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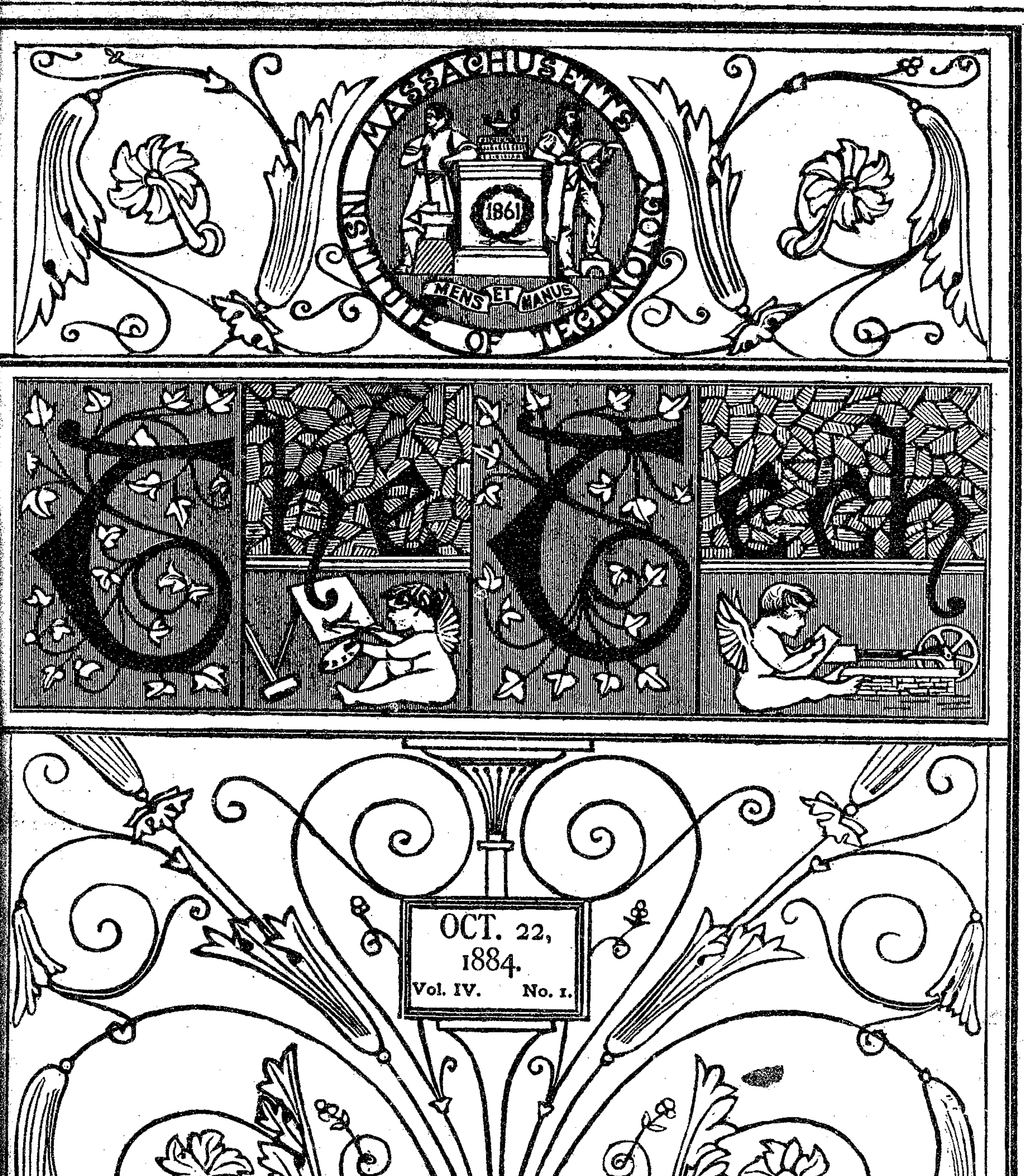

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The Tech.

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THE TECH.

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

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STARTING with the present number, upon the fourth volume of THE TECH, the editors are gratified to feel that the work which has been expended upon the paper has been in the right direction, and that the efforts which have been put forth to make it the faithful representative of the Institute have been appreciated not only by the undergraduates and alumni, for whom it is especially intended, but by many collegiate and scientific publications, which have frequently given it a word of encouragement.

In consequence of the close application required of those who take the Institute courses, and who have a realizing sense of the fact that they are beginning professional work, there is little — too little — time for recreation. So THE TECH, which aims to reflect every-day Institute life, is necessarily of a more sober nature than some other college publications; but it is not intended that this soberness shall deepen into gloom. The main object of the paper is to entertain, not to amuse; and it is hoped that the entertainment furnished will be sufficiently substantial to secure for it the success which seems promised, and to establish THE TECH as one of the permanent institutions of the place.

AS we return to the familiar scenes about the Institute each year after our long vacation, we first look about to see what changes have taken place in our absence, and this year they have been not a few.

Beginning with Rogers building, we notice that externally it still retains its former stately beauty, the contemplated additional story not having been erected, as the fire authorities would not permit a wooden roof to be placed upon so high a building.

The top of Rogers building has now been entirely abandoned to the mechanicals and Freshmen. The northern half of the fourth story has been thrown into one large room, and is used by all the mechanicals as their drawing-room. In the basement, the alterations begun last year, which made the front half of the building the laboratories of applied mechanics and mechanical engineering, have been completed, and now the remainder of the basement has been devoted to the new mining laboratory. Additional room was gained by removing the broad stairs which led to the basement, and this is now reached by a spiral iron stairway.

