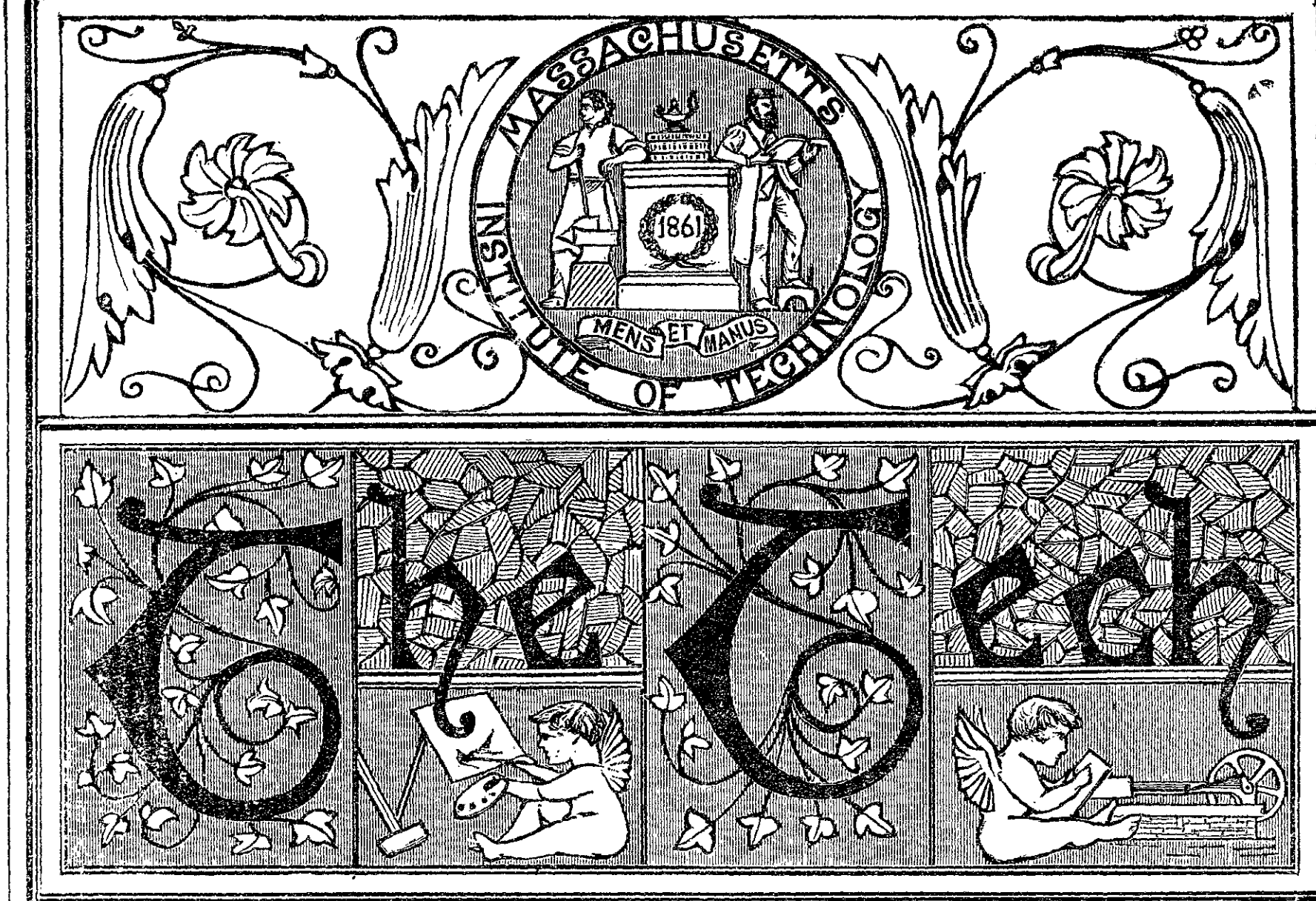

TECH

DEC. 31,
1884.

Vol. IV. No. 6.

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The Tech.

VOL. IV. BOSTON, DEC. 31, 1884. No. 6.

THE TECH.

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NLY a few weeks ago it was stated in the *Columbia Spectator*, that Quantitative Analysis had been dropped from the regular course in the School of Mines.

This surprising announcement at once suggests some very important questions about our mining course. Are not some of the more important studies neglected, by spending so much time on chemical analysis? Why are we compelled to spend half of our time, during the last three years, on what one of the best mining schools in this country thinks an unnecessary accomplishment for a mining engineer? Few mining engineers who have charge of the actual running of mines are ever called on to make analyses. This is especially the case in many coal districts, where no analyses are made except by the State and the consumers. In other classes of mines rough assays are often all that are necessary. To the average miner geology is much more important than quantitative analysis, yet the practical and most valuable part of our geology is made optional, and the time is so filled with chemical work that of the three options, mathematics, geology, and metallurgy, only one can be taken.

A miner going into the coal regions thus spends half his time on something that is of no *practical* benefit to him, and has to omit geology or the higher mathematics, both of which are necessary.

A certain number of substances have to be analyzed to get a degree. To do this, a quick, accurate worker must spend twice as much time as the Faculty require, and a slow worker takes more time in proportion, if he can get it.

Thus an average miner has to come to the laboratory at eight or half past in the morning, and work in it every spare minute, including the dinner hour, until half past four in the afternoon. He has to go up and down stairs to every recitation, and stand up all the time he is at work, and is then expected to go home and study from three to five hours, as if nothing had happened. The result is, too often, that, worn out with long standing and breathing acid fumes, the studies are neglected. The catalogue represents this amount of chemical work by a modest ten or twelve hours per week, but the students find by experience that it takes from twenty to twenty-four.

If the *Spectator* is correct, the School of Mines is as far at one extreme as we are at the other. In our course the difficulty could be overcome by having part of the chemical work optional; then a man who never expects to make an analysis after leaving the Institute could take mathematics and more geology, and get his degree without spending one and one half years of precious daylight on chemistry.

The same amount of time spent on geology or metallurgy would accomplish far more than when spent on chemistry.

The main objections to the chemical work as now arranged are: —

1. The determinations, if not correct within three per cent, have to be repeated Thus a student not unfrequently works a whole term on one of the very difficult determinations, like galena, menaccanite or spiegeleisen, doing it over several times.

2. The common elements, such as Si, Fe, Al, Ca, etc., are not only determined two or three, but ten or fifteen times.

3. A student *cannot*, without working much extra time, do the required amount of work.

4. No part of the chemical work is optional.

AMID the general improvement which we, as a nation, are making in almost every department of education, there is one direction in which we are sadly, not to say criminally negligent. This is what we may call political education. No better proof of this is needed than the developments which attend any great political contest, such as that through which we have just passed. At such times, when men are called upon to decide upon questions which involve any deep, fundamental principle of government, their ignorance or misconception of the true import of those principles is, in view of their importance, alarming. As a direct result of this ignorance, men become blind followers of party or personal preference; and then follows all that train of evils which scheming politicians are enabled to work upon credulity. In view of the fact that we, as a people, are face to face with some of the most difficult problems with which any nation has had to deal, the careless, we might almost say, flippant way in which our modern politics are conducted, must seem to a thoughtful observer almost reckless.

