seem to have gathered an added intensity, where ordinary flesh and blood has lost color, and to eye and ear are borne, ever and anon, the visions of flying wraiths and the echoes of a supernatural melody. The touch of the artist here is incommunicable and indescribable, and is the unique possession of his singular genius. The machinery by which the effect is worked differs, but the result is the same."

W. P. A.

NOT DEAD YET, BUT NEVERTHELESS, *after* "*Life.*"

A fair damozelle Imogene
Once tried to construct a machene
To capture the heart;
And, succeeding in peart,
With fright scared the young men quite grene.

M.



Mr. Hoppin, '88, of New York, was in town last week.

The C B_3A Society has initiated Mr. Francis Goodhue, '90.

Perry R. Fletcher, formerly '87, visited the Institute last week on his wedding trip.

Holden, half-back of the Tech team last year, has been elected captain of the Harvard eleven.

Mr. Nathaniel I. Bowditch has joined the Sigma Chi fraternity.

The Freshmen recently gave a supper at the Quincy House to their victorious foot-ball team.

At the last meeting of the 2 G Society, Mr. Ellison C. Means, '88, was initiated.

The Freshman foot-ball team has been photographed by J. H. Towne, '90.

Prof. Wells' new Plane Geometry for general school and college use has been recently issued.

Mr. Varney, ex-'87, is studying law at the University of Pennsylvania.

The membership tickets of the Athletic Club admit members and ladies free. No entry fee in the events is charged for members.

"Charles Cross proposes to cross the ocean to France in a dory."—*Boston Sunday Herald.*
Technology, Rah! Rah!! Rah!!! '89.

'90 has chosen the Harvard Freshman colors, crimson and white, for class-colors. Originality is not expected to be found among Freshmen.

At the meeting of the Society of Arts last Thursday, Mr. Thompson, of Lynn, read an interesting paper on electrical welding.

The regular Hammer and Tongs meeting and dinner was postponed from last Saturday until next Saturday.

Any one desiring note-paper with the Institute seal stamped thereon, can obtain it from Conner, '88, or Merrel, '88, in the Analytical Laboratory.

The Chess Club has elected as members, Messrs. G. C. Kaufman, '89, G. G. Stone, '89, George D. Chadman, '90, J. R. Hall, '90, and J. B. Baker, '90.

The Athletic Club games, Saturday, are for the benefit of the foot-ball Association. A large crowd should be present, especially on account of the class tug-of-war contest.

Mr. H. Souther, '87, on his return from Steelton, Pa., where he was studying for his thesis work, was taken dangerously ill with typhoid fever, and is now confined to his room.

The class of '88 met on November 4th, and adopted crimson and black for the class-colors. Mr. Greeley made some interesting remarks in regard to the *Quarterly*, which were heartily indorsed by the class.

Prof. Lanza attended the meeting of the Society of Mechanical Engineers held in New York, at which he read a paper on the results of tests of the strength of shafting subjected to twisting and bending.

The foot-ball team has been photographed by Hastings, and THE TECH will publish a heliotype print of the picture in the next number. Through an unfortunate mistake, Duane was not present when the photograph was taken.

Mr. W. R. Ingalls, '86, who is in charge of the Kokomo Ore Works, has had to suspend operations at Kokomo until the spring. At present he is night-superintendent of the concentration-mill of the Col. Sellers', at Oro City, Col.

A movement is being made to form a M. I. T. Alumni Association in Illinois. Mr. Solomon Sturges, '87, of Chicago, has received over thirty favorable replies to letters sent out to the alumni in the State, and the organization will soon be formed.

The Sophomores first chose navy blue and white for their class-colors, but at a meeting

last week they were changed to orange and black. What the colors will be next week is unknown, as scientific observers are unable to make any predictions upon the subject.

Mrs. Rogers, assisted by Mrs. Francis A. Walker, received the Senior class and the Professors at her home last Wednesday evening. The evening was enjoyed by all who were present, and the series of Wednesday evening receptions, of which this was the first, is looked forward to with much pleasure.