In the entrance hall, the corner where the letter-rack was has been parted off by a railing

and wire-work, and an attendant stationed there who delivers the mail and checks books, coats, and parcels for the students. Although it is rather annoying to be compelled to wait for one's mail when there is a crowd about the window, still the greater safety compensates for all inconveniences.

Over in the new building the changes have been but few. The department of civil engineering has been transferred here from Rogers, and occupies quarters on the second floor. Owing to the increase in the number of students taking this course, two new assistants have been added and an additional number of instruments purchased. Above, in the chemical laboratories, things are the same as last year, with the exception of the assistants. Mr. Lund, formerly of the analytical laboratory, has gone to Cornell as instructor in chemistry, and Mr. Underwood to the laboratory of industrial chemistry, which is now in the basement of the new building, the unsightly old building where it used to be having been removed. Prof. Pope, of the Iowa State University, is expected to come to the analytical laboratory some time in November. Prof. Ordway has resigned from the Institute and accepted a call to Tulane University, La.; otherwise the corps of instructors remains the same this year as last, and we hope the same friendly feeling between them and the students will continue this year as heretofore.

THE impromptu rush between squads from the Sophomore and Freshman classes, which occurred last week, will, we hope, be the last of its kind. Although better natured than most such contests, it was a dangerous precedent, likely to engender between the classes a hostile feeling inimical to the best interests of our institution, and the participants should remember that their action tended to revive a custom rapidly being thrown aside by the leading colleges as an old-fashioned barbarism. It is especially unfortunate that such an affair should take place after a torchlight mass meeting or drill, for which the officers of the Tech regiment are responsible; a repetition may deprive the regiment of the use of the Institute swords, drums and gymnasium, which have been loaned by Pres. Walker for the occasion.

If the two parties *must* rush, however, we would suggest that they choose some better place than the top of a high flight of stone steps, a violent push from which might occasion serious, not to say fatal, results; and by all means postpone any such action until after the procession, so that its success shall not be interfered with.

DURING the early part of THE TECH's existence, considerable difficulty was met with by its managers in securing sufficient funds to continue its publication. This difficulty has considerably diminished, as its increasing circulation has brought it to the notice of a greater number of interested persons, who are willing, by means of subscriptions or advertisements, to aid in its support; but one difficulty which still remains is that many at present in the Institute, who should, therefore, more than any others, be interested in the Institute publication, are not willing to subscribe. This is especially true of Freshman classes, and *par excellence* of the present Freshmen, who, so far as canvassed, show a smaller percentage of subscribers than any of their predecessors.

THE TECH is conducted in the interests of all the classes, and should be aided as well by the Freshmen as by the upper classes and instructors, who have found it worthy of their support. It is hoped that the members of '88 will show in a decided manner that the small size of their present list of subscribers is due to delay, not to indifference.

THE Glee Club has begun the new year with nearly all its former members. The interest and enthusiasm in the club seem to point to even a greater success than was attained last year. Another musical society has this year been organized, and promises to be a great source of enjoyment and culture among the students.

orchestra has already enlisted the inter- the school, and deserves every encour- ent. There cannot be too much of this of thing in the Institute, where so little cement is offered for the improvement e social and artistic faculties. The truest of success in life requires something be- the immediate training of a professional se of study; there must be some collateral vation of the broader parts of a man's re. It is a part of this culture which the musical societies, wittingly or unwittingly, to introduce among the students here, for this reason they should be aided and ered by those who can in a great measure ke or mar their fortunes.

I Saw.

I saw
A gentle maiden, — aye, so lovely, too, —
A sturdy youth near by, alack! too true.
I saw
Him there; but where on earth 's his arm, I wonder?
Where? Round my girl's waist it is, by thunder!

The Mining Laboratory.

DURING the past summer, the mining laboratory has been entirely reconstructed and greatly enlarged by the addition of the space formerly occupied by the quantitative chemical department, and the wide hallway and most of the partitions separating the old rooms have been torn down. The broad stairway formerly leading to the basement has been replaced by a circular one of iron, and the space thus gained utilized for the supply and toilet rooms. The laboratory now consists of the following rooms: Assay room, 30 x 35 feet; toilet room, 17 x 19 feet; supply room, 9 x 17 feet; furnace room, 40 x 35 feet; and milling room, 28 x 93 feet.

The assay room, on the site of the old third-year chemical laboratory, has been rendered fireproof by covering the floor with pressed brick and removing most of the woodwork. There are ten crucible or pot furnaces, each being enclosed with a heavy sheet-iron jacket. Of muffle furnaces there are seven, one using petroleum fuel, one charcoal, two coke or hard coal and three soft coal. The latter will accommodate two men each, offering in all furnace accommodation for a class of twenty. An iron table fifteen feet long, divided into five stalls, answers the various purposes of storage for fuels and tools and pouring room for assays. Posts placed at intervals in front, topped with iron plates, serve for separating the metal from slag. Fifty desks furnished with the necessary fluxes and appliances are provided. Arranged around the walls of the room are shelves for the ore samples and pulp balances. The fine button balances are kept in a separate room, away from dust and heat.