How, then, we ask, is the public mind to be educated politically? Certainly, not by noisy street parades and fire-works. The procession and the rocket don't teach us anything of tariff or civil-service reform! The very existence of these things at a time when momentous issues are at stake, is a proof of political demoralization. The platform is losing ground, as a means of public education, and our only resource seems to be the press. If the press were what it should be, what better means of instruction could we have? But while we are indebted to the press for all our information in regard to business and the events of the day, we can no longer rely upon it as a safe guide in politics. It has all but abdicated this important part of its duty, *i. e.*, the *impartial* discussion of political questions. It is understood that we speak now of the press as a whole, and not to the honorable exceptions which are doing all in their power to supply this much-felt want. We agree, therefore, with a recent writer, whom we do not now recall, that the political education of the people rests upon political leaders, and not until these are men of high and blameless morality, as well as men profoundly versed in the principles which underlie all good government, can we look for a broad dissemination of sound political instruction.

NUMEROUS literary and artistic contributions received within the past few weeks indicate an increased interest in THE TECH, or a manifestation of interest already existing, on the part of its friends, which is very gratifying to those in whose charge it is placed. This is one step in the right direction; we desire to suggest to our readers another which we hope will prove mutually beneficial. Any one, in any kind of work, especially of a philanthropic and unremunerative nature, is glad to know what portions of it are appreciated and productive of good, and what are susceptible of improvement. With this idea in mind, we should be pleased to hear from our readers, personally or by written communication, any suggestions or expressions of opinion as to editorials, articles, and methods. It must be borne in mind, lest this request seem unusual, that THE TECH is not an enterprise for making money, but for the students, whose ideas it seeks to represent; consequently any plan by which such ideas are brought to its notice (and they are not brought to notice without a special request) is in the line of its proper work.

Ever Again?

TO F. J. R.

Bright shone the stars. In the moonlight clear
  Gleamed the dew on the slumbering heather.
The lights o'er the water seemed wondrously near,
  As we wandered that evening together.

. . . . . .

The shadows are dark on the water to-night;
  The wind o'er the heather sighs drearily.
Shall we ever again find the moonbeams so bright?
  Tell me, my dearest one, shall we?

H. C. S.

The Adoption of the Metric System.

ONE of the latest articles on the adoption of the French system of weights and measures is by Mr. Coleman Sellers, of William Sellers & Co., Philadelphia. This gentleman, in his recent travels in Europe, has paid considerable attention to this subject, and, as his firm has for a number of years used the metric system in some departments of its works, he speaks from personal observation and experience. He says that a report of the Paris Geographical Society, which shows that countries representing a population of two hundred and forty-two millions are using the French system, while only those representing ninety-eight millions are using the English system, is misleading, for the following reasons: First, because, in countries which have nominally adopted the French standard, the English is extensively in use, as in iron rolling, screw cutting, and the measurement of boards, dry goods, and other merchandise; second, because the basis of population is not the one which shows the interest involved, since, for example, "the confusion and loss caused by a change in the system of measurement in Russia, with her millions of peasantry, would be less than that sustained in the city of Philadelphia alone from a like cause. . . . Millions of those numbered among the people who use the French system have no occasion to use any or know any system whatever, save in the very crudest form."

It is thus evident that the population now making practical use of the English standard is greatly in excess of that using by force the French system. Mr. Sellers thus expresses the result of his observations in this matter: "With all this long practice during my connection with the firm, I have written and spoken against the enforced adoption of the system not only because of the expense involved in changing, but because it is not a practical system; it permits of no elastic gradation of shop or trade sizes." The metre is too large, and the decimetre too small, to replace the foot, while there is no convenient unit like the inch, the centimetre being too small for such operations as determining the pitch of screws; also, the litre being of a cubical shape, its transposition into a shape such as is commonly and conveniently used involves the quadrature of the circle.

A person so well known as Mr. Sellers is excellent authority, and his opinions appear to be confirmed by the disinclination of the people of the United States to adopt this system, though made legal. Nevertheless, it does seem as though a simplification of the present standards and tables of weights and measures would result beneficially, especially if the units adopted by different nations could be made not necessarily the same, but easily convertible one into another. The expense and confusion of such a change would be of comparatively short duration, and, in our own country, for example, would do away with the annoyance arising from the multiplicity of units suggested by the following terms: Avoirdupois, troy, and apothecaries' weights; dry and liquid measure; nautical and statute miles; fathoms, leagues, cords, stones, hands, sizes, lines, links, etc., etc., to say nothing of the irregular progression in all the tables of measures of extension and capacity.

The metric is not the only possible decimal system, nor is the use of decimals alone necessary. The combination of decimals with the "halving" process in our monetary system has been found admirably adapted to use, and it is reasonable to suppose that, beginning with a gradual abandonment of many superfluous terms, and aided by proper legislation, the people of

this and other countries would, before many years, be in a condition of readiness to adopt such a simple and convenient system.

This subject is undergoing discussion in the press and before scientific societies, and the results may be the beginning of a needed practical reform.

Five Cents.

It is all very well for poets to tell
  Of Peters or Charlies the Great;
But let them come here, and I 'll treat to beer,
  If we 've not a hero their mate.

A description exact, and also compact,
  Is rather a difficult matter;
But if you 'll be kind and "fractures" not mind,
  I 'll kick off a horrible clatter.

Not slim, but quite tall; eyes handsome, not small;
  But, oh, what a snap and a twist,
When you ask him a question to obtain a suggestion
  As to what he 'd be pleased to suggest.

How the Wrong or Not Right, not apparent at sight,
  Could be improved to make it Correct;
Your answer below is all right, you know,
  So the errors are hard to collect.

You are humble and lowly, go up to him slowly
  To ask what the matter might be;
He gives you a look, you reach for your book,
  And feel you are up in a tree.

But you soon get the drift that you 're all adrift
  On what you were off on before;
He takes up his stylograph, gives a short cough or laugh,
  And your problems are covered with gore.

With a mark here and there, make no difference where;
  "It is awfully wrong to say so";
You pocket your work, smile a sick-looking smirk,
  And away from our hero you go.

His name can you doubt, as his merits you shout,
  While he us poor freshmen does flunk?
Just look at our cheek, how the tears down it streak,—
  Perhaps I should say how they trickle.
Ah, there—hold your breath and keep still as death,
  Our hero is William, our ——.

