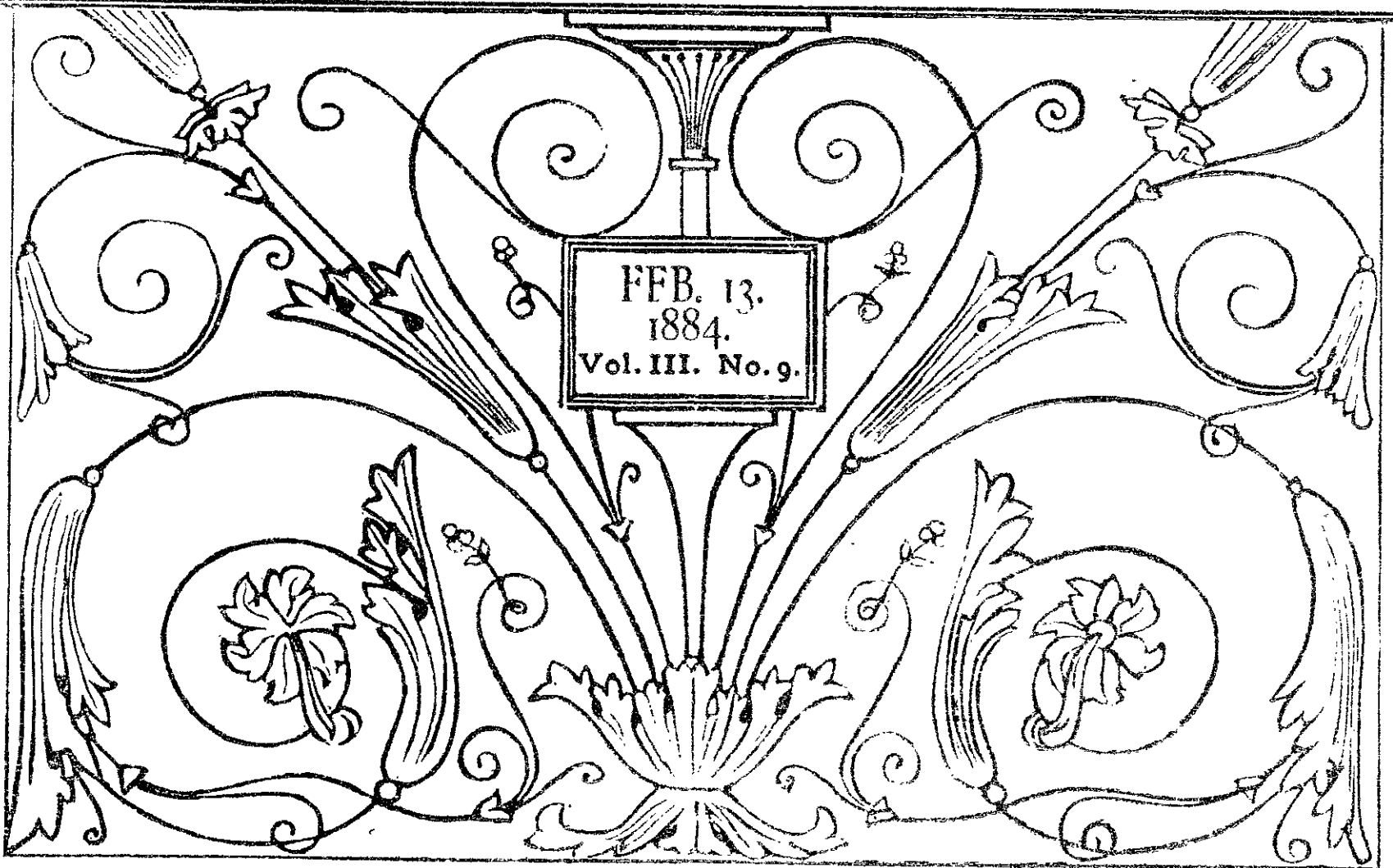
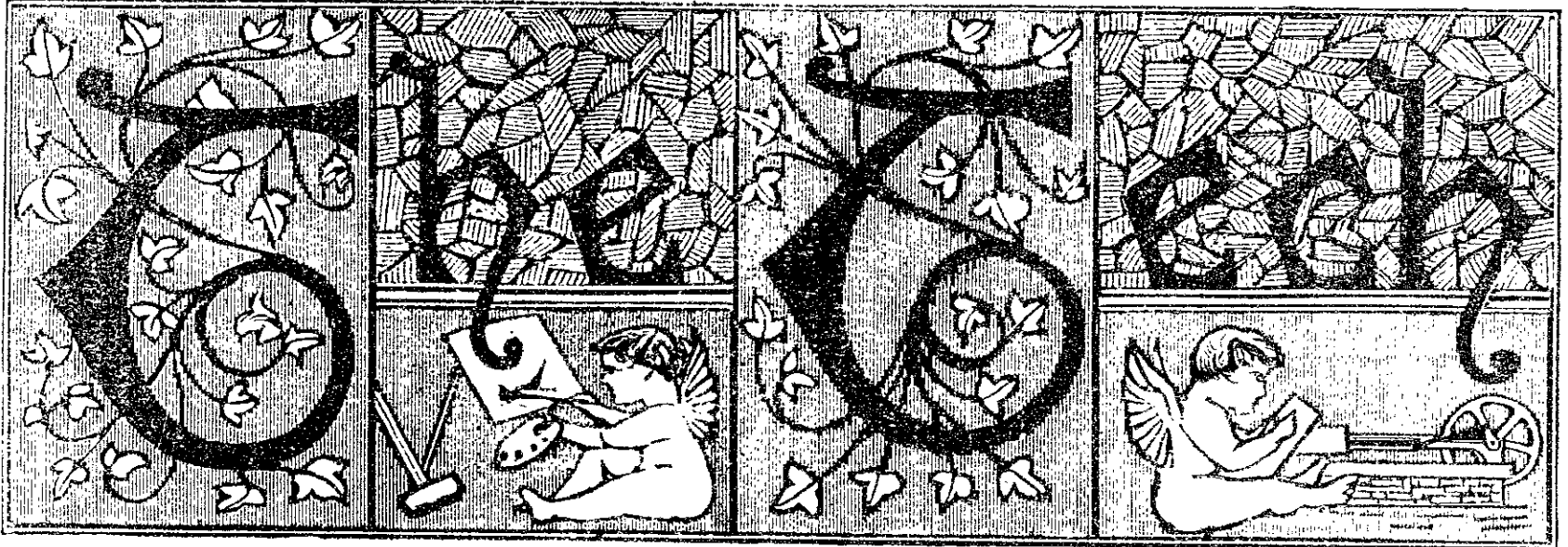
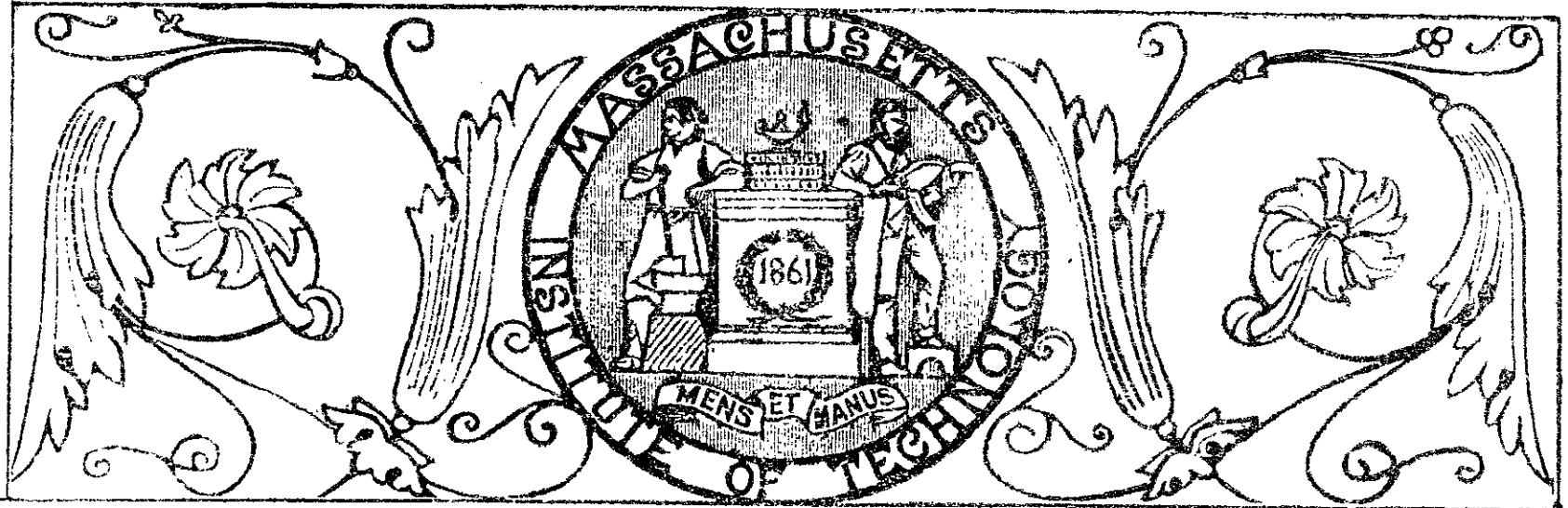