The furnace room has been entirely remodelled by lowering the floor to the level of the cellar and destroying all the old furnaces. The old historic brick blast furnace will be replaced by a small water-jacket furnace, and the following furnaces have been built, viz.: one calciner and chloridizing furnace (with about sixteen square feet of roasting surface), one copper refining furnace (capacity five hundred pounds), a lead agglomerating and smelting furnace of about the same capacity, with a lead kettle, a kiln for roasting copper ores, a cupelling furnace, a small roasting and calcining furnace (hearth four square feet), a small cupelling furnace for treating from five to fifty pounds lead bullion, and two large pot furnaces. An amalgam retort, with forge, vise and work-bench, completes the accoutrements of this room.

The milling room extends entirely across the building. A portion of the room, cut off by a glass partition, is utilized as weighing room, private office and private laboratory. In one end of the room is placed the crushing and washing machinery. The former comprises a Blake crusher, a five-stamp battery and crushing rolls, a Bogardus mill, and a Hendrie & Boltoff sampling mill. The latter (washing machinery), on a lower asphalted platform, consists of a Richards separator, four sets of jigs, Evans table and Frue vanner (one half actual size).

Two settling tanks receive the overflow, and rotary pumps supply the water required. There are three steam tables, for drying ores and prod-

ucts. For amalgamating ores, are provided one thirty-inch Wheeler pan with dolly tub for collecting amalgam, two combination pans, twelve and eighteen inch diameter, with a thirty-inch settler, and one eight-inch pan; also a ball mill for amalgamating gold ores. Ample provision has been made for lixiviating ores and for treatment by electrolysis and with acids. A Root blower for the supply of the blast furnace and an exhaust fan for the removal of dust caused by dry crushing find place here. There are two main lines of shafting, an upper and lower, each ninety-two feet long, beside considerable counter-shafting. Power is supplied by the Porter-Allen engine, and a small vertical engine is held in reserve for night work and other emergencies.

The toilet-room supplies a long-felt want. It contains hot and cold water and every convenience. In it are lockers for the fourth-year class, and clothes hooks for the third.

In addition to all these alterations, elaborate vaults have been built, 16 x 73 feet, and six and one half feet high, alongside the furnace and milling rooms, for the storage of fuels and ores.

All these changes have made this laboratory the most complete in the United States, if not in the world. F. W. C.

OBITUARY. — Those who had made the acquaintance of Arthur W. Sanborn, last year in charge of the iron-working department at the shops, will regret to hear of his death, which occurred on Sept. 17. Mr. Sanborn had a severe attack of typhoid fever early in the summer, from which he was recovering, when a hemorrhage of the lungs proved too severe for his already enfeebled constitution.

Articles contributed to THE TECH should be written on but one side of the sheet, and communications of any kind should be accompanied by the name of the writer. Drawings must be made in black ink, and about twice the size intended for publication.

Beneath the Rafters.

Ah, that dear, old farm-house garret,—what a glamour o'er it falls,
Hallowing each rough-hewn timber in its dusty, cob-webbed walls!
With the skeins of mingled mem'ries, Fancy weaves her mazy woof,
When I sit there, vaguely list'ning to the raindrops on the roof:

For I think how, in my childhood, such a pouring day as this
Seemed to each unruly imp the sum of human miseries;
Then the garret's treasured chaos roused itself for his behoof,
Till he e'en forgot the dreary, steady patter on the roof.

But the best and brightest mem'ry twines around one drizzling day
When two rummaged through the attic, "just to pass the time away."
If a maiden needs assistance, never wooer stands aloof,
Though his heart go pitter-patter, like the rain upon the roof.

So I helped her over rubbish in her "crazed-for-antiques" quest.
Soon our heads came close together, bending o'er an ancient chest,
And I yielded to temptation;—so subdued was herreproof
That a tune of triumph seemed the raindrops' murm'ring on the roof.

. . . . . .

With the patt'ring of the raindrops mingles now an angry hum,
And before a wasp's weird music my intruding Muse is dumb:
For those rhythmic sounds remind me that my skin is not sting-proof,
So I soon am out of hearing of the raindrops on the roof.

L., '87.

A Visit to Mammoth Cave.

ONE day in the early part of last summer a party of three started from Louisville by the morning train to visit Edmondson County's, Kentucky's, in fact, the world's, largest cave. To say that it is the largest in Edmondson County, is to say a great deal, as there are fully five hundred caves there. There was nothing especially remarkable about our party, except that two thirds of its members were also members of the Tech. Luckily for our peace of mind it was a party in which three is company and not a crowd.

But this is an early digression. Too much wandering will be done hereafter to allow of any here.

Cave City, the nearest station on the L. & N., is about ten miles from the cave and eighty-five from Louisville. When we arrived there we found that the stage, which was to carry us the remaining ten miles, would not leave for several hours, so we decided to walk the miles intervening between us and our destination. Leaving our valises to be brought by the stage, we started off, and, after several hours of warm work, arrived at the hotel. This is an architectural curiosity. It is a long, low, L-shaped pile, the older part made of logs and the later portion of frame. A broad porch extends along its whole length and makes a delightful promenading ground. Big forest trees surround it, their welcome shade making the warmest day bearable.