'88.

E. Worthington, Jr., '85, and F. W. Hoadley, '88, have been elected editors of THE TECH, and will begin their duties with the next number.

Ready-Made Examination Papers.

As the time for the semi aunuals is fast approaching, we take the liberty to call the attention of professors and students to the following examination papers, which are selected at random from our large and extensive stock on hand. Several years have elapsed since we began to gather and arrange materials for these papers, and we now feel ourselves justified in saying that we can and do turn out as fine an article as can be produced. We wish to call special attention to the paper in Physics, which, for brevity and conciseness, we claim, has never been equalled. Feeling sure that the originality of the questions will commend our papers at once to all professors and teachers, and that they will fill a long-felt want on the part of both professors aud students,

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POLITICAL ECONOMY.

I. If a man thinks protection a bad idea, why should he not take down the fence around his apple orchard, and kill his bull-dog?

II. If the tax should be taken off tobacco and cigars, what would be the effect on the price of brown paper and cabbages? Also tell how many cigarettes will kill a dude.

III. Provided a public debt is a good thing, why is not a private debt a good thing? Then why pay your tailor's bill?

IV. What do the terms, Woman's Rights and Liberty of the Ballot, mean? And do woman's rights include the liberty of the ballot (ballet) in all spectacular plays?

* Special discount to clergymen's sons on answer contrivance.

V. Do you believe in a reduction of the *tariff*, and do you believe there would be a reduction in the *tar(e)iff* you should mend the hole in your coat?

ALGEBRA.

I. If the equality

$$YO : M :: E : U$$ is correct,

why don't

$$YOU = ME,$$

and if YOU equal ME, why can't you *stand* for me once in a while?

II. *Arithmetical Progression.* Prove that the sum of two terms at the M. I. T. equals $200.

III. A certain young lady is three times as old as B. B is 10 years of age; why, then, does the certain young lady try to make out her age is sweet sixteen?

IV. A boy at a fair spent his money on eighteen oranges and sixteen apples, which he ate If he had had half again as much money, he would have had half again as much pain. Explain what was the matter with the boy, and who paid the doctor's bill.

PHYSICS.

I. Think of every unanswerable and unearthly question any one ever heard of, also a few that no one ever heard of, and answer them with great care, stating how you draw your conclusions, *i. e.*, with pencil or ink.

ENGLISH, RHETORIC, AND HISTORY.

I. Who was George Washington, and who would now be thought the greatest man, George Washington or John L. Sullivan?

II. What are the chief exports of the United States? Are not Newburyport, Salem, and New Bedford, kind of *ex-sports* now

III. Is the *aim* of the study of rhetoric practical; that is, could it hit a bullseye at a thousand yards?

IV. Can you parse (pass) the Brunswick Exchange?

V. What is the nature and purpose of the Introduction, or, in other words, was the *purpose* of the *introduction* to me of that dull girl due to your bad *nature?*

CHEMISTRY.

I. What does the symbol H_2O tell us of the composition of city milk?

II. Tell exactly what you mean when you use the symbols I. O. U.; but if you don't mean anything, don't tell.

III. Explain all that takes place when a servant girl brings kerosene in contact with the kitchen stove. Also tell if this is a chemical or physical change; and if it is a physical change, why will not physic cure the girl?

V. Give the principal characteristics of common gas? Is not the way your gas bill runs up a characteristic of gas? If not, why not?

Metallic Thermometers.

IT is interesting to note the advance which has been recently made in the construction of one of the most useful of scientific instruments, namely, the metallic thermometer.

The first to apply the unequal expansion of metals to the construction of a thermometer was Brègnet. His method consisted in suspending a cone-shaped lamina, as it is called, from a support like that from which the needle of an ordinary astatic galvanometer is dropped. The lamina is a long metallic strip, composed of two metals which expand unequally by heat. These metals are soldered together lengthwise, and in the above case, the strip was shaped into a cone, the apex of which was attached to the support, and the free end or base to a hand. Under the action of heat the cone would unwind or open out, because the more expansible metal was placed inside. This motion carried the hand with it, which, being adjusted over a suitably marked disk, would indicate the temperature. Since then marked improvements have been made. At first an improvement was made in the shape of the lamina, which consisted of two flat strips of brass and steel, soldered together lengthwise, and then bent into the shape of a **U** with the brass innermost, one end being made fast, and the other connected to a wheel, moving a pinion on which was fixed a hand which, after adjustment, indicated the temperature Ex-

perience soon showed this instrument to be faulty, inasmuch as the weight of the lamina would cause the instrument to vary several degrees, when placed in position where the weight could act to advantage on the wheel and pinion.

About five years ago an attempt was made by the Auburndale Watch Company to overcome this fault in the French instrument by using two laminæ, one to counterpoise the other. After much experimentation with **U** and **C** shaped laminæ, it was found impossible to rectify this trouble in the French instruments. Thousands of the American instruments were sold before any way could be devised to correct the dropping of the hands. Finally the object was achieved by the use of a *spiral* lamina composed as before of two metals with the most expansible innermost. On being heated the lamina would unwind, while a removal of heat would cause it to wind up more closely. One end of this lamina is made fast, while the other operates through a wheel and pinion upon a hand which indicates the temperature. This instrument can be made very accurate, when constructed of good solid stock, with good workmanship.

The acme of all inventions in this line was produced a few months ago. This new instrument resembles very much in external appearance our familiar mercurial thermometer encased in a metal protector. The lower part of the instrument consists of an air chamber in which is a lamina, and the upper part is a cylinder of metal with a narrow slit cut in it from top to bottom, about one eighth inch wide. Behind this slit revolves a paper cylinder which has a sloping line drawn once around it, diagonally from top to bottom, with the surface above the line colored black, so that, when the paper cylinder revolves, the appearance is like that of a substance rising in the metal cylinder. As this paper is connected with the lamina the instrument will indicate the temperature in a manner analogous to that of a mercurial thermometer. This is acknowledged to be one of the most ingenious of novelties and remarkable for its simplicity, accuracy and durability. H. A. R.

Athletics.

THE winter indoor games of the Athletic Club were held in the gymnasium on Saturday, Dec. 20. The attendance was small, but those who were present had the pleasure of witnessing some very interesting contests.

The first event on the order was the *fence vault*, in which there were four entries. It was evident from the first that the contest was between A. H. Twombly, '87, and W. L. Dearborn, '88. The bar was gradually moved up until a height of 6 ft. $6\frac{5}{8}$ in. was reached. Both men cleared this, but neither could do any better, and, as Twombly had a handicap of $1\frac{1}{2}$ in., the medal was awarded to Dearborn.