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The Tech.

VOL. III.

BOSTON, FEB. 13, 1884.

No. 9.

THE TECH.

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

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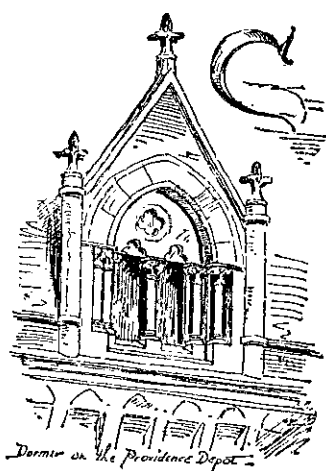
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Subscription, \$2.00 per year in advance. Single copies, 15 cents each.

ALFRED MUDGE & SON, PRINTERS, 24 FRANKLIN STREET, BOSTON.



CONCEIVE of a perfect human being, and reflect how near man can approximate to the ideal. Such was Wendell Phillips, whose loss the whole country mourns to-day. He was a man who was known to us all alike, and the scientific world mourns with the rest the death

of the great philanthropist. His merits have been recognized the world over. We feel our incompetence to do justice to them, and to speak of some few defects so closely allied to his merits as to be almost inseparable from them seems beyond us. Our young generation, which remembers not the stirring events of antislavery days, mourns his loss with his contemporaries and compatriots.

Is there one among us who has not read of the inexperienced youth, who at the meeting held in Faneuil Hall, on Dec. 8, 1837 (it was the beginning of a new epoch in our history), to protest against the murder of the Rev. Elijah P.

Lovejoy, at Alton, Ill., for giving expression to some antislavery principles, when few of any social position or standing in the community espoused the cause of the slave, who was bold enough and confident enough in the righteousness of his cause to confront the attorney-general of the State, surrounded by a host of supporters and by his eloquence win over a large proportion of the scoffers to his side.

This was the first time Mr Phillips addressed the public; and it is probable that he was never more eloquent than upon this occasion, when the words flowed straight from the heart, having never thought of speaking until he jumped upon the platform to defend the rights of man. How the present generation will remember him as the patriot of their time, like Hancock, Samuel Adams, and Paul Revere, of the past!

Socially Mr. Phillips was, unlike most great men, affable to those whose good fortune it was to know him. Nobody was too humble to approach him without fear of rebuff. He was a thorough gentleman. It is related that an English visitor pointed out to Mr. George Ticknor two gentlemen walking down Park Street, with the remark, "They are the only men I have seen in your country that look like gentlemen." The observation was significant.

Mr. Phillips' home side of his life was sweet to look upon, his devotion to his invalid wife almost heroic. Never has there been known such unparalleled self-sacrifice to the interests of another.

His work is over, and possibly he will not be missed now; but the world will never forget the man "who dared to be a traitor to Union when the Union was traitor to right."

AFTER a much longer delay than usual, the catalogue of the Institute for 1883-1884 suddenly appeared, shortly after the mid-year

recess, to the great astonishment of all. The book presents a radical change from its predecessors, containing some forty additional pages, and including what was formerly the supplement.

A perusal of the catalogue will show that the past year has been an important one in the history of the Institute. During this time two new buildings have been completed, — one for the departments of chemistry, physics, and architecture, and the second for the workshops and the School of Mechanic Arts. These buildings have relieved the overcrowded condition of Rogers Building, thus giving space for the much-needed expansion of the engineering departments, the whole basement now being occupied by the mining and mechanical laboratories. The old workshop on Boylston Street still continues to be an eyesore to all, but we understand that this is soon to be removed.

While this increase of facilities has been going on the authorities have not been behind in increasing the number of instructors, so that no complaint can this year be made of insufficient attention from instructors. At present there is a corps of fifty professors and instructors, and two lecturers, in the School of Industrial Science; eleven in the School of Mechanic Arts, and three in the School of Design, making a total, after deducting names counted twice, of sixty-two. Last year in the three schools there were but forty-three. The number of the Faculty has been increased from seventeen to twenty-four.

The number of students is as follows:—

	1884	1883
School of Industrial Science....	443	368
School of Mechanic Arts ..	56	57
School of Design.....	62	91
	—	—
	561	516

The small increase is due to the number of students in the School of Design having been limited.

Not one of the least important changes of the year is that of the head of the department of Mechanical Engineering, which promises to

soon raise that department to an equal degree of excellence with the other engineering departments.

The proper training of a student's body is beginning to have the attention paid to it which it deserves; and college faculties are endeavoring to secure its accomplishment by all the means at their disposal. Gymnasium practice is being made compulsory at some of our colleges, and this is everywhere working the best results. At Amherst the average health of the student is shown to be in the ratio of his attendance, the Senior being healthier than the Junior, the Junior than the Sophomore, and so on. This result is directly traceable to their system of compulsory exercise in the gymnasium. Cornell has also adopted this plan, and an effort is being made among the two lower classes at Princeton to secure it.

At the Institute, however, there is hardly any interest taken in this direction. The various athletic associations endeavor to supply this as best they may, but show very poor results. For a week or two before each meeting, there are a number of men in practice; but they are not the ones who need it most, and even they do not receive that benefit which would be secured by a steady, moderate amount of practice, continued during the whole year. If we could have an instructor who should point out to each man in what points he was physically deficient, and if every one was obliged to spend a small portion of his time in the gymnasium, as much as he is in his studies, we should have a very marked improvement in the health and physique of the school.

Dr. Sargent's results at Bowdoin show what can be done with a small amount of time judiciously spent in light exercise. If we could have some such system at the Institute, there would not be that played-out feeling which so many of us experience at the end of each year, and every one of us would feel as he approached his graduation day that he was fitted physically as well as mentally to enter upon his appointed life-work.

A Visit to Holyoke.

I.

ONE of the busiest though by no means one of the most picturesque of the larger towns along the banks of the Connecticut is this thriving little city, the centre of the paper industry in the United States. Crowded together along the river, or upon the numerous canals which render its water-power more available, are the mills of the thirty-five or more firms and companies engaged in the manufacture of paper of almost every sort and quality. It was early one August morning that the writer started out from Amherst, distant some twelve miles, to learn the mysteries of the process by means of which one's cast-off garments become agents in the transmission of ideas.

The antique stage with its four horses rolled, or, to drop the conventional term and speak correctly, groaned and rattled away from the trim little post-office; the two young girls upon the back seat arranged their bags and bundles, remarking *sotto voce* as they did so, that it was going to be a beautiful morning to "watch" the scenery, and we were off.