After eating a hearty supper and providing ourselves with caps and canes, very necessary articles in cave travel, we were ready for our second tramp. Our guide to the region of darkness was an ancient darky whom every one calls "Old Nick." With him we are to view the river Styx. Nick takes our tickets and leads the way to the mouth of the cave and down some rough stone steps to the level of the cave floor. The first thing we notice is a very strong current of cold air flowing outward. This takes place whenever the outside air is higher in temperature than that of the cave. When lower the current flows inward. The temperature of the cave is very constant, averaging in summer fifty-nine and in winter fifty-eight degrees F.

After passing in a few hundred feet Nick unlocks an iron gate, which bars our way, allows us to pass through and then relocks it, so that we are completely in his power. We are now in the Narrows. After walking a short distance over well-beaten clay, the passage broadens into a large hall several acres in extent, called the Vestibule. On our right a broad passage called Audubon's Avenue extends. Several years ago a company was started to cultivate mushrooms in this avenue; finding it unprofitable they soon suspended operations. In the Vestibule we see the remains of salt-petre vats which were worked from 1808 to 1814, principally to obtain salt-petre for our army during the war of 1812.

The main cave in which we are now walking extends for several miles with an average height of fifty and breadth of eighty feet. Our first stop after leaving the Vestibule is at what the guide calls the Methodist Church. The pulpit is formed by a ledge of rock on the left, about fifteen feet above us. Here in the summer time service is frequently held by visiting clergymen. After lighting Bengal lights from the pulpit, so that we may have a good look at it, we move on. On the ceiling overhead a thin layer of gypsum has been deposited, upon which in places the black oxide of manganese appears in startlingly realistic forms. One of these, the ant-eater, is especially perfect. Moving on we come to a huge rock on our right which is about forty feet long, twenty broad, and ten high. We know by its shape that it must be the Giant's Coffin.

After passing a decided bend in the cave, we come to two roofless stone cottages, where, in 1843, a party of consumptives lived for a few months in hopes that the even temperature and bracing air might prove beneficial. Whether from lack of sunshine or from being already in a too far advanced stage of the disease, they soon gave up the experiment, after one of their number had died.

Next, we come to the celebrated Star Chamber, whose "heavenly" appearance is given by thousands of little spots of sulphate of magnesia upon a background of black gypsum. It is really almost impossible to believe that we are not gazing upon the studded heavens, for we can see what closely resembles the Milky Way, and all the mock stars seem to twinkle. We sit down on the benches provided, put out our lanterns, while Old Nick leaves us, so that we are in complete darkness. Soon off to the left we hear a cock crowing and a faint light appears. It is Nick at a distance showing us the dawn. Now a black cloud sweeps over the heavens, shutting out the stars; then the dim light grows brighter, the

clouds pass away and Nick is with us once more.

We have now gone as far as we are to go in the main cave. So, turning back, we retrace our steps as far as the Vestibule, ascend a flight of steps and enter the Gothic Gallery. On either side of the path we see monuments of loose stones which bear various inscriptions. Nearly every state in the Union and almost all the countries of Europe are represented by these piles, which have grown and are growing by the addition made by visitors. Even some of the colleges are represented, among them Harvard, Yale, and the Institute. Now we stop before a group of stalactites, the altar of the Gothic Chapel. Several marriages have taken place here, the first being decidedly romantic. It seems that the bride's mother in this case was much opposed to her daughter's marriage; so much so that she made her promise never to marry her lover on the face of the earth. By being married in the Gothic Chapel she managed to keep the letter of her promise to her mother and keep, too, her engagement to her lover.

On we tramp, still in Gothic Avenue, until we come to Lake Purity. And now, once more we retrace our steps, this time to the Giant's Coffin. Behind this we find a small opening, through which we pass into the Wooden Bowl room, so called, because long ago a bowl of Indian origin was found there. Passing down steps from here, we come to the Side Saddle pit, which derives its name from the shape of an overhanging rock. This pit, by actual measurement, is sixty-five feet deep, while above it a dome adds thirty-five feet more, making in all one hundred feet from top to bottom.

After passing up and down several flights of stairs, through a narrow passage, the Labyrinth, Nick cries "Halt," and we stop before a narrow, window-like opening in the rock. Peering in we can see, in spite of the darkness, that it is another combined pit and dome. Nick tells us that this is Gorin's Dome. Leaving us, he goes to another opening and drops through it blue lights and paper saturated with oil. By the bright light thus produced we can see the bottom, one hundred feet below us, while by straining our eyes we imagine we see the top, which is a like distance above us. It is a sight which holds even the most careless spell-bound for the time, and if nothing else was to be seen, would amply repay a long journey. We are in the region of pits and domes. There are six or seven at least, within a short distance of each other. They serve, as shafts in a mine, to connect the several very distinct levels in the cave.

Retracing our steps, we come to the Bottomless pit, which Nick gravely informs us is called so because it has a bottom. It is fully one hundred feet in depth. On we go through Revellers' Hall and Penseco Avenue, to Grand Crossing, where two avenues of goodly size cross one another at right angles, one about ten feet higher than the other. From here we go through the Valley of Humility, the ceiling of which is so low that a tall man feels his backbone gradually becoming tied into a bow-knot, as it were, from the continued stooping. The passage narrows, but grows higher. At last, in Fat Man's Misery, it has narrowed to eighteen inches. This name then needs no explanation. The fattest man who ever passed through here weighed two hundred and eighty pounds. He managed, with the aid of his guide's muscle, to go through safely. But now we enter Great Relief, and our backs unbend. We tramp on, along the banks of the river Styx, until it disappears again in the rocky walls. These underground streams have no perceptible current, being merely back water of Green River, which flows near the caves. Returning to Great Relief on our way out of the cave, we find, to our joy, that we shall not have to be humble again, as there is another way out. We begin to go up, almost perpendicularly, over ladders and rocks, until we get about one hundred and fifty feet higher than we were at the base of this little mountain. Then, in like manner we descend, watching every step lest we go headlong. To our surprise we find ourselves on familiar

round, being once more in the main cave. Soon we are at the gate, and shortly after in the outer world, with its hot, oppressive air, laden with the odors of vegetation. The cave air contains a large amount of oxygen, which accounts for its bracing effect.