Putting the Shot. — (16 lbs.) Won by F. R. Young, '86, 33 ft. $5\frac{1}{2}$ in., P. R. Fletcher, '86. 32 ft. $3\frac{5}{8}$ in. Dearborn, '88, and Sturges, '87, were the other contestants.

Running High Jump. — W. L. Dearborn, '88, S. Sturges, '87; F. R. Young, '86. Dearborn was the first to fall out, at 5 ft. S. Sturges cleared 5 ft. $1\frac{3}{4}$ in., but could go no higher, while Young kept on and jumped 5 ft. $3\frac{1}{2}$ in.

Indian Club Swinging — H. D. Bates, '88; G. A. Billings, '87; R. H. Pierce, '85. Won by Billings.

Tug-of-War. — Trial heats. '86 and '87. The most interest in the games was centred upon the tug of war contest between the class teams, as they had showed themselves to be so evenly matched by their practice pulls. The Junior team consisted of P. R. Fletcher, anchor; A. S Garfield, J. W. Smith, and G. W. Farmer, Sophomores; A. H. Twombly, anchor; W. B. Douglas, Wm. Fish and H. F. Hill. '86 got the drop by about three inches, lost two inches, but soon after regained them, and won the heat by $5\frac{1}{2}$ inches.

'85 and '88. '85; Baker, anchor; Pratt, Worthington and Richardson. '88; Dearborn, anchor; Vorce, Daniels, Nutter. The Freshmen won the drop but were unable to retain it long, and when time was called, the ribbon was $2\frac{1}{2}$ inches on the Seniors' side of the scratch.

Fencing. — Trial heat. J. B. Ray, '88, and R. H. Vose, '88. Won by Ray, 7 points to 6.

Running High Kick. — Hill, '87; Dearborn, '88; Douglas, '87; Sturges, '87. It was a foregone conclusion that Hill would win this event. His record was 8 ft. 5 in.

Feather Weight Sparring. — S. A. Whitney, '86, and E. P. Quigley, '88. This was one of the most interesting events of the day, the two men being so nearly equal. Whitney was not in the best of condition, but fought pluckily throughout. Quigley won the second bout and the third, Whitney losing the latter on account of a foul.

Fencing. — Final bout. Ray, '88, and Low, '86. Won by Low, 7 points to 5.

Tug-of-War. — Final heat. '85 and '86. Fletcher got the drop of about two inches, and held it throughout, increasing the distance to four inches, by a few quick heaves just before time was called. '86 thus retains the class championship.

Sparring. — Light weight. H. P. Duker, '87, and E. S. Daniels, '88. This was a good exhibition of sparring on Duker's part, but it was no contest between the two men, for Duker was so much the superior. His rough treatment of his opponent called forth a constant stream of hisses from the spectators, which was certainly in very bad taste, and showed a great ignorance of the rules for spectators during such a match. As the games were not open to contestants outside of the Institute, and as Duker's name does not appear in this year's catalogue, we do not understand why his name was permitted among the entries.

The officers of the meeting were as follows: Clerk of course, Chas. F. Spring, '85. Referee: R. S. Gorham, H. A. A. Stewards: A. G. Robbins, '86, and E. L. Pierce, '86. Judges: A. R. McKim, '85, and F. M. Ames, '86. Judges of sparring: J. M. Smith, '86, and Charles Strauss, S. E. A. C.

Eighteen members of '79 held an annual meeting at Young's, Friday evening, December 26. The officers for the ensuing year are: J. W. Cabot, president; E. G. Hartwell, vice-president; H. H. Campbell, secretary; F. S. Coffin and E. C. Miller, executive committee.

Communication.

[*The editors do not hold themselves responsible for opinions expressed by correspondents.*]

TO THE EDITOR OF THE TECH:

Your No. 2 for this year has an editorial on a Railroad School at Vienna, and course of instruction in Railroads at Yale. There is also suggested the introduction of a course in this subject at the Institute, or of studies relating to it in the already existing courses. That there is a call for such studies cannot be doubted, but there does not seem to be at present sufficient ground for making a separate course of this subject, except as a branch course in one of those already existing, and undoubtedly that of civil engineering is the one which bears the most on railroads. The need of a subdivision in the last-mentioned course is very apparent to those connected with it. Civil engineering comprises in its scope such a vast variety of differing subjects that to become proficient in all would be an impossibility for any one man. With the present advancement of science and skill the only true way is to choose some one branch of the profession and master it and all relating to it in the completest manner possible. For each one to choose a specialty best adapted to his tastes and abilities is what we must come to sooner or later. If we attempt to cover too wide a scope, we shall always find, whichever way we turn, some one ready to do in a better manner whatever we attempt, while we shall become lost in a multitude of details and technicalities.

Driven thus to a specialty, the sooner choice is made the better, and the more knowledge gained in this special branch the better the chances of early success. Could not the course in Civil Engineering be subdivided at the close of the third year into two or three subdivisions, such as Railroads, Hydraulics, and Sanitary Engineering? Let the third year be a general course on Engineering, such as will enable the student to see just what each branch comprises, and guide him in making his choice of a specialty. The fourth year can then be made one which

will especially bear on his chosen course, and give him a definite line in which to shape his studies. A glance at the Catalogue shows how many enter the railroad business, and while they have an excellent foundation as civil engineers in general, they must commence at the bottom and work up by arduous toil and persistent endeavor. With a subdivision of the course as lready mentioned, the student who chooses railroads can gain a broader knowledge of the subject than years of practice would give him, and enable him to think intelligently and wisely on railroad matters.

Our systems of railroad management are daily growing in perfection and multiplication of parts and details, requiring the need of men who can grasp such subjects and handle them to the best advantage. With good instruction in this most important factor in our country, — the railroads, — would not the Institute be accomplishing one of the noblest ends for which she was founded, making men capable of filling some of the most responsible positions in life? W., '85.

EDITOR TECH: In the *Tuftonian* for December, I read an article on the second game of foot-ball between Tufts and Technology. One part of the article reads: "The Techs evidently had not forgotten what excellent service the base-ball lines did them in the first game, and had freshly marked them for this occasion, while the regular lines were determined by pacing and making a few heel marks, this utter lack of proper lines affording the only ground the Techs had for their charges of unfairness against the referee." That this is an insulting article is drawing it too mild; it is a base slander, and the *Tuftonian* correspondent knows it. I would also inform the gentleman that things are not run in that manner *here*, however they may be in *other* places If Tufts College wants any proofs in regard to this matter, I would simply refer it to Mr. J C. Morse, manager of the Union Grounds, where it will learn our wishes as to whether foot-ball or base-ball lines were requested. Farther on, the article reads: "Capt. Fletcher, without any cause whatever, demanded the removal of the referee," who, by the way, was not a Tufts man, but had prepared for college with many of the Tufts men, and was in sympathy with them. Did not Mr. Fletcher have any cause for removing the referee, when the ball was *plainly* passed forward twice, and a touch-down resulted? Please will the *Tuftonian* tell us where our rights come in? I will say, in conclusion, that we played as fair a game as any other team ever did with a Tufts team. *We* draw the line at any team playing Tufts an absolutely fair game. I should not wonder if Dartmouth agreed with us in what we say, after reading the *Tuftonian* accounts of Tufts games with that college.