The road soon led us outside the town, where we caught the full beauty of the Pelham Hills, among which Amherst nestles, and a little later we were riding through broad fields planted with tobacco, which is grown in considerable quantity about there. We drove into Hadley shortly after, where the stage delivered an attenuated mail-bag; and one could but be struck by the dreary quiet of the place, beside which Sleepy Hollow would become a bustling metropolis. It was here that the gray-haired regicide appeared so suddenly from his retreat in old colonial days, and saved the settlement from its Indian invaders.

The town is about half-way to Northampton, the seat of Smith College, and dear to the hearts of Amherst boys, who are rarely so poor as to be without one or two feminine "cousins" there in term time.

Here I took the train, and after a few minutes' ride along the river found myself at the end of

my journey, and starting out under the guidance of a friend, who was provided with the necessary passes. Having presented our credentials at one of the largest mills, we a little later entered the rag-room in company with a kindly foreman. It was several seconds before our eyes became accustomed to the cloud of dust and lint which filled the room; but our nostrils were instantly aware of a most unsavory odor which seemed to exhale from everything. Long tables with transverse partitions went around the room, and at short distances broken scythes were firmly fastened perpendicularly to the table, and with their edges toward the wall. Before each scythe stood a woman, surrounded by numerous baskets, who dexterously removed all hooks and eyes, buttons and similar articles, not to speak of bricks, corsets, and old boots, from the rags as they were brought to her from the bales. She then sorts the rags according to the system adopted in the mill she may be in, and after cutting them in small pieces places them in their proper baskets. They are then taken up stairs, and put into one end of large cylindrical dusters, which are placed horizontally. The brush inside, by an application of the principle of Archimedes' screw, moves the rags continually forward, finally discharging them at the farther end, comparatively free from dust, although anything but clean. From here we followed them to the rotary boilers, the foreman remarking as we passed a pile of corsets that they had sold the day before sixteen tons of those hollow mockeries, the accumulation of less than three months.

We found the boilers to be long cylindrical affairs, placed horizontally, so that they could revolve upon their longer axis. They were charged through a man-hole with about a ton of rags apiece, and a quantity of lime and water, which varied somewhat with the condition of the rags. In some mills soda ash is also added, and is, of course, converted by the lime into caustic soda. The man-hole is then sealed up, and a low pressure of steam admitted, while the boiler slowly revolves for about twelve hours. The rags, which to all appearances are now far dirtier than

ever, are then removed and carried to large oval tubs, which, with their attachments, are called rag engines. On one side of the partial partition, which coincides with the major axis of the oval, and makes a continuous channel, is a veritable paddle-box, within which revolves a system of knives. On the floor of the engine, and nearly touching the first knives, is an iron bed-plate, in which are fastened other knives. Water is all the time running into the engine on one side through a flannel filter, the surplus being removed by a cylindrical drainer of wire gauze on the other side. The motion of the knives keeps the mass of rags and water moving all the time by drawing the rags in at one side of the paddle-box, and throwing them out at the other. The bleaching of the rags is now effected by the addition of the necessary quantity of a solution of bleaching powder, which quantity is of course dependent on the quality of the rags. The chlorine is slowly liberated by the addition of sulphuric acid in a highly dilute condition; the whole process of bleaching in the engine occupying about twelve hours, at the end of which time the rags are reduced to "half-stuff." Any undesirable quantity of free chlorine is then neutralized by a solution of sodium thiosulphate or *antichlor*, as it is known to paper makers, and the half-stuff is transferred through a trap in the floor of the engine to the drainers, which are small rooms having a perforated bottom, and directly under the engine. There it remains for several days, the chlorine acting slowly on the stock and the water draining out.

Leaving the drainers we returned to the engine room, where the half-stuff was undergoing further transformations to fit it for the paper machine. The heating engines, in which the half-stuff is reduced until it shows the proper fibre and is free from lumps, are similar to the rag engines just described, except that they are without the drainer of wire gauze. They are generally filled to nearly their utmost capacity with water and the half-stuff, mixed for the cheaper papers with a large percentage of wood pulp, and after the whole has become thoroughly

mixed the engine-size is added. This is merely a resin soap, made by boiling ordinary resin with a solution of soda ash. The further addition of alum after the heating action of the engine has continued for some time, precipitates the sylvates and pinnates of aluminum together with the aluminum salts of the other acids contained in the resin in and upon the fibres of the pulp, destroying their capillary action, and so rendering them when in the form of paper more or less impervious to moisture, while preventing to a large extent the spreading of the ink. The quantity of engine-size used varies greatly in the different mills, and with the sort of paper to be made. A large amount is objectionable, however, as it causes frothing when the pulp flows on to the paper machine. The coloring matter of the paper, if any is to be used, is also added to the material in the engine, and is generally some mineral substance, as ultramarine, chrome yellow, or red lead, although the aniline dyes are used to some extent. A small quantity of ultramarine is generally added, even to white paper, since a blue white is more agreeable than one containing a large proportion of yellow.

The proper condition of the pulp is determined by the foreman by shaking a small quantity up in a wash basin with a considerable amount of water, and then slowly pouring the whole into another basin. The fibre can thus be readily examined, while any lumps which may be present are easily seen. When the whole is ready for the machine the pulp is transferred to great circular vats, where it is churned constantly to keep it of uniform consistency. It is then pumped up as fast as needed into the machine room, where it undergoes the final transformations, which lack of space compels us to reserve for a second article.

A. D. L.

The Faculty have voted that when five or more students in a class have lectures following each other consecutively, they shall close five minutes before the hour, in order to give students sufficient time to pass from room to room or from building to building.

Chased by a —?

WE had been sitting for half an hour or so in the dark, over our pipes and the dying embers, telling stories desultorily, now silent, again laughing quietly over some dry remark, when we were broken in upon by Jamie Darford and his dog Nick. For once the two were coaxed into quietness, and we persuaded Jamie to tell us a story about his experience in the back-woods the winter before.

"Well, fellows," said he, after we had all exhausted our persuasive powers, "if you care about hearing it, I'll tell you an adventure Nick and I had one night, though I don't think I ever told it before. Nick, I preface, is the hero of it; indeed, had it not been for him, I should hardly have been telling you the story now.

"It had been tremendously cold weather for two or three days, and coming as it did immediately after a bad thaw, it caused the ice on the river that was to float our logs down in the spring to be like glass. I had been invited to a merry-making in C——, a considerable logging village about fifteen miles below us, and determined to skate down after supper. I thought I could easily do the distance in an hour each way.

"I said nothing in particular to the men about where I was going; but I wrapped up warm, put my skates under my arm, took care to shut Nick into the hut, and started.

"It was a glorious night; the moon was just approaching the full, and her light was brilliantly reflected from the frozen-crusts of snow. The air had just the tingle in it to make the blood dance. The ice was perfect in its absolutely smooth polished surface. A fine night for a skate, thought I, as I shot out into mid-stream, if one only had some company.

"I looked at my watch. Twenty-five minutes of seven, — time enough. The moon was not so high yet but that it cast many a deep shadow of the fir-trees across the rather narrow river; but my way lay mostly in the light, as there were many windings and turns in the stream. As I sped on, my thoughts went back to the stories the men had just been telling of the Northern

Canadian woods; then they turned to my home, and I wondered what my friends were doing on this magnificent night, — reading and enjoying themselves quietly, probably, in the dim light of the sitting-room. Harry would be out sliding, I was sure; but I could see my mother plainly, folding her hands so peacefully upon her knitting, a far-off look in her calm eyes. Was it of me she was thinking? And there was baby Tom, ready to go to bed, and say good night to grandma; and Fanny was reading her everlasting novel. Why would she never —

"Bother! my skate was loose; I must stop and strap it tighter. I slackened my speed, and knelt upon the ice a moment. Hark! Did I not hear a curious cracking in the woods up back of me? I listened: there it was again. It might have been the ice or the trees, at first; but now, Hark! Hark! In that moment every slightest sound would have been as loud on my ear as a thunderbolt. I could now distinguish even the slipping, scratching sound of the nails of some animal upon the snow-crust, back a little way from the ice. I felt instinctively at my pockets. Fool! Carelessly I had left my pistols behind, and had nothing with which to defend myself, not even a stout club; the stick I carried was a light, trimmed switch, which was worse than useless.