And now, although I have described our route, I have not by any means described all the cave. As we did not go the long route, I will not attempt to describe its beauties, beyond saying that the most interesting objects on it are Echo River and Cleveland's Cabinet. On the former an underground boat ride, three-quarters of a mile in length, is to be enjoyed; in the latter the eye is feasted on flowers of all kinds, in white gypsum, on the ceiling.

A person expecting to see great quantities of stalactites and stalagmites in varied fantastic forms will be disappointed, for there are very few in the cave. Its grandeur, and the great distances which can be traversed, are what give it its reputation. In this connection I might add that there are one hundred and twenty-three passages in the cave, with a total length of one hundred and fifty miles. The lowest point reached is two hundred feet below the level; the highest, one hundred and fifty feet above it. It is hard to get distances accurately, as the cave is zealously guarded from surveyors, for fear that they may discover that it extends beyond the limits of the cave estate.

The next day we spent in a visit to White's Cave, which for beauty far surpasses the Mammoth, and also to the Mammoth Dome, a special route in Mammoth.

The following morning, with a feeling of regret, we three mounted to the top of the stage and started homeward. I was with the driver, while the other two thirds sat behind, with a young lady between them, with whom they were soon flirting desperately. After a delightful ride of several hours, delightful at least to two thirds, we reached the station, boarded the train, and soon were home once more.

Owing to the large size of the lower classes, '88 alone met in Huntington hall on the 29th of September.

Massachusetts Institute of Technology.

THE following is a list, given us by the secretary, of the number of students in the Institute this year, together with that of last: —

School of Industrial Science.	1884-1885.	1883-1884.	1884-1885.	1883-1884.
Fourth year . . .	31	29		
Third year . . .	63	37		
Second year . . .	86	61		
First year . . .	197	145		
Special students .	197	171		
	574	443	574	443
School of Mechanic Arts.				
Second year . . .	6	9		
First year . . .	31	21		
Specials	26	26		
	63	56	63	56
School of Industrial Design.	62	62	62	62
Mass. Institute of Technology			699	561

This shows an increase of 138 over the number of last year. The whole number of new students this year is 267.

The regular students of the three upper classes are divided among the various departments as follows: —

	4th year.	3d year.	2d year.	Total.
Civil Engineering . . .	7	10	13	30
Mechanical Engineering.	7	20	27	54
Mining Engineering . .	8	9	12	29
Architecture	2	2	6	10
Chemistry	4	7	10	21
Electrical Engineering .	2	15	13	30
Natural History . . .	0	0	0	0
Medicine	0	0	2	2
Physics	0	0	1	1
General Course . . .	1	0	2	3
	31	63	86	180

Over ninety-five per cent of the three upper classes will march in the torchlight procession; only about thirty per cent of the Freshmen have been secured. What 's the matter with '88?

Foot-Ball.

AT a meeting of the Foot-Ball Association at the beginning of the term, officers were elected for the ensuing year, and, sufficient money having been subscribed, it was voted to hire the Union Athletic Grounds for the season, thus giving the eleven a suitable place in which to practise, — a thing never before possessed. After some practice the following men were selected to constitute the eleven: —

Rushers: Herrick, '88; Steele, '85; Mahon, '85; Fletcher, '86; Ladd, '88; Vorce, '88, and Cooley, '87. Quarter-back, Douglas, '87; half-backs, Twombly, '87, and Winsor, '86 (captain); full-back, Shortall, '87; substitutes, Bartlett, '86. and Sturges, '87.

The first game was played with Harvard on Saturday, Oct. 11. The Techs played well during the first three quarters, Winsor kicking a goal from the field. At the close of the inning the score stood: Harvard, 10; Mass. Inst. of Technology, 5. In the second three quarters the Techs became demoralized, and Harvard scored point after point. Steele was disabled in a rush directly after the commencement of the inning, and Bartlett took his place. At the end of the game the score stood: Harvard — 4 goals from touchdowns, 5 safeties, 2 touchdowns, 1 goal from field; total, 43. Mass. Inst. of Technology — 1 goal from the field; total, 5.

Wednesday, Oct. 15, the Techs played the eleven from Tufts College on the Union grounds. The Techs were minus the services of some of their best men, and so the game was quite exciting throughout. The Tufts eleven made a touchdown in the first inning, but failed to kick a goal. In the second inning Cooley made a touchdown, from which Douglas kicked a goal. The score was: Techs, 6; Tufts, 4.

Mr. Spring, '85, has felt compelled to resign the managership of the foot-ball team on account of the pressure of his studies. It is probable that Mr. Sturges, '87, who is manager for the present, will be chosen to fill the vacancy.

Class and Society Organizations for 1884-85.