A number of students in the two lower classes who are interested in photography, have formed an organization under the name of the Technology Photographic Society. The officers of the society have been elected as follows: President, H. D. Smith, '89; Vice-President, E. L. Brown, '89; Secretary, J. H. Towne, '90; Treasurer, S. G. Bates, '89.

The Fraternity party at the gymnasium last Saturday was very enjoyable, the music being especially good. It was a pity that so few were there to enjoy it; but this is probably due to the haste with which the affair was carried through. These parties are for the benefit of the Foot-Ball Association, and for that reason alone they should be well supported.

The Society of '87 met at Parker's, November 3d. After lunch an informal programme was carried out, which included responses to toasts by Messrs. Brainerd, Draper, Cushing, Spaulding, Curtis, Shepard, Bartlett, Curtis and Peters, with Mr. Giles Taintor as toastmaster. Mr. Taintor sang his inimitable song and an encore. Incidents of the war were told by several members, amid the smoke of cigarettes, and Mr. Davenport, of Lynn, made a few interesting remarks on the new electrical welding.

In an account of the Seventh Regiment sports in New York City, one of the Boston dailies stated that Easton, the anchor of the victorious Harvard tug-of-war team, had never been defeated but once, and that was in a disputed contest with the M. I. T. team, when Harvard lost by an eight of an inch. This is an injustice to the Technology team, of which Winsor, '86, was anchor, for they pulled Harvard squarely by an inch through their superior skill. The result was too decided to admit of dispute.

The roster of the M. I. T. Cadet Corps is as follows: Major, R. G. Brown; Adjutant, Duncan Campbell; Quartermaster, J. H. Hyde; Sergeant-Mayor, E. F. Simpson. Company A: Captain, W. L. Ripley; 1st Lieutenant, C. E. Babb; 2d Lieutenant, A. H. Rogers. Company B: Captain, H. G. Stater; 1st Lieutenant, G. W. Taylor; 2d Lieutenant, W. L. Bowker. Company C: Captain, H. M. Goodwin; 1st Lieutenant, G. L. Gilmore; 2d Lieutenant, Charles Hayden. Company D: Captain, H. C. Clapp; 1st Lieutenant, S. W. Moore; 2d Lieutenant, E. F. Bragg.

The Society of '89 had its monthly dinner at the Quincy House, Dec. 10th. After the dinner, speeches were made by members of the class; and then followed some banjo selections, and singing by a trio. The following verse seemed to hit the right spot:—

> "Our Freshmen once did wear nice hats,
> And thought we'd make no row;
> They also sported pretty canes
> With silver heads, I vow.
> But they haven't, they haven't,
> They haven't for a long time now.

Solos were sung by Messrs. Kendricken and La Rose. Mr. La Rose was elected "beacon" of the Society.

The class of '87 held an important meeting in room 15, Nov. 4th, with an attendance of about half the class. The first important business was the election of the class photographer. Hardy was chosen, after five ballots and much canvassing, by the adherents of the different photographers. The secretary was instructed to write Mrs. Rogers, accepting with thanks her invitation to the class for the Wednesday evening receptions. A motion was passed to send a letter to the *Congregationlist*, refuting the charges made by that paper against certain pro-

fessors of trying to undermine the religious beliefs of the students. Mr. Brace stated the objects and purposes of the *Quarterly* to the class, and the meeting then adjourned.

In place of its regular meeting, the Society of '88 had a sleighing-party on Dec. 10th. A jolly crowd of twenty-four left the Institute about seven o'clock, in a large boat-sleigh, bound for Lexington. Arriving in Cambridge, the crowd felt the need of a few musical instruments; and, accordingly, some were procured, and the sleigh started off, whilst mellifluous sounds filled the air. Lexington was reached about half-past nine, and a sumptuous (?) repast was disposed of. Great admiration was expressed at the agility with which a whole plate of hot soup was poured down one unfortunate's neck. About half-past eleven the party started for home. The way back was enlivened by songs from Devens, whose voice had been greatly improved by cheering the whole evening; also by numerous races, in which '88 was always victorious. The Tech was reached about one o'clock, and the crowd dispersed. The evening was a most perfect one, and will long be remembered by the fellows who went. It is said that the moon was the only one who was full.