"I listened no longer, but rose to my feet, and as I started on at almost breakneck speed, I glanced over my shoulder. My fears were realized. Behind me, in the brushwood that skirted the stream, I could distinguish a dark, swift-moving animal. I was in for it, then; and you may believe I did my level best.

"On, on, on, faster, faster, faster than I had ever gone before. I was breathless, yet I could see no signs of any clearing. I felt as if I had skated hours, but was no nearer my destination than before. Did ever stream have so many windings? Scarcely did I get a good headway before a sharp turn compelled me to slacken my speed. But now here was a good mile's stretch, comparatively straight. From time to time for some distance I had heard the animal scraping round the turnings of the

stream, sliding straight to the bank before it could change its direction. I had thought I would have the advantage in a straight course, but I was wrong. As we got well upon the mile stretch, I grew conscious that I was being gained upon. I looked back for an instant, and saw a dark form a hundred yards behind me, but as it was in dark shadow, I could not distinguish what it was; from its size, however, I thought it might be a small lion.

"On, on again we sped till we came again to the crooked windings. Here, I had learned, lay my advantage; for though I lost time in rounding the turns, my pursuer lost more, because he was obliged to start anew from the edge every time.

"At last, to make a long story short, I saw a light in the village of C——. Welcome sight! Never had a lighted window seemed so warm and cheering. I had in the last five minutes or so gained quite a respectable distance on my pursuer, and was looking with anxious eyes for the landing-place, when, as luck would have it, I tripped over a snag in the ice, and went flat upon my face. In that moment I despaired; the next, as I was in the act of rising, I felt the creature pounce upon me. Imagine, if you can my sensations."

"Well," cried we all in a single breath, "what came next? Where does Nick come in?"

"Just at this point," returned Jamie bending over, and patting the animal's head, "don't you suppose I know when Nick jumps on my back?"

The Life-Saving Service.

AT a meeting of the Society of Arts, Jan. 24, an interesting and instructive address on the above subject was given by Capt. D. A. Lyle, '84, of which the following is a brief synopsis:—

In reviewing the history of the work, the speaker stated that the first organized attempt at saving life imperilled by wreckage was inaugurated by the Massachusetts Humane Society — which still does a useful work — in 1782.

Not till 1848, however, was the true inception of the United States service. The first year,

but \$10,000 was appropriated, and this was expended upon the New Jersey coast. In spite of occasional reverses, inadequate appropriations, etc., the service has steadily advanced in extent and efficiency since that date. In 1878, after several years of struggle and neglect, two great wrecks, involving large loss of life and property, resulted in a considerable extension of the service, and its establishment on the present basis.

Its present status (Report of June 30, 1882) may be summarized as follows:—Whole number of stations, 189; on the main Atlantic coast, 139 (including 15 in Massachusetts); on the Gulf coast, 5; on the Lakes, 38; on the Pacific, 7. The personnel comprises a general, and an assistant general, superintendent, both civilians; various inspectors — of the United States Revenue Marine; twelve district superintendents, civilian experts, and one keeper and six surfmen for each station. The officers are now able to secure the best surfmen for the work, in spite of its arduous and dangerous character.

The efficiency of the service may be judged from the following statistics for the year ending June 30, 1882:—Disasters 345, property involved \$4,706,000.00, property saved \$7,106,000.00, persons involved 2,398, lost 12, total expense \$594,889.74.

After giving thus the history of the organization, Capt. Lyle spoke of its present methods, illustrating by photographs and models. Although we cannot give details, yet a brief outline may be interesting. During the more inclement months, dangerous extents of coast are constantly patrolled to insure speedy discovery of wrecks. In case life is imperilled, the first step is to establish a connection with the wreck by means of a line. This is effected by firing over the vessel a peculiar, oblong projectile, to which is attached the end of a long, light line, from a small mortar, the Lyle gun. By means of this the sailors on board draw out a cable which they secure as high as possible to the mast. They are then brought ashore one at a time by the breeches-buoy, or if large numbers are on board by the life-car, either of these trav-

elling suspended from the connecting cable. It should be remembered, however, that the life-boat is first resorted to unless the violence of the sea or the distance from the station forbids, and in any case if the wreck lies very far from shore. When, as is usually the case, the wreck lies within four hundred yards of the shore, the former method is quite practicable. The projectiles have been fired upwards of six hundred yards, but the limit is soon reached, as it is hard to combine in the line used the necessary lightness, non-resistance, and strength. Any material in the least degree rigid, as fine wire, is quite inapplicable. The mortar used is of composition metal, weighing with all appurtenances one hundred and eighty-five pounds, and takes its name from Capt. Lyle, its inventor. Its construction and that of the projectile, even the arrangement of the line in loops or fakes, all embody the results of careful study and experiment. The life boats used are much lighter and less expensive than the English, and are more easily transported wherever needed.

At the conclusion of the address, to which so brief a summary does scant justice, a few items of interest were added by Capt. Sparrow, the superintendent of this district.

The Tech's Predecessor.

AN old copy of *The Spectrum* recently fell into our hands, and as, doubtless, there are many at the Institute who do not know that THE TECH had a predecessor, some remarks and extracts from the above-mentioned paper may be interesting.

To take THE TECH as a standard of comparison, the first radical difference between the papers appears in the fact that while our predecessor appropriated, at least in name, the whole of the *Spectrum*, THE TECH is content, so far as outward appearances go, with something approaching the red and violet in the two ends thereof.

According to its prospectus, *The Spectrum* was an eight-page paper published every alternate week of the term by the students of the

Institute. The price was one dollar for the term, and single copies were sold at fifteen cents each. The issue in question bears date Feb 28, 1874, when the paper was about to commence its third volume. Its table of contents shows the matter to be of a much more serious character than THE TECH would dare present to its readers. An editorial, however, sets forth the difficulty of editing the paper so forcibly, and it applies so well to the condition of THE TECH to-day that we copy it in part, as follows:—

“Our trouble, heretofore, has been the lack of interest and spirit that has been shown by the majority of students in regard to contributions. How, then, shall we meet the difficulty? Evidently the only way to get their co-operation is to publish a paper in which there shall be matters of interest to every individual. Another difficulty that has been in the way of the prosperity of *The Spectrum* is the erroneous idea that it is, and was originally intended to be, a class organ, edited and contributed to only by men in that class. We have sought to overcome this difficulty by making a change in the editorial board. This body formerly consisted of men belonging to one class; it now represents two, the Sophomore and Junior. These are the changes which have been thought advisable, and every student ought now to feel that *The Spectrum* is a thing in which he has a personal interest, an interest which it is his duty to show by some substantial work in its behalf. We want especially to impress upon the minds of fellow students that *The Spectrum* is and shall be the medium through which their ideas may be freely expressed on subjects of interest, and that their failure to take advantage of the opportunity will lead us to feel that they are not alive to their own interests.”

Just how long *The Spectrum* lived we are unable to say, but we can draw a lesson from its early decease and urge all our readers to act upon the above suggestions if they would make THE TECH a permanent success.

Recollection is the only paradise from which we cannot be turned out.

Notes of a Trip to Florida.

PALATKA, FLA., January, 1884.

MY friend B. and I left Washington the other day by the so-called "Fast Mail Train" for Jacksonville, Fla. In reality, however, the train could not even be called an "accommodation train," since it was delayed first by hot boxes on the cars, and then by those on the engine, while the growling passengers whiled away the time by gathering palmetto leaves or looking into the negro cabins. At Charleston the first change of time—from the Eastern to the Central Standard, one hour earlier—was made, and in consequence we had an unusually long day. South of Charleston, wood took the place of coal as fuel for the locomotives. The firemen were generally negroes, but the engineers universally white men.