'85. President, Chas. R. Richards; vice-president, Chas. Stanley Robinson; secretary, Robert E. Richardson; treasurer, Sidney Williams; corresponding secretary, Isaac W. Litchfield.

'86. President, Jas. C. Duff; vice-president, W. H. Low; secretary, Sidney R. Bartlett; treasurer, Jas. P. Lynde.

'87. President, E. A. Haskell; vice-presidents, Frederick C. Todd, Henry Souther, Jr.; secretary, Geo F. Curtiss; treasurer, Geo. O. Draper.

'88. Not yet elected.

2 G. President, Everett Morss '85; vice-president, Hugh MacRae, '85; secretary, W. R. Ingalls, '86; treasurer, A H. Anthony, '86.

ΣΧ. C, W. M. Taylor, '86; P, Theodore Stebbins, '86; A, Heywood Cochran, '85; Q, Fred'k W. Putnam, '86; T, Charles Wood, '86.

ΓΣΥ. President, A. R. McKim, '85; vice-president, Chas. F. Spring, '85; secretary, Sidney Williams, '85; treasurer, L. M. Thacher, '86.

SOCIETY OF '87. — President, F. E. Shepard; vice-president, E. A. Haskell; secretary, T. W. Sprague; treasurer, A. L. Cushing; directors, Fred'k C. Todd, Hollon C. Spaulding, Guy Kirkham.

ATHLETIC CLUB. — President, Chas. F. Spring '85; vice-president, Theodore Stebbins, '86; secretary, P. R. Fletcher, '86; treasurer, H. M. Steele, '87.

GLEE CLUB. — President, John G. Howard, '86; vice-president, E. A. Haskell, '87; secretary and business manager, T. A. Fox.

FOOTBALL ASSOCIATION — President, P. Winsor, '86; vice-president, Wm. B. Douglas, '87; treasurer, secretary and business manager, Chas. F. Spring, '85.

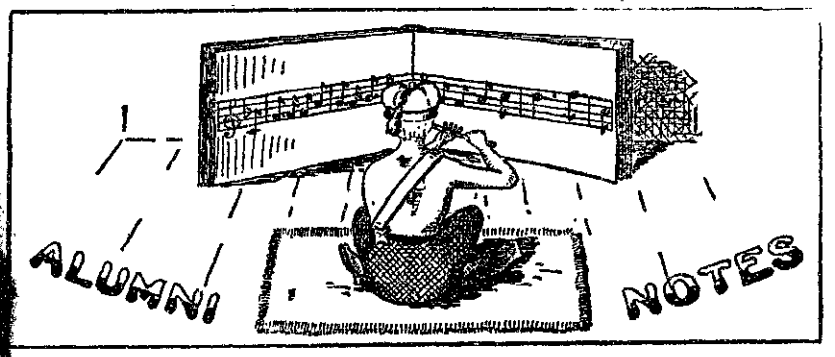
Smart Youth. — "Jim, do you know why white sheep eat more than black sheep?"

Scientific Companion. — "No; do they?"

S. Y. — "Yes, it's a fact."

S. C. — "Well, perhaps the chemical constituents of white wool require —"

S. Y. — "Oh, nonsense! They eat more because there are more of 'em."



The graduating exercises of the class of '84 took place in Huntington Hall on the afternoon of Tuesday, May 27. The exercises, which were conducted in the simple manner characteristic of Institute ceremonies, were opened by a short address by President Walker. The greater part of the time was occupied with the reading of extracts from theses by graduates representing the several departments of the school, after which diplomas were presented, and, on the announcement of the completion of the exercises, the connection of '84, as a class, with the Institute, was severed.

Charles B. Appleton, S. B., assistant in department of mechanical engineering, M. I. T.

H. F. Baldwin, S. B., in office of assistant engineer Louisville & Nashville R. R., Louisville, Ky.

Fred. L. Bardwell, S. B., assistant in general chemistry, M. I. T.

T. H. Bartlett, S. B., in civil engineering department of the Northern Pacific R. R., Ainsworth, W. T.

H. D. Bennett, student in civil engineering, M. I. T.

C. C. Bothfeld, S. B., with the Edgemoor Iron Company, Wilmington, Del.

Miss Alice I. Brown, S. B., teacher in chemistry and physics at Bradford Academy, Bradford, Mass.

W. K. Callahan, with W. P. Callahan & Co., manufacturers of machinery, Dayton, O.

W. F. Carr, S. B., instructor in civil engineering, University of Minnesota, Minneapolis, Minn.

C. J. Carven, S. B., office of city engineer, Boston.

R. L. Chase, S. B., with Albany Aniline and Chemical Works, Albany, N. Y.

H. S. Codman, Brookline, Mass.

G. L. R. French, S. B., with Burlington & Missouri R. R. Co., Nebraska.

A. H. Gill, S. B., assistant in sanitary chemistry, M. I. T.

F. M. Haines, S. B., in civil engineering department of Northern Pacific R. R., Ainsworth, W. T.

James G. Holder, S. B., in drug business in Lynn.

George F. Knapp, S. B., assistant in mining department, M. I. T.

George F. Lull, chemist in charge of liquor department of Penobscot Chemical Fibre Company, Penobscot, Me.

P. S. Morse, S. B., 33 Marlboro Street, Boston.

C. O. Prescott, S. B., assistant in quantitative laboratory, M. I. T.

William L. Puffer, S. B., assistant in department of physics, M. I. T.