Yours respectfully,

SOLOMON STURGES.

DECEMBER 23, 1884.

EDITOR OF THE TECH:

The class of '87, not feeling at all satisfied with the result of the tug-of-war contest of Saturday, Dec. 20, challenges the class of '86 to a tug-of-war contest to be held at any time or place wished by '86, the classes of '86 and '87 to combine to furnish the medals, and the result to decide the championship of the Institute held at present by '86.

ALEX. H. TWOMBLEY,
Capt. '87 Tug-of-war team.

Noticeable Articles.

The most noteworthy illustrated articles in the *Century* for January are that on "Recent Architecture in America," in which the illustrations are particularly good; that on the "National Museum at Washington"; and that on the "Operations of the Western Flotilla during the Rebellion," in which the illustrations are from original drawings by Rear-Admiral Walke.

The students of politics will find in the *Nineteenth Century* a paper on the "Recent Presidential Election," by W. H. Hurbert, formerly a New York editor; another in the *Fortnightly* from "An Englishman's Point of View," E. F. G. Law; and still another in the *North American Review* for January by Henry Watterson, entitled "The Reunited Union," which ends thus: "Many disappointments may follow the election of Mr. Cleveland, who, if he were ten times a statesman, could not fill the expectations of his supporters. This is, however, merely to say that party reveries seldom realize the fears of the defeated party, as party triumphs never attain the

hopes of the victor. Two errors the change of parties will undoubtedly expose, the one that the Republican party is alone qualified to govern; the other that the South cannot be trusted. The incidents of administration may be left to take care of themselves. The Union is itself again."

The subject of the "Federation of Great Britain and her Colonies" is treated in the *Nineteenth Century* for December by John Douglas, lately prime minister of Queensland, and in the *Contemporary* by H. U. Baker. Prof. Rudolf Gueist, the learned author of a very elaborate work on the British government, has a paper in the *Contemporary* on the "Government of Berlin," which may be of interest to readers who are concerned about the improvement of the government of Boston. There is no more pressing political question to-day than the best form of self-government for large municipalities.

In the *North American Review* there is an interesting paper by Frederic Harrison on "Froude's Carlyle," and another on "Socrates, Buddha and Christ," by W. L. Courtney. Students of economic questions will be interested in a paper on "American Labor Organizations," by Richard J. Hinton, and another on the "Increase of Wealth," by ths statistician Mulhall.

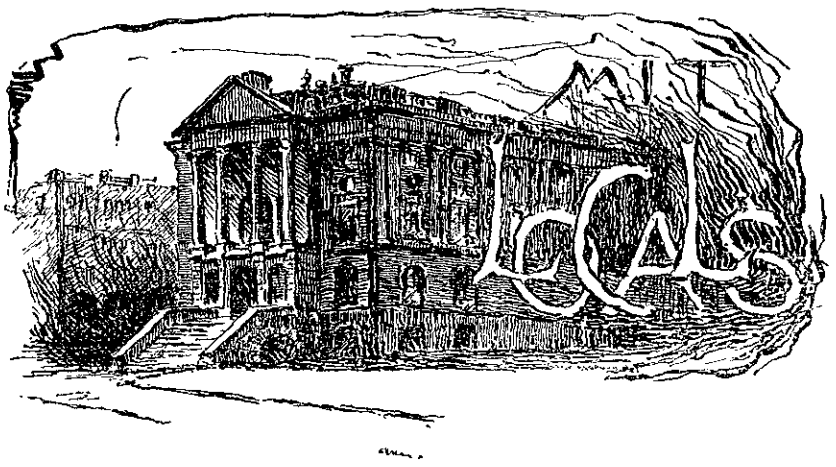
It is just a hundred years ago, the 12th of this month, since sturdy Dr. Johnson died, and, thanks to the immortal Boswell, the interest in his personality, if not in his writings, appears to be as great as ever. It seems almost impossible to say anything new about "Old Poz," but Mr. Gosse, who has just concluded a course of lectures before the Lowell Institute, has half a dozen very pleasant pages about him in the *Fortnightly*.

In the *Contemporary* that very able writer, Miss Frances Power Cobbe, endeavors to forecast the consequences of the world being given over to Agnosticism, though she has no fears of any such event ever happening. Miss Cobbe is an anti-supernaturalist, but a devout believer in religion. In the same magazine is a paper on "France and China" by Sir Rutherford Alcock, formerly British Minister to Japan. W. P. A.

The *Sanitary Engineer* in its issue of Dec. 4 begins a series of articles on Driven Wells, by Mr. J. C. Hoadley. Mr. Hoadley presented this paper at the Philadelphia meeting of the American Association this summer, and it is commended to the Civil Engineers for careful reading, either now or at some future time. The same subject is treated by the same author, but somewhat more popularly, in the Supplement to the Fifth Annual Report of the State Board of Health, Lunacy, and Charity. W. R. N.

Evolution of the Electric Railway, — Its commercial and Scientific Aspect. By Dr. Wellington Adams. — *Electrical Engineer*, Dec., 1884.

Dolbeare's Electro Static System of Telephony. By Prof. E. J. Houston. — *The Journal of the Franklin Institute*, Dec., 1884.



'85.

A Happy New Year.

Now is the time to subscribe.

The next term begins Tuesday, Feb. 3.

The chemical laboratories close on Jan. 13.

THE TECH'S New-Year's wish. May you all pass the semi-annuals successfully.

A number of '87 men indulged in a supper at the Quincy House on the 23d inst.

The Junior Architects are wrestling with their first problem.

Charles D. Sawin, '78, has been appointed by the governor to be the physician and surgeon at the State Prison.

Even with the additional two days, the Institute probably has a shorter Christmas vacation than any other institution in the conntry.

There are to be about fifty regular examinations at the semis. The new plan of giving every student a printed list of the examinations will be appreciated by all, as was the plan of printing the schedules on small cards.

The at first incomprehensible action of the Faculty in granting us two days' extra vacation at Christmas was easily understood when it was afterward found that an equal amount had been taken from our semi-annual vacation.

It is a difficult matter to suit seven hundred students; this year, after the petition for the two days after Christmas had been handed to the Faculty, another was received, begging that the laboratories might be opened on those days.

A large party of the third and fourth year miners visited the South Boston Iron Foundry on Tuesday, Dec. 30, upon invitation from Capt. Lyle, to witness the casting of another of the large guns for the United States government.