At St. Augustine we visited the Coquina quarries, situated on a sandy beach, exposed to the swell of the Atlantic. This curious stone is a conglomerate of shells and sand, and though soft when first cut into blocks, hardens on exposure to the air. It is of the material that the seawall, built by the United States government, to protect St. Augustine from the inroads of the sea, is constructed, as well as many of the older buildings of the city.

One morning we embarked for the Ocklawaha River on the funny little steamer "Marion," a stern-wheeler, housed all over to protect things from contact with the branches of trees, against which the boat brushes as it pushes its way up the sinuous and narrow stream. The motive power was of the most primitive description, being simply two direct-acting, high-pressure engines. As in all this region, wood is the fuel used. A double rudder situated behind the wheel gave control to this strange craft, which, though she drew but two feet of water, would occasionally bump into a cypress snag and as quickly glide off again. The river banks were a maze of palm and cypress trees, the latter draped with the long, gray Spanish moss. Strange birds and butterflies, frightened by the noise of the steamer, flew across her path, while the muddy stream harbored, presumably, multitudes of

water-snakes, fishes, turtles, and alligators, though we only saw the head of one of the latter as he leisurely swam across our bow. When night came the scene was illumined by a bonfire of pitch-pine sticks placed in a cage on top of the pilot-house, producing a very weird effect.

We returned to Palatka by rail, our experience being that the trains, though slow, were not so bad as generally represented.

Railroad building is being actively pushed in Florida, and there are now nearly fifteen hundred miles finished in the State, where a few years ago there was not one. Many of the completed roads are narrow-gauge.

A. L. R.

The Determination of Sulphur in Pyrites.

THE *Zeitschrift für Analytische Chemie* gives a method of the opening up of pyrites as follows: About 0.5 grm of the sample is introduced into a small stoppered flask, to which is added 30 c. c. water, and then about four c. c. of bromine. The flask should be immediately stoppered and shaken for five minutes. The bromine should be added all at one time, for if introduced gradually sulphuretted hydrogen escapes. Scarcely any heat is evolved. The oxidation is complete when all the bromine has passed into solution, and when no pulverulent sulphur creeps up the sides of the flask. The liquid is rinsed into a flat porcelain dish, and the greater part of the bromine is allowed to evaporate in the cold; the solution is neutralized in a beaker with ammonia, but not so as to form a permanent precipitate, it is then poured into an excess of hot ammonia in a platinum capsule and digested for from ten to fifteen minutes over a small flame; then it is filtered, the filtrate acidified slightly with HCl; the hot diluted solution is precipitated with Ba Cl₂, and the Ba So₄ is purified and weighed in the ordinary manner. Iron cannot be determined in the same portion, as it is volatilized in the cold along with the vapors of bromine.

Of the forty-nine professors and instructors of the School of Industrial Science, twenty-four are graduates of the Institute.

Department Notes.

That the subject of the speed of trains has not yet lost its interest is shown by the fact that a recent paper, by Mr. Foxwell, on the speed of English express trains, has been extensively copied here and in England. In connection with this subject we would remind our valued contemporary, the *American Machinist*, that we did not deny that the Chicago expresses were the fastest long-distance trains in this country, but simply that the Pennsylvania's "Limited" was the fastest of them.

We are indebted to *Cotton, Wool and Iron* for a flattering notice of THE TECH. We can return the compliment by saying that *Cotton, Wool and Iron* is the best paper of the class published.

Mr. Theo. E. Schwarz writes from Denver, Col., to the *Engineering and Mining Journal* about the special field of work of the mining engineer. He says that the requirements of a competent mining engineer are: 1st. A constitution able to stand hard work and privation; good digestion, muscular development, and eyesight. 2d. A scientific training and education, such as is now provided in the mining course in the leading mining schools of this country, namely, the Massachusetts Institute of Technology and the Columbia School of Mines. 3d. Not less than five years' practical experience in the leading mining sections of this country, including work as prospector, common miner, mine foreman or shift boss, and superintendent. This should include experience in working both bedded and fissure-vein deposits. 4th. A character prominent for honesty, self-control, pluck, and perseverance. Mr. Schwarz adds that the mining engineer who lacks any one of these four requirements is not qualified to practise his profession.

The standard gauge, four feet eight and a half inches, was the first gauge adopted for steam railways by Mr. Stevenson, in England, and is the one in most general use, although others have been since experimented with. The history of the manner in which Mr. Stevenson hit

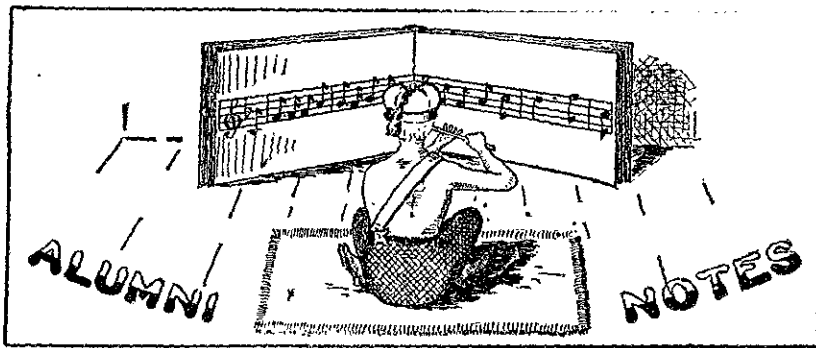
upon four feet eight and a half inches is said to be as follows: When about to build the first railroad the question of how wide the rails should be apart troubled him somewhat, and he took a rule and measured an ordinary wagon track, which proved to be four feet eight inches wide. The tracks were laid this distance apart, but when the cars were placed on the rails it was found that half an inch would have to be added to the width in order to allow for the lateral motion of the wheels, hence the standard gauge of four feet eight and a half inches.

In the *American Engineer*, beginning with Jan. 18, are a series of papers descriptive of the "Strain Meter" of Dr. Fränkel. Its object is the measurement of strains, either of tension or compression, which the members of a structure undergo when loaded in any given manner. The strain meter produces a regular diagram, on which the abscissas represent time and the ordinates, the variations in length of the piece under stress. The diagram shows the whole course taken by the strains on the structure, and their mode of variations during any required period. The author states that it is capable of indicating strains to .003 mm.

The *Railroad Gazette* for Jan. 25 contains a description of Dujour's system of moving and locking switches. By this system, with one movement of the main bar, the switch is unlocked, moved, and then locked again in its new position, — the advantage of the system consisting in the use of only one lever and main rod connecting the switch with the switch-tower.

The new synchronous multiplex system of telegraphy, by which seventy-two messages may be sent over one wire, is highly spoken of and promises to revolutionize the present methods. Mr. Patrick B. Delaney, the inventor, has been at work on this for several years. It is probable that the students will have an opportunity to examine the method of working of the system soon before the Society of Arts.

A bill has been brought before the House to introduce the use of hand tools in the public schools.



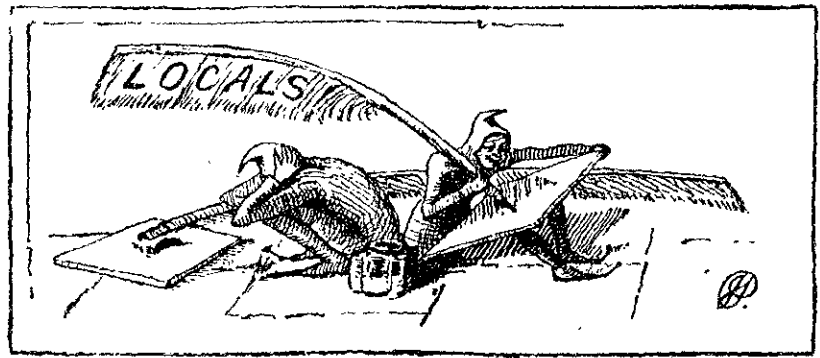
Class Secretaries.