A. J. Purinton, S. B., assistant in department of mechanical engineering, M. I. T.

William J. Rich, S. B, private assistant to Prof. R. H. Richards, M. I. T.

C. Snelling Robinson, S. B., student at M. I. T.

Theo. W. Robinson, S. B., student at M. I. T.

A. Lawrence Rotch, S. B, 3 Commonwealth Avenue, Boston, student of meteorology and secretary of class of '84.

J. P. Ryder, S. B., assistant in chemistry at Tufts College.

Miss Amy M. Stantial, S. B, private assistant to Prof. Nichols.

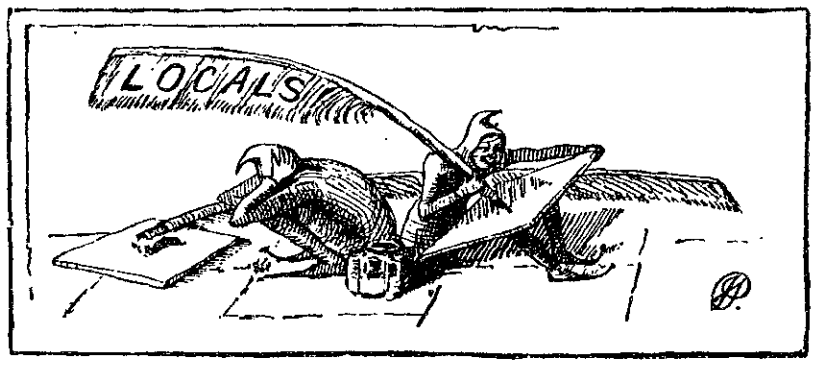
F. M. Stuart, with A. H. French, civil engineer, Brookline, Mass.

E. T. Sturgis, S. B., Bear Gulch, Gardiner City, Gallatin Co., Mont.

Harry W. Tyler, S. B., assistant in first-year mathematics, M. I. T.

Capt. J. F. Weston, U. S. A., stationed in Arizona.

F. C. Williams, Jr., assistant in department of applied mechanics.



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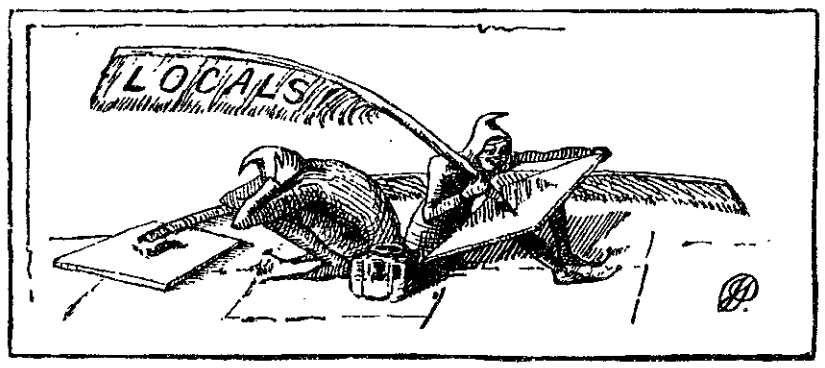

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Noticeable Articles.

THERE have been many interesting papers in the vacation magazines. I can only indicate a few in the files which I have just now at hand. Students of English politics will be interested in comparing all that has been written on the burning question of the House of Lords and their opposition to the new Franchise Bill. In the *Fortnightly* for August is a paper, written from the Radical point of view, by Prof. J. E. Thorold Rogers, M. P. In the *Contemporary* for August is a series of short papers on the "House of Lords and the Country," by various writers, from the Duke of St. Albans to George Howell, workingman; also a paper, by H. D. Traill, on the "Political Crisis"; and in the September number, one on the "Conflict with the Lords," by Prof. Goldwin Smith; and, in the *Fortnightly* for September, one on "The People and Peers," by H. Labouchère, M. P.; and on "People, Parliament and Peers," by Arthur Arnold, M. P. Our English brothers are in quite as great a state of excitement over this question as we are over our Presidential election.

Students of education will be interested in an article in the *Nineteenth Century* for August, by Rev. H. Solly, on "Technical Education"; and in one in the *Contemporary* for August, by Rev. Dr. Riggs, on "Technical Education in America," where our Institute comes in for honorable mention. Prof. James Bryce, in the *Contemporary* for June, writes on "An Ideal University."

Students of architecture will be interested in a paper in the *Contemporary* for July, by James Cubitt, on "Sir Christopher Wren and his Work."

Students of literature will read Prof. Seeley's paper on "Goethe" in the *Contemporary* for August; a paper on the "Purgatorio of Dante" in the *Contemporary* for September, by the Dean of Wells; and Mr. Hoare's paper, in the *Fortnightly* for August, on "Tough Old Thomas Hobbes."

In the *Fortnightly* for July is a paper, by T. G. Bowles, on "Newspapers"; and a grim one, on "Gaming and Gamesters," by B. H. Becker. Mr. Dunckley writes, in the *Contemporary* for July, on "Egypt, Europe and Mr. Gladstone," and Prof. Mahaffy on "Out-of-the-Way Places in Italy." In the *Fortnightly* for September is a paper, by Mr. C. W. Jackson, on "Sport and Travel in Norway" (one of the most entertaining of recent sporting books, by the way, is "Three in Norway, by Two of Them"); and Lord Cochrane writes concerning Chili.