The Junior Architects recently visited the Quincy stone quarries and the South Boston iron works.

Mr. W. D. Livermore, '87, recently met with a severe accident in the analytical laboratory. While making a determination of cinnabar, the ignition tube exploded, the pieces of glass striking him in the eyes, but, although blinding him temporarily, fortunately will not result in permanent injury.

The reading-room, which the Freshmen appear to have selected for an assembly room, fails of its legitimate purpose when thus used. Loud conversation and boisterous laughing are a serious inconvenience for those who wish to read or study, and while much is excusable in Freshmen, there is a limit which even they should respect.

The completion of the coat-room in the hall, and the attendant's familiarity with students' faces, have made the checking of articles and delivery of mail much more rapid; the safety of the plan is apparent. A great improvement, however, would be some arrangement for the formation of a line by those who, especially at twelve o'clock, crowd up to the window from all directions.

The Co-operative Society at the University of Michigan, although only one month old, has already proved itself a successful venture. — *Yale News.* We have several times remarked upon the need of a co-operative society at the Institute, such as those at Harvard and Ann Arbor. It only needs a few energetic spirits to start the thing here, and after that we have no doubt of its success.

The first concert of the Glee Club, assisted by the Orchestra, is to be held at Chickering Hall, on Thursday evening, January 8. Both organizations have been rehearsing for several weeks on what promises to be a very attractive programme, having besides glees and the always acceptable college songs, several pieces which will be presented for the first time. No tickets will be sold at the hall, but associate members can purchase extra tickets of Mr. T. M. Fox, Arch.

The College World.

In General. — The University of Michigan has one hundred and eighty-eight Freshmen. Magill University has one hundred and ninety-five. — The endowments of Girard, Columbia and Harvard Colleges are respectively $10,138,000, $6,250,000 and $4,500,000. — *News.* Princeton will have nine of the present foot-ball eleven back next season. DeCamp, the end rush, has been chosen captain for next year. — Only fifty-nine men in the senior class, Columbia School of Arts.

There is a very large number of candidates for pitcher of the Yale University Nine and several for each of the other positions. Of the sixty-eight men in the Law School, thirty-five are college graduates, twenty-six being graduates of Yale, and nine of other colleges.

Brown hopes to enter a crew next summer in the intercollegiate regatta.

The attendance at various German universities during the summer semester of this year was: Vienna, 4,706; Berlin, 4,145; Leipzig, 3,230; Munich, 2,511; Prague, 2,000; Halle, 1,716; Tübingen, 1,500; Breslau, 1,481; Bonn, 1,241; Würzburg, 1,232; Göttingen, 1,000; Heidelberg, 989; Konigsberg, 925; Freiburg, 924; Jena, 636. — *Cornell Era.*

The following is the number of students this year in the principal colleges in the country, as far as we have been able to learn: —

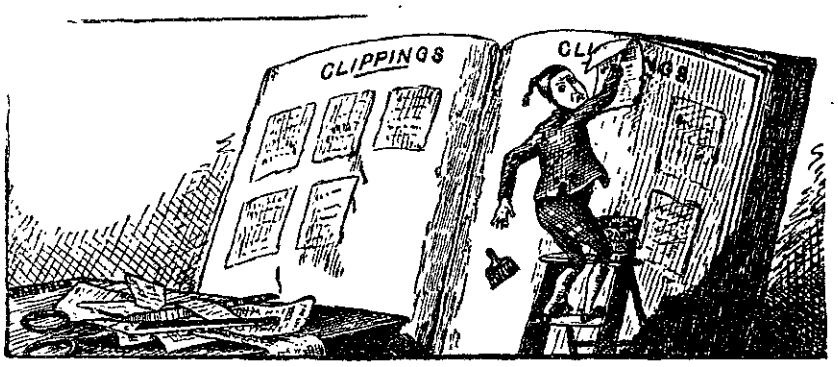
Harvard	1,586
Columbia	1,523
Oberlin	1,314
University of Michigan	1,271
Yale	1,086
Massachusetts Institute of Technology	706
Cornell	539
Princeton	505
Dartmouth	402
University of Vermont	346
Amherst	334
Lehigh	300
Johns Hopkins	273
Williams	253
Brown	248

The *Argo, Acta Columbiana, Yale Record,* and *Columbia Spectator* published holiday numbers. All were excellent, especially the *Spectator*, which, with its drawings by the McVickers, reminded one of the old times.

The holiday number of *Outing* is an unusually entertaining number of this bright magazine. A handsome engraving, "The Wheelman's Vision," forms the frontispiece. Mr. John Boyle O'Reilly writes enthusiastically of his summer's voyage "Down the Susquehanna in a Canoe," in the course of which he discovered a wonderful singing beach. It is well worth one's time to spend a few hours in reading *Outing*.

The *Century* for January contains many interesting articles, but is lacking in short stories. Mrs. Van Rensselaer contributes a fourth paper — this time on churches — on "Recent Architecture in America," in which she speaks of Trinity Church, Boston, as "the most beautiful structure that yet stands on our side of the ocean." Mr. Howells replies, in an open letter, to the charges of anachronism in his new novel, asserting in its defence that, in order to give the effect of contemporaneousness, "the general truth is sometimes better than the specific fact." The other open letters are upon timely subjects, and the Bric-a-Brac is as bright as usual.

The *Tuftonian* criticises the "rather vague account," which appeared in THE TECH, of the last Tufts *vs.* Techs foot-ball game. The "rather vague account" was written purposely to save us the unpleasant necessity of chronicling the ungentlemanly conduct, both of certain members of the Tufts team, and those who came over from Tufts to witness the game. We omitted to state the score, because, in the mind of any fair and unbiassed person, two touch-downs in the beginning of the game were scored by the all but open assistance of the referee. In the statement in regard to the base-ball lines upon the grounds, the *Tuftonian* makes an unfounded and ungentlemanly insinuation, which needs no refutation on account of its absurdity.



Repartee.

They were lunching one day,
In a handsome *café*,
And she happened to say,
As she noticed the way
That he and ice-cream were in unity,
"Can you eat ice-cream with impunity?"
And he made a reply,
With a wink of the eye,
"No, but I can with a spoon."

But her triumph came soon;
As they left the saloon,
He gave her a good opportunity:
"And now, Bessie dear,
As the weather is clear,
Can you take a walk with impunity?"
Her smile was as bright as the moon,
And deliciously sly,
Came the mocking reply,
"No, but I can with a *spoon*."

Life.

First Imbiber (*manipulating straw*) — "I can always tell good stuff by the way it stirs."

Second ditto (*incredulously*). — "Ah, indeed!"

First I. — "Yes, I can, — by the way it stirs my blood."