The College World.

HARVARD.— An effort is being made to raise money, by subscriptions, for a silver cup to be inscribed with the name of the winner of the college championship in tennis each year.

THERE are forty-two college graduates on the staffs of the six leading daily newspapers of Boston. They represent fourteen colleges. Of this number, 17 are graduates of Harvard, 5 of Yale, 3 each of Dartmouth, Wesleyan, and Boston College, 2 each of Colby and Williams, 1 each of Amherst, Bowdoin, Brown, Cornell, Trinity, Tufts, and the University of Michigan.

HARVARD has graduated 10,933 students, and the larger part during the last 50 years.— At the first vesper service under the new *régime*, over 500 students were present. The college library spent $39,726.76 during the year 1884–85.— Vesper service is held every Thursday afternoon, from five until half-past.

YALE.— It is stated that Yale thinks of taking legal proceedings to secure the foot-ball championship, according to the constitution of the Foot-Ball Association. As it is, Princeton holds it in virtue of the fact that one college holds the championship until another college deprives her of that honor.— The new catalogue will contain about 300 pages. The word "University" is for the first time used throughout the book.— The candidates for the 'Varsity nine have already gone into training.— The first Junior Promenade was held in 1872.— Thirty-four of the seventy-one class secretaries are residents of New Haven.— Professor Lyman was the first to discover proofs of the atmosphere surrounding Venus.— In the Law School there is a class in short-hand of 15 members.

PRINCETON.— The new captain of the foot-ball team weighs 180 pounds. Yale's new captain weighs only 130 pounds. With Princeton, foot-ball is evidently a weighty subject.

IN the championship games of the past season, Yale has scored 244 points to 4; Princeton, 112 points to 10; Harvard, 66 points to 41; University of Pennsylvania, 14 to 133; Wesleyan, 6 points to 254.

TRINITY.—A meeting of the Trustees was held December 1st, to appoint a special committee to procure plans and specifications for the proposed building for the use of the scientific department.

CORNELL.—The Freshmen have adopted a class hat, a black Tam-O'Shanter with a green top-not.—The students have asked the Board for permission to inclose the athletic grounds with a high fence.

PENNSYLVANIA UNI.—At the University, there is a prize called the J. William White cup, which is awarded to the class making the highest score in general athletics. The first places in the sports count as follows: Cricket, foot-ball,

base-ball, rowing and tug-of-war, each six points; tennis, three points; swimming, two; in track-athletics, first place, two, and second place, one.

DICKERSON COLLEGE.—Parents of a young man who was expelled, have brought suit against the college for $10,000 damages.

TRINITY MEDICAL COLLEGE, Toronto.— The Seniors attacked the Freshmen, and threw some of them out of the window. One Freshman had his collar-bone broken.

DARTMOUTH.—No scholarship students are allowed to use tobacco in any form.—Six books are allowed each student from the library during vacation.

AMHERST.—The Christmas vacation began December 15th.

COLUMBIA.—There are twenty-five candidates for the Freshmen crew.—One alumnus of the College appears in the list of the class of 1758, whose printed biography states that he was born Sept. 1st, 1749. Unless there is some error here, this was probably the youngest graduate ever invested with the baccalaureate in an American college.

Women are not allowed, by law, to enter any Prussian University.

ROGER WILLIAMS UNIVERSITY, for the colored race, has 214 students.