- '68. No organization.
- '69. Prof. W. R. Nichols, Mass. Inst. Technology.
- '70. Prof. C. R. Cross, Mass. Inst. Technology.
- '71. W. A. Pike, Minneapolis, Minn.
- '72.
- '73. E. H. Greenleaf, Museum of Fine Arts, Boston.
- '74. Chas. F. Read, 41 Lincoln St., Boston.
- '75. John Cabot.
- '76. John R. Freeman, Lawrence, Mass.
- '77. R. A. Hale, Lawrence, Mass., care Essex Co.
- '78. L. O. Towne, Rico, Col.
- '79. H. H. Campbell, Steelton, Penn.
- '80.
- '81. F. E. Came, Winsor Hotel, Montreal, P. Q.
- '82. W. B. Snow, Watertown, Mass.
- '83. H. S. Chase, Manchester Cotton Mills, Manchester, N. H.

Edwin Child Miller, '79, was married Jan. 30, to Miss Ida Louise Farr, at the Church of the Unity, Boston.

Mr. S. M. Felton, Jr., '73, late general manager of the New York and New England Railroad, has been elected vice-president of the N. Y., L. E. & W. R. R. Mr. Felton, by his genial manners and courtesy, had many friends in this city, who will heartily regret his loss, as some of our students can testify.

We wish to correct a statement in the last TECH to the effect that F. C. Morrison, '82, was at Zanesville, O. Mr. Morrison is at present on the engineer corps of the city of Boston Water Works, constructing a conduit at South Framingham.



Have you joined the Base Ball Association?

The blowpipe laboratory has been removed to room 36, new building.

Mr. H. B. Merriam, '86, was initiated a member of Sigma Chi the latter part of last term.

The Institute was well represented at Jamaica Pond on Saturday, the 2d; the ice was in excellent condition for skating.

The Freshmen are having a short course of lectures on Political Economy, by the president.

Sidney Williams, '85, has been very ill with pneumonia, and C. H. Brown, also '85, with typhoid fever, but both are now convalescent.

Members of the Athletic Club, desiring to procure the "shingle," can obtain them on application to Mr. Bunce, '84.

The Glee Club sings at Linden on the thirteenth, and at Chelsea on the twenty-first of this month.

The second afternoon dance will occur next Saturday, the 16th. Robinson '84, Richards '85, Wood '86, and Cushing '87, are the committee in charge.

The "2 G." held its regular meeting at Young's Hotel, Tuesday evening, on which occasion four new members were admitted, one from '85 and three from '86.

The steady "grinding" for the semi-annual examinations seems to have taken effect on the Sophomores, as several have had to consult oculists in regard to their eyes.

This term it is the Sophomores who are overworked; the miners' course was so full that English had to be omitted.

Sigma Chi at a recent meeting passed resolutions expelling Chas. A. Herpich, '85.

The regular meeting of the $\Gamma. \Sigma. \Upsilon.$ was held at the Parker House, Friday evening, Feb. 1. Mr. C. H. Bartlett, '85, was initiated, after which the meeting was adjourned for dinner.

'86 leads off in the discussion of class suppers. They evidently want to have it over, so as to have plenty of time to recover from its effects.

The Freshmen are talking of forming a Greek-letter society.

It is said that the Freshman class will not give a class supper this year. Better give an afternoon tea.

Prof. Osborne's notes on differential calculus have been printed and supplied to the Sophomores, proving a great convenience.

The Faculty have granted the TECH the use of room 18, Rogers Building, for an office, where we shall be glad to receive our friends in the course of one or two weeks.

The weaving department of the School of Design is in a very flourishing condition. Mr. Scott contemplates adding another loom to the five already in use.

The gymnasium committee are doing good work in improving the gymnasium. A set of vertical bars, parallel bars, and several pairs of boxing gloves have been added to the apparatus. The addition of hot water in the bath-room was made at the suggestion of the committee.

Prof. Wells's new Trigonometry is used by the first-year class.

A new and large bulletin board has been placed in the entrance hall of Rogers Building, which will prove a great convenience to students. We hope that professors will take care that antiquated notices are not allowed to accumulate there.

Our contemporaries are publishing reviews of the records of their foot-ball teams during the past fall. Ours can be stated in a few words: Harvard 12, Massachusetts Institute of Technology 1.

The Glee Club promises us a concert to be given in April. The programme will consist of a few glees, serenades, and part songs by German and English composers, and also a number of college songs.

Scene, Room 4. Prex. — Give an example showing that difficulty in classification is not confined to this subject.

Senior. — Why, in botany they don't know whether an animal is a plant or not

Room 5, Rogers Building, formerly a part of the old physical laboratory, is to be fitted up as the mineralogical lecture-room. In the meantime the class in mineralogy is obliged to use any room which may happen to be unoccupied.

We understand that a committee of the Faculty has been appointed to take measures towards relieving our overcrowded courses.

Prof. of Chemistry: "If you had a jar of CO_2 contaminated with CO, how would you purify the CO_2 ?"

Fresh.: "Throw it away and make some more."

Another Fresh. replied that since CO_2 was the heavier he would let it settle and then draw it off through a tap.

Mr. John Fiske, a distinguished lecturer, is repeating his course of lectures on the American Revolution, at the Old South Church, on Tuesday and Wednesday evenings. Any student who would like to attend a few times or for the whole course, can procure them by leaving his name at the TECH office or in the letter-rack addressed to "C."

The Rogers Memorial Tablet, through the action of the committee, approved by President Walker, was during the vacation removed across the hall, where the light on the face is much better. We regret to note that Mr. Bartlett, the sculptor, is very ill, and was consequently unable personally to superintend the transfer of the Tablet.

A serious fire was narrowly averted at the Institute last week. At about eight o'clock in the morning of Wednesday, the 6th, the janitor discovered smoke arising from the floor of the fourth story of Rogers Building. A little water extinguished the fire. No damage except the charring of some timbers was done. The fire had evidently been smouldering for some time, and had there been more draught the damage would have been more serious. The cause of the fire is unknown.

Noticeable Articles.

NORTH AMERICAN REVIEW. February. "Corporations, their Employés and the Public," by Carl Schurz. "John Brown's Place in History," by Senator J. J. Ingalls. "Race Progress in the United States," by J. C. Tucker, M. C. "Rival Systems of Heating," by Dr. A. H. Bell and Prof. W. P. Trowbridge.

THE CENTURY. February. "Gustave Courbet, Artist and Communist," illustrated. "Lieut. Gen. Sheridan," with a portrait. "The Cruise of the Alice May," illustrated.

THE ATLANTIC. February. "Voices of Power" (the Pulpit and the Stage), by O. B. Frothingham

POPULAR SCIENCE MONTHLY. February. "Fifty Years of Mechanical Engineering," by A. C. Harding. "Sir Charles W. Siemens," with a portrait.

LIPPINCOTT'S. February. "Old Germantown," illustrated. "An Indian Cattle Town" (Muscogee in the Creek Nation).

W. P. A.

A YOUNG lady remarks :
For the sake of recreation,
Once I asked an explanation
From a young man (no relation),
What was meant by "osculation,"
While I shifted my location
To invite the sweet sensation.
Well, imagine my vexation,
When he gave me the translation
And its Latin derivation,
Like a pedagogue's oration,
Just as if we were at school.
Was n't he an awful fool?

'Varsity.

From information gathered at Palatka, Fla., we learn that one of the Farnsworth brothers, survivors of the Columbus disaster, was passed to Jacksonville, and paid twenty-five dollars by the Savannah Line Company. His trials, it seems, were not at an end, however; for it is said that, arriving at Jacksonville much sooner than was expected, he was taken in hand by the authorities, his money was taken from him, and he was lodged in jail until his identity was proved. Rather rough to survive the hardships of such a wreck, and then to be imprisoned therefor. We wish him better luck for the future.