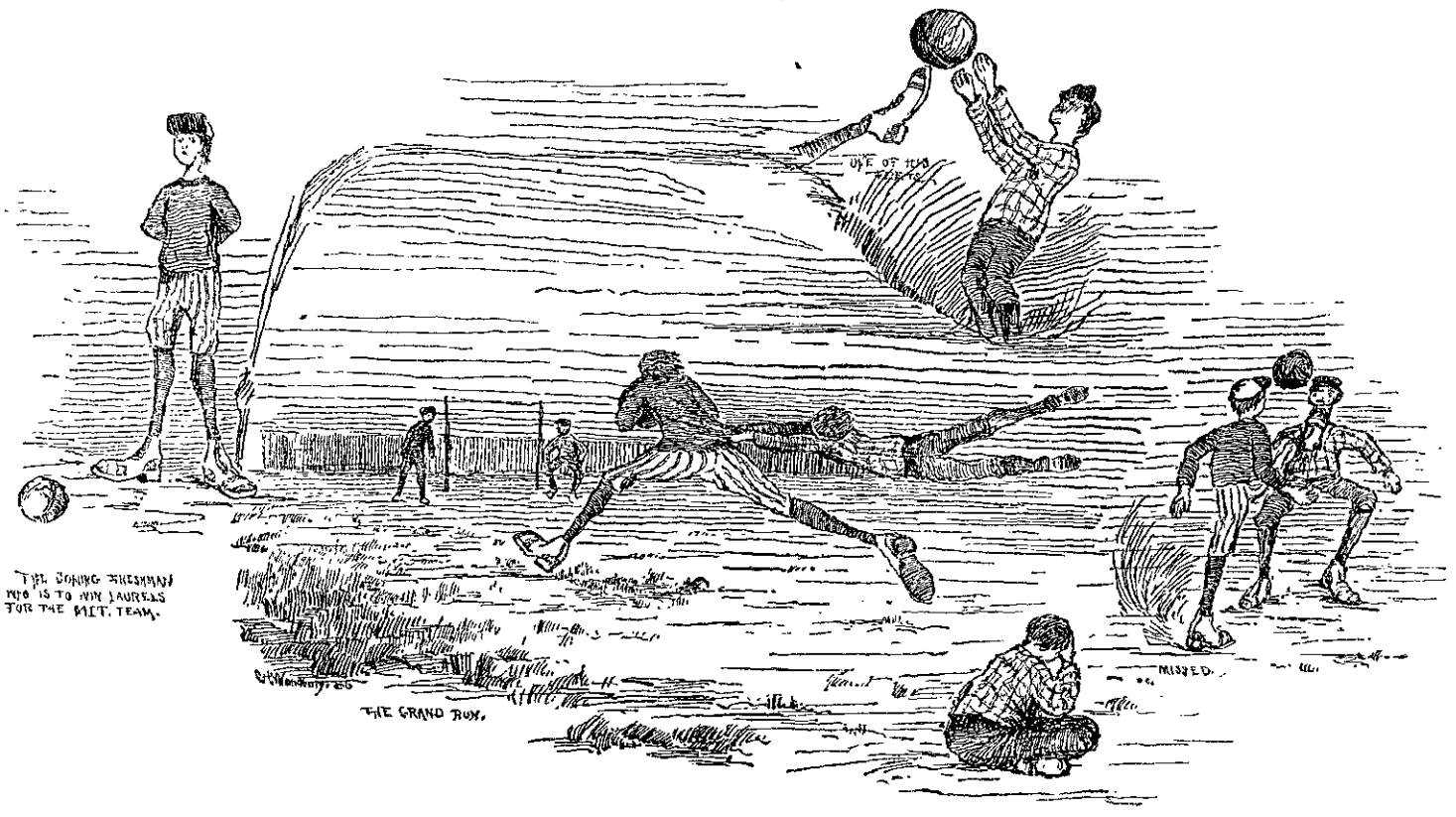
FASHION'S FANCIES.

Trousers will be worn this winter.

Linen dusters at evening parties are not *de rigeur*.

Socks with openwork heels and toes will be worn by bachelors, as heretofore. — *Life.*

Indignant Tourist to the Hotel Manager, who has just presented his Bill. — "See here! You have charged me fifty centimes for writing-paper, and you know very well that you have not furnished me a scrap!" "But, monsieur, it is for the paper on which your bill is made out." — *French paper.*



IN MISS KATE L.'S BIRTHDAY BOOK.

From the CENTURY "Bric-a-Brac."

We parted, and mine eyes were wet;
Thine, too, I think were brimming.
With tears or brine? Love, I forget.
Could it be both? I think not. Yet,
You know we were in swimming.

Charles Henry Webb.

Scene in horse car. — Enter two young ladies.

First Y. L. (*dolefully*). — "All the seats seem to be occupied."

Second Y. L. (*sarcastically*). — "And all the occupants *seem* to be very much *pre*occupied."

"What is the meaning of that red line above the fourth story of your house?" asked a stranger of a man near Pittsburg. "That is a water mark. That mark shows how high the water was during the great overflow about a year ago." "Impossible! If the water had been that high the whole town would have been swept away." "The water never was that high. It only came up to the first-story window, but the cursed boys rubbed it out three or four times, so I put it up there where they can't get at it. It takes a smart man to circumvent those boys." — *Texas Siftings.*

LITERAL.

Miss Angelica. — "I suppose you have been going out a great deal lately, Mr. McFamish?"

Mr. McF. — "No. I have only been to one dinner in two weeks."

Miss A. — "Dear me! You must be hungry!" — *Century.*

There is a story of a man who was tried for stealing a pair of trousers. He was ably defended, and the jury brought in a verdict of not guilty. The prisoner's counsel collected his fee, and then said to the vindicated statesman: —

"Well, get out; you're free."

"I'll wait till *he* goes," returned the victim of slander, pointing to the plaintiff; "I don't want him to see me."

"Why not?"

"'Cause I've got them breeches on." — *Puck.*

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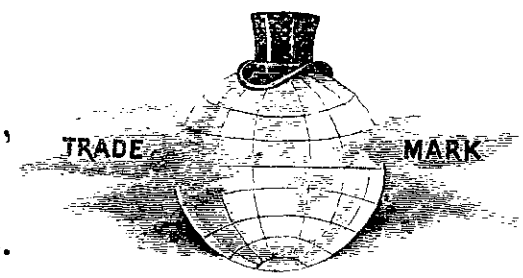

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THE annual season of Italian Opera opens at the Boston Theatre this week, and will continue two weeks. With such a strong company of singers it must succeed. Adelina Patti appears twice this week. This is her last engagement, as she will retire at the end of this season, after having sung twenty-five years in opera. The other prominent members of the company are Mme. Fursch-Madi, Mme. Scalchi, Sig. Giannini and Mlle. Nevada. The latter is an American, her home being in the far West. She has scored great successes in Europe.