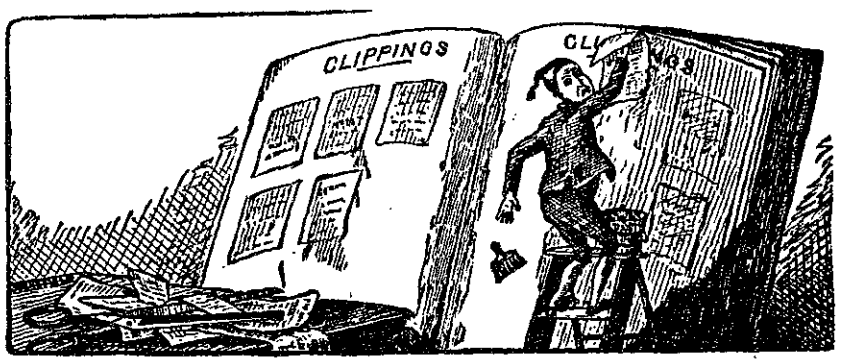
Foot-ball by electric light, is the latest thing in Canada. It is very popular.

WILLIAM AND MARY.—President Ewell claims that the earliest chair of law at any American seat of learning, was established at his College, in 1779, thirty-six years before that of Harvard.

In Russia it is never asked, "What's in a name?" It is taken for granted that it's the whole alphabet.

The sweet girl students of Bryn Mawr College have thought best to wear the Oxford cap and gown.

Two of Garfield's sons and one of the late ex-President, are studying law at the Columbia College Law School this year.



THE BOOBY PRIZE.

I.

It dangles from my gas-jet now,
And as it turneth to and fro
Upon its cord, I wonder how
I won, not very long ago,
That little drum, these letters neat
Painted upon one tiny head:
"*Something, perhaps, that you can beat,*"
And on the other, all in red,
"*The Booby Prize.*"

II.

We stood beneath the great hall light,
After the rest had gone their way.
"O Jack, can you forgive me quite?
I made that wretched thing to-day.
I little thought to whom 'twould fall,
Or else," and then, quite soft and low,
"I'd not have made the thing at all.
Will you forgive me e'er you go,
That Booby Prize?"

ENVOY.

Since then a change has come o'er me;
False prejudice has taken flight:
If *certain things* could always be,
I'd struggle hard to win each night
The Booby Prize.