Is n't it about time to begin practising for the nine?

The College World.

HARVARD. — The Freshman class in the School of Veterinary Science numbers nine men. — The boat club has accepted Columbia's challenge for an eight-oar race. — 208 students are studying in the chemical laboratories. — Theatricals by the Hasty Pudding Club, to be given in Boston, are in preparation. — Harvard has been left \$300,000 by the will of the late George Oakes Clark, of Milton. This property is at present in trust for the benefit of Mr. Clark's widow and two children.

YALE. — In view of the statements concerning the unhealthfulness of Yale, an inquiry has been made by a committee consisting of Prof. Chandler of Columbia, Dr. Lyndsley of the New Haven Board of Health, and Prof. Brewer of the Sheffield School. They report that there is no unhealthful condition, that the students appear to be in good health, and that there is no cause for alarm. — A new secret society, the "Fox and Graves," has been formed. — The Faculty send their second admonitions to parents and guardians in registered letters to prevent their interception by students or their interested friends. *Ex.* — A second glee club has been organized. — The Ohio and Mississippi Railroad has paid the Yale Glee Club \$1,200 for damages in the recent accident. The club has withdrawn its suit against the railroad.

PRINCETON. — At a mass meeting the students voted to put a crew upon the river this year.

NOTES. — Several New York colleges have formed a State intercollegiate base-ball association. — During the annual bowl fight at the University of Pennsylvania, recently, the students got into a serious disturbance with the police. — The students of the Stevens Institute of Technology have established a monthly journal, *The Stevens Indicator*. The first number is well printed and has a neat cover. The paper promises well, but we hope that future numbers will contain something besides accounts of foot-ball games. — Mr. Nate Gest of '84, Williams College, was killed while coasting.

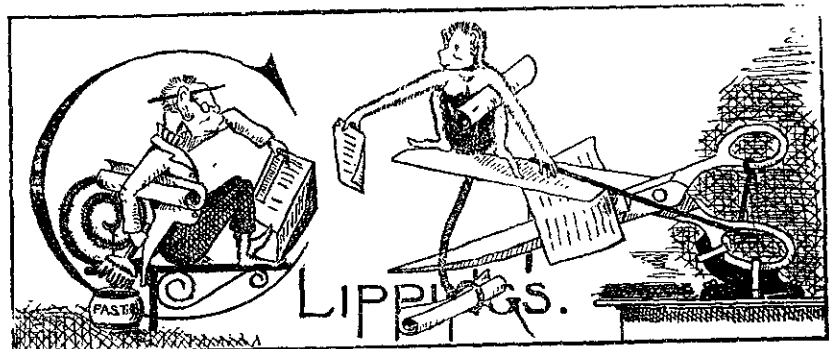
The crew of the University of Pennsylvania has issued a sweeping challenge to the boat clubs of other colleges, and proposes to claim the championship if a match is not made within sixty days. As Pennsylvania did not show much ability in their races last summer, it is probable that the challenge will be disregarded by Harvard and Yale. The self-praise and conceit of the Pennsylvania club has called forth severe comment from the various sporting papers. — Dartmouth has received an unconditional bequest of \$50,000. — Our Western exchanges are still alive with the subject of Matthew Arnold. — Prof. Williams, of Brown, is engaged upon a new translation of the Nibelungenlied. — The *Brunonian* defends the use of "horses" in translating the classics on the ground that after a knowledge of the grammar of a language has been obtained, the object is to acquire a familiarity with the literature, and that this can best be done with the aid of a good translation. — Oxford caps have nearly disappeared from Columbia. — Representatives from Lafayette, Rutgers, and the Stevens Institute of Technology are to meet on Feb. 9, for the purpose of forming a base and foot ball league. The University of Pennsylvania and Wesleyan University will be included in the league.

The attendance of some of the leading colleges of the country for the current year is as follows: —

Columbia, 1,520; Harvard, 1,522; Michigan, 1,524; Yale, 1,092; Mass. Inst. of Technology, 561; Princeton, 527; Cornell, 457.

A study of the catalogue will show the popularity of the engineering courses at the Institute. Sixty-six per cent of the fourth-year class, eighty of the third, and eighty-five of the second are studying the various branches of engineering.

History has been added to the requirements for admission to the School of Industrial Science. Applicants for admission must be prepared on Mackenzie's "Nineteenth Century," a book used by last year's Freshman class.



Oh, the snow, the beautiful snow,
 (Shut that door.)
 Filling the sky and the earth below :
 (Yes, you can shovel it off for a quarter.)
 Over the housetops, over the street.
 (Ten dollars an hour for a sleigh? Good heavens !)
 Over the heads of people you meet :
 (Arrest that boy for snow-balling !)
 Dancing,
 Flirting.
 Skimming along —
 (Hit the poet with a leather thong.) *Puck.*

Chatty old bachelor: "Most r'mark'ble likeness between those children, nurse!" Nurse: "Yes, sir. Twins, sir." Old Gent: "What, both of 'em?" — *Punch.*

There is very little satisfaction in having a man fined five dollars for an assault, if you have to pay your own lawyer ten dollars. — *Ex.*

A mountain statesman is named Maginnis M. Maginnis. The middle initial is thought to stand for Maginnis, and a vague suspicion is gaining a footing that he may be of Irish descent.

DISTINGUISHED AMATEUR ARTIST (*modestly displaying results of his afternoon's leisure*): "You must bear in mind they were all done very rapidly. I don't suppose I gave more than five minutes to each!"

MR. SNARLE: "Oh, *that's* no excuse!" — *Punch.*

Servant, entering a room and seeing her master standing on his head:

"For heaven's sake, Herr Mayer, what are you doing, — are you going to engage yourself to a circus?"

"Oh, no; I have such cold feet, and you know, the air is much warmer above than below!" — *Fliegende Blätter.*



What the Civil Engineers have to put up with. [The artist may be excused for not knowing what a theodolite is, as he is taking Course I.]

The papers announce that a Chicago hotel waiter was "accidentally shot in the pantry." Why will the papers insist on using these medical terms? We don't know just how much to sympathize with the poor fellow. It is to be hoped that the pantry is not a vital spot.

A man in a sleeping-car went through a terrible accident, in which the car rolled down an embankment, without waking. It was noted, however, that as the car struck the bottom, he murmured, "Don't, Jane, don't; I'll get up and start the fire."

A tailor was startled the other day by the return of a bill which he had sent to an editor, with a notice that the "manuscript was respectfully declined."—*Princetonian*.

"I hear," said Mrs. Parvenu, "that Mr. Wilson's son took the diploma at Yale last year. I always said Yale was an awful unhealthy city!"—*New York Mail*.

"Bread," exclaimed a Vassar College girl,—"bread! Well, I should say I can make bread. We studied that in our first year. You see the yeast ferments, and the gas thus formed permeates everywhere, and transforms the plastic material into a clearly obvious atomic structure, and then—" "But what is the plastic material you speak of?" "Oh, that is commonly called the sponge." "But how do you make the sponge?" "Why, you don't make it; the cook always attends to that. Then we test the sponge with the thermometer and hydrometer, and a lot of other instruments, the names of which I don't remember, and then hand it back to the cook, and I don't know what she does with it then, but when it comes on the table it is just splendid."—*Ex.*

A large bear hangs in front of a Chatham Street restaurant, which will soon be served up in juicy steaks.—*Tribune*.

What, the restaurant?

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French Flannel and Cheviot, Pajamas, Scotch Shawls and long Flannel Night Shirts for "steamer and railway traveling."

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MEN'S

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FURNISHINGS,

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— 343 —

Washington Street.