Those students fond of light opera will have an opportunity to hear "The Beggar Student" at the Bijou Theatre, during the present week. It was first presented near the end of last term and was very favorably received. With the cast given a most excellent production is assured.

It will be succeeded by "Prince Mathusalem," which is now in active preparation.

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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.

Attached to the Institute are also two special schools: viz., the "School of Mechanic Arts," and the "Lowell School of Industrial Design." The former gives a training in the use of tools, together with elementary mathematics and drawing. English, French, and geography are also taught in this school. The fees for tuition are $150 a year. The Lowell School teaches the making of designs for prints, carpets, wall-papers, laces, ginghams, and other woven goods. A weaving department with a variety of looms is connected with this school. No charge for instruction is made.

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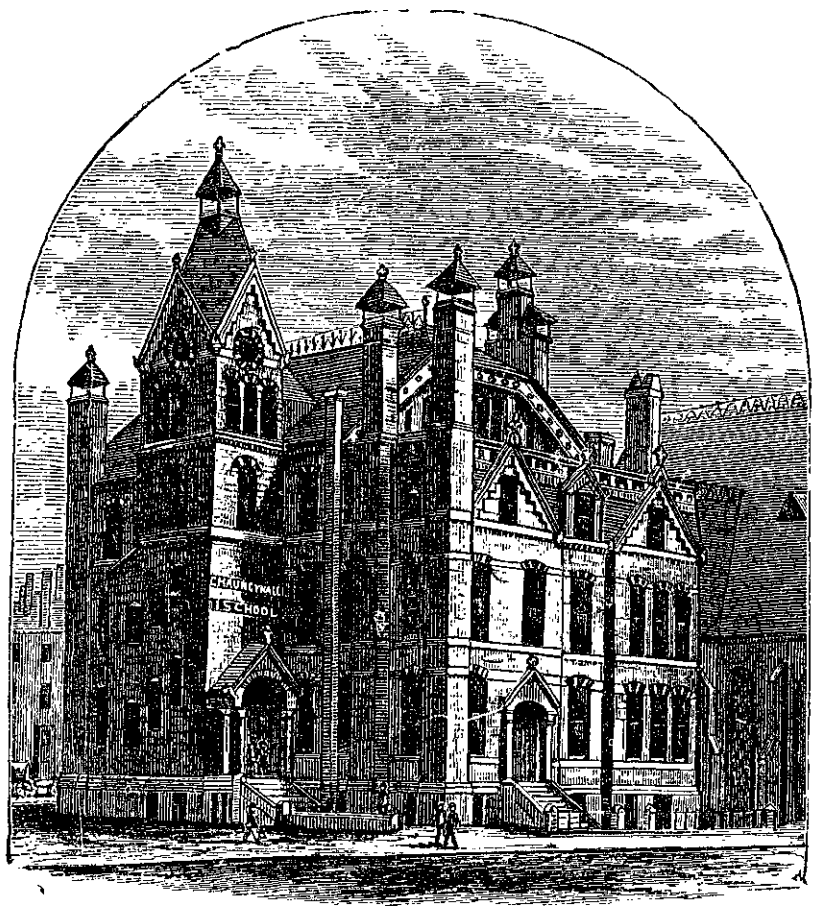

The last catalogue of the Institute (page 59) lays due stress on the importance of students' entering fully prepared. **Chauncy-Hall School** has long fitted pupils for the Institute, and for the last ten years has made thorough preparation a specialty. For the standing of its candidates, **reference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

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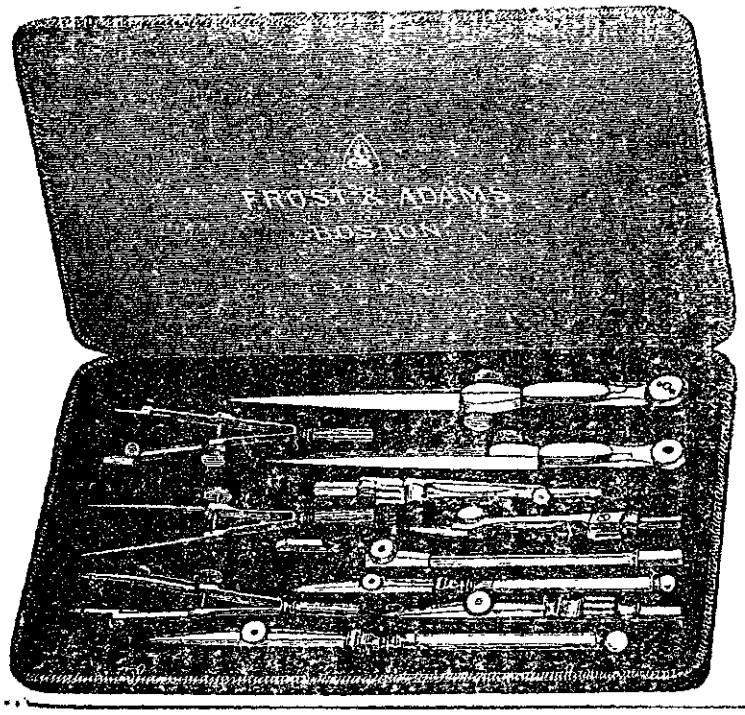

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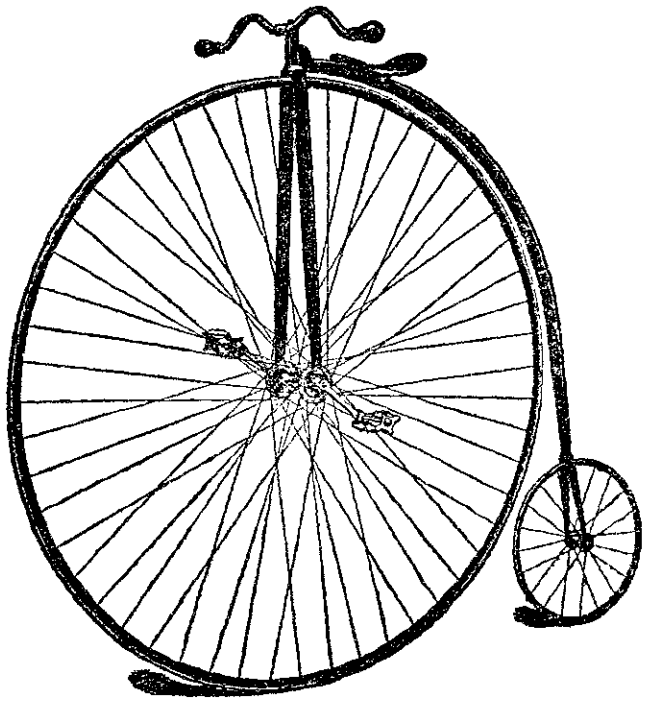

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