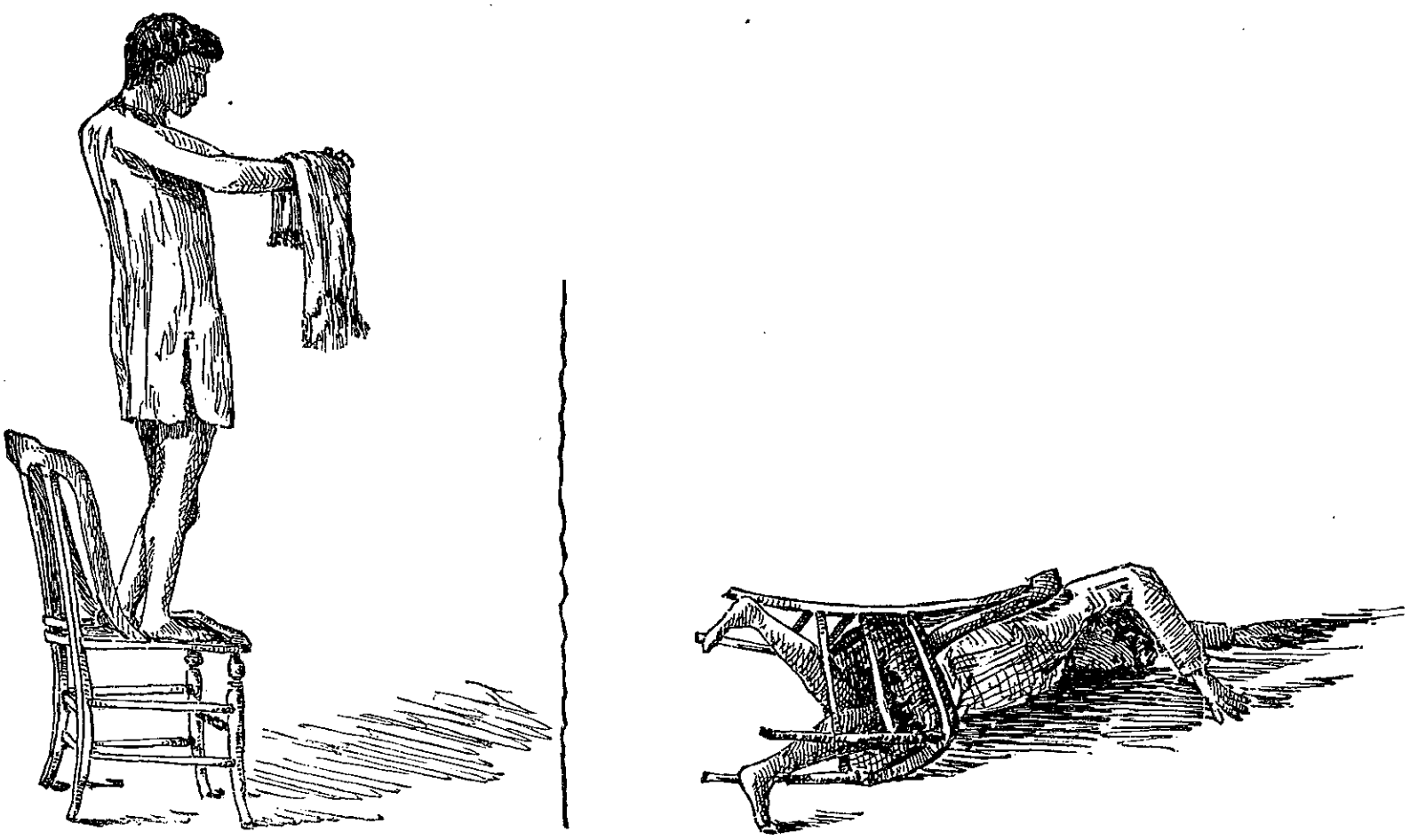
—*The Dartmouth.*

Neal Dow is lecturing on "How to get ahead." We suppose he recommends a combination of Bass ale and Rhine wine.—*Life.*

A rousing speech—"Get up—breakfast's ready!"—*Ex.*

Midnight is called the whiching time of night, because at that hour it is sometimes difficult to determine which to do, go home or whoop it up larger.—*Life.*

"All flesh is grass," they say; but how about a wooden headed man with a marble brow, an iron will, and a stony heart. Go to, and if you can't go two, go one.—*Life.*



YOUNG SNIGGINS, '90, HAS ATTENDED A PERFORMANCE OF "ADONIS," AND ON RETURNING HOME, ATTITUDINIZES BEFORE HIS MIRROR,—THE GIDDY THING!

Wife: "You haven't been inside of a church since we were married — there!"

Husband: "No; a burnt child dreads the fire."— *Judge.*

THE ANSWER.

On my right at dinner sat Mollie;
On my left there was little May Belle,
Who is always so sparkling and jolly,
And who likes me, I fancy, quite well.

The former, somehow, spoke of ages;
"Now what would you take me to be?"
I asked. She replied, "Of life's pages,
I suppose you have turned twenty-three.

Miss Belle on my left was abstracted,
And did not our words overhear,
Nor knew she the answer expected,
As I whispered quite low in her ear:

"And what would you take me for, Mary?"
And then this small maiden perverse,
From out of abstraction, quite wary,
Responded,—"For better or worse." —*Life.*

While the editor is up-stairs writing an article in which he "points with pride" to the paper's circulation, the business manager is down stairs "viewing it with alarm."— *Life.*

"Witness, did you ever see the prisoner at the bar?" "O yes; that's where I got acquainted with him."— *Ex.*

LIABLE TO BREAK.— "O George!" she exclaimed, catching her breath as she gazed out to sea, "there seems to be no limit to old Neptune's broad expanse; and the waves, George, how playfully they gambol along the shore!"

"The waves are very foolish, dear," said George, with a sigh.

"How foolish!"

"To gamble where there is no limit."— *Life.*