THE Class of '85 held their second reunion at Young's Hotel Saturday evening, Feb. 9, and after action on matters of business the following programme was given by the members: A paper on "The Chicago Fire Patrol," by T. W. Fry; "Violin Solo," A. I. Plaisted; Paper on "College Athletics," C. F. Spring; Reading, "The Vagabonds," Arthur D. Little; "Flute Solo," E. B. Homer, accompanied by Mr. A. L. Merrill on the Piano; Paper, "Notes on a Foundry," N. G. Robertson; "A Reminiscence," C. S. Robinson.

Afterward a light spread was partaken of, and College songs sung. It was decided to hold the class supper March 14.

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Besides the above distinctly professional courses, the Institute offers scientific courses of a less technic 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 for 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, gingham, 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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Students and all others interested invited to call or send for catalogue.

The Institute catalogue has long held the reputation of having advanced ideas, but the current number far exceeds its predecessors, in mentioning under the high-sounding title of "edge-stone mill," the well worn grindstone in the mining laboratory.

We are glad to see that there is to be another afternoon party, and hope that it may be successful. It should be so, considering the pleasant time all enjoyed who went to the last one. Go and have a good time.

We acknowledge the receipt of the *Yale Courant*.

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Caution.

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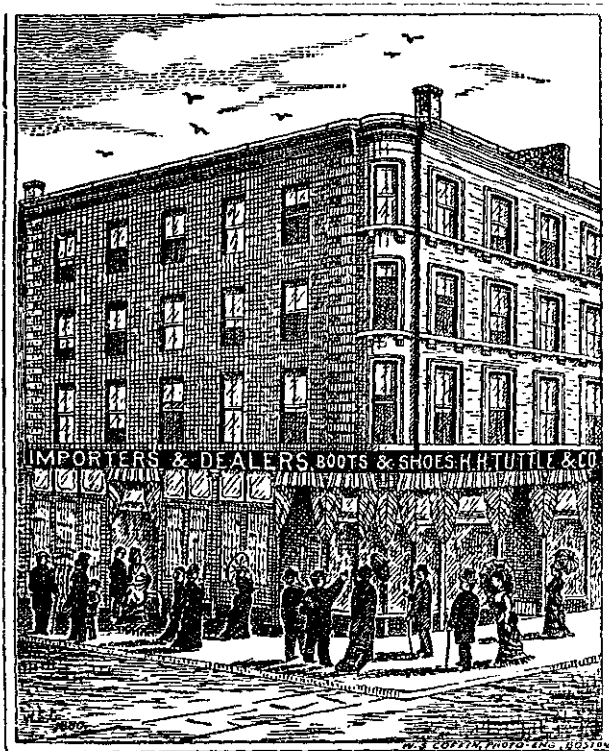


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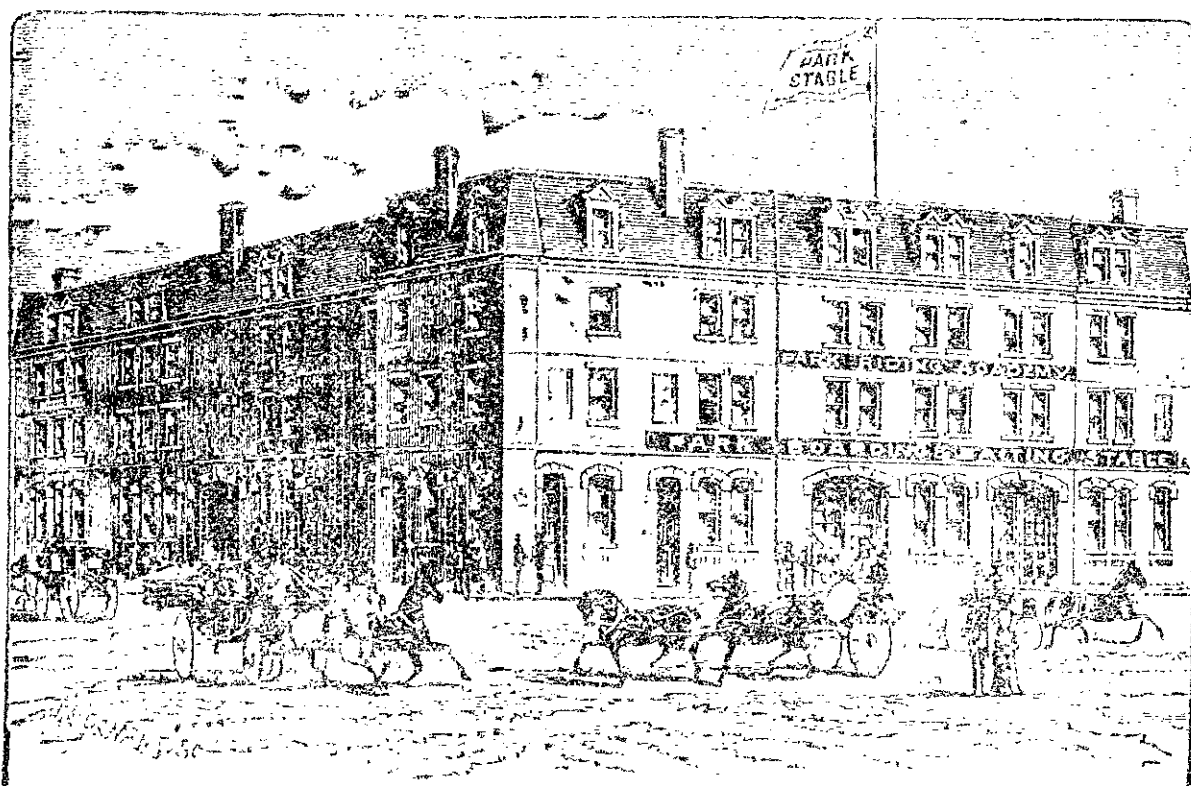
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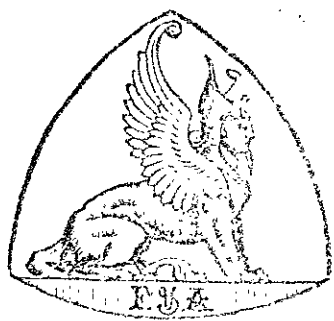
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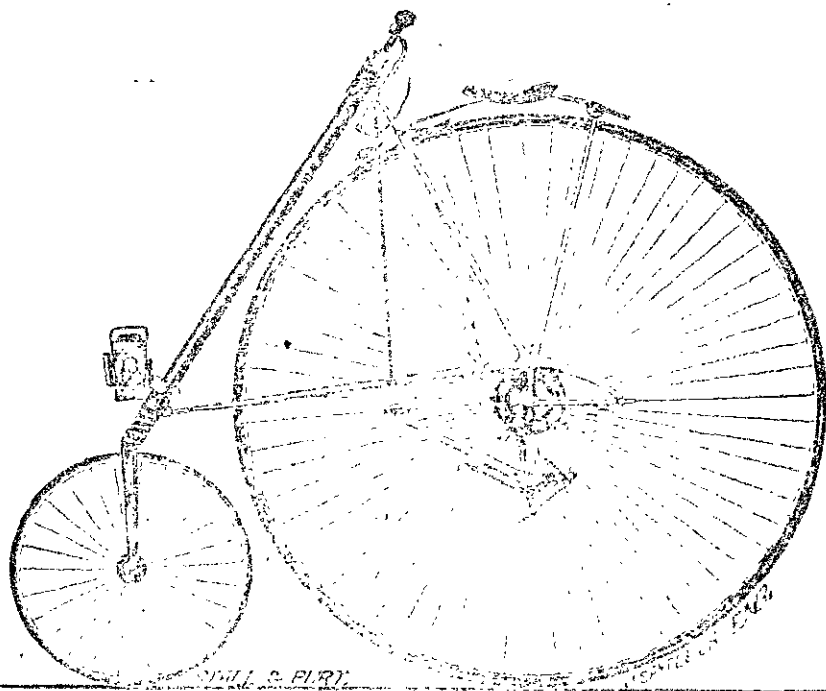
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