Lovers of good acting will be interested in a paper, in the *Fortnightly* for September, on "Mr. Irving's Work," and in another, in *Macmillan* for August, on "Twelfth Night at the Lyceum." In *Macmillan* for July is a paper on an "Irish Trout Stream," and another on the very different subject of "Wordsworth's Relations to Science."

W. P. A.

The College World.

HARVARD. — The political canvass at Harvard resulted as follows: Blaine, 484; Cleveland, 462; St. John, 26; no choice, 27. By a vote of 569 to 393, it was decided to parade with the Republican torchlight procession. — A Harvard graduate, now in England, is agitating the project of sending an intercollegiate foot-ball eleven to England. — Ten of the most advanced courses in Harvard have but one man in each. — Thirty men dressed in Mother Hubbards will represent the Annex in the torchlight procession. — The statue of John Harvard, by whose bequest the college was founded, was unveiled Oct. 15.

YALE. — Yale won both the single and doubles at the intercollegiate tennis tournament at Hartford. — The eleven recently defeated the Stevens Institute of Technology eleven by a score of 96 to 0.

ELSEWHERE. — At the University of Virginia there is said to be no regularly prescribed course of study, no entrance examinations, no vacations, except the summer one, and but six holidays. *Yale News.* — Wellesley College has commenced its new year with four hundred and ninety-six students, having one hundred and fifteen in the Freshman class, though there would have been one hundred and fifty if all had been admitted who came up to the standard of last year. *Yale News.* — Of the two hundred and sixty students at Johns Hopkins University this year, one hundred and fifty-one are college graduates pursuing post-graduate courses. — The five hundredth anniversary of the founding of the University of Heidelberg occurs in 1886. Preparations are being made for its celebration, which promises to be one of the most imposing ceremonies ever solemnized in Germany. — The University of Pennsylvania has just opened a veterinary school. — There are forty-five thousand volumes in the library of the University of Michigan. — Sixty-three Freshmen in the Columbia School of Arts, and eighty-four in the School of Mines. — The Freshmen won

the cane-rushes at Yale, Princeton, and Cornell. — Vassar '88 numbers about forty-five young ladies. — The Princeton team averages one hundred and eighty pounds in the rusher line. — Of eight $200 scholarships, recently awarded at Cornell, four went to lady students. — The Freshman class at Lehigh University numbers one hundred and thirty-two, a gain of eighty in three years.

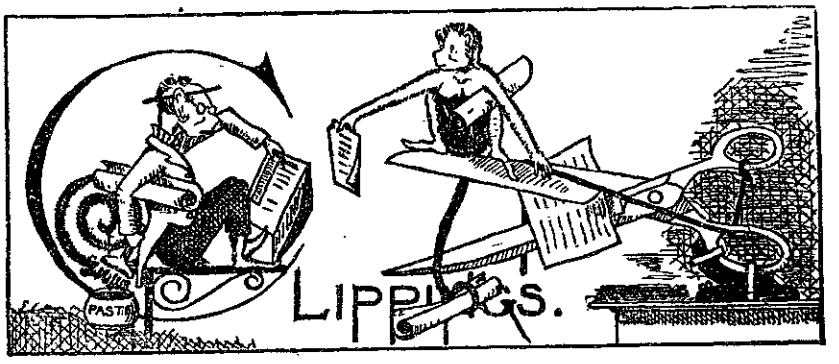
Our special correspondent at Wellesley College writes: —

"At the instigation of a student of more than ordinary political inclinations, the young ladies of the college have taken a general ballot on the Presidential candidates. The election was arranged with due ceremony, three ballot-boxes being prepared in different places, the usual care taken to prevent fraud, and each candidate ably represented by 'workers.' Unfortunately for equity, the illustrious head of the 'People's party' had but one canvasser, whose skilful commendations and glowing eulogies of that valiant warrior met with but a chilly reception, as shown in the vote: —

Blaine	270
Cleveland	63
St. John	63
Butler	1
Lockwood	1
Number of students voting,	398"

LATER: "It is rumored that the members of the new Missionary Society have unanimously voted to confine their efforts, for the present, to the mental elevation of the above-mentioned Butler follower."

The fall meeting of the M. I. T. A. C. will take place Nov. 1 on the Union Athletic grounds. The committee have decided on the following events: Running high jump, running broad jump, standing broad jump, putting shot, 100-yard dash, 220-yard dash, quarter-mile run, half-mile run, mile run, bicycle races, three-legged race, hurdle race (10 hurdles, 220 yards), throwing base-ball, kicking foot-ball, one-mile walk.



A Corsage Bouquet.

Myrtilla, to-night,
Wears *Jacqueminot* roses.
She 's the loveliest sight,
Myrtilla to-night.
Correspondingly light
My pocket-book closes:
Myrtilla, to-night,
Wears *Jacqueminot* roses.

Life.

"As a mere matter of form," said she, as she adjusted her stays.

Visitor: "Does not smoking interfere with drawing?" *Draughtsman:* "Oh, no! in order to smoke I have to draw."

A Western paper says, rather ambiguously, that the Cornell Freshmen this year will embrace twenty young ladies.

Musical maiden: "I hope I am not boring you, playing so much?" Enamoured youth: "Oh, no! Pray go on. I — I 'd so much sooner hear you play than talk." — *Ex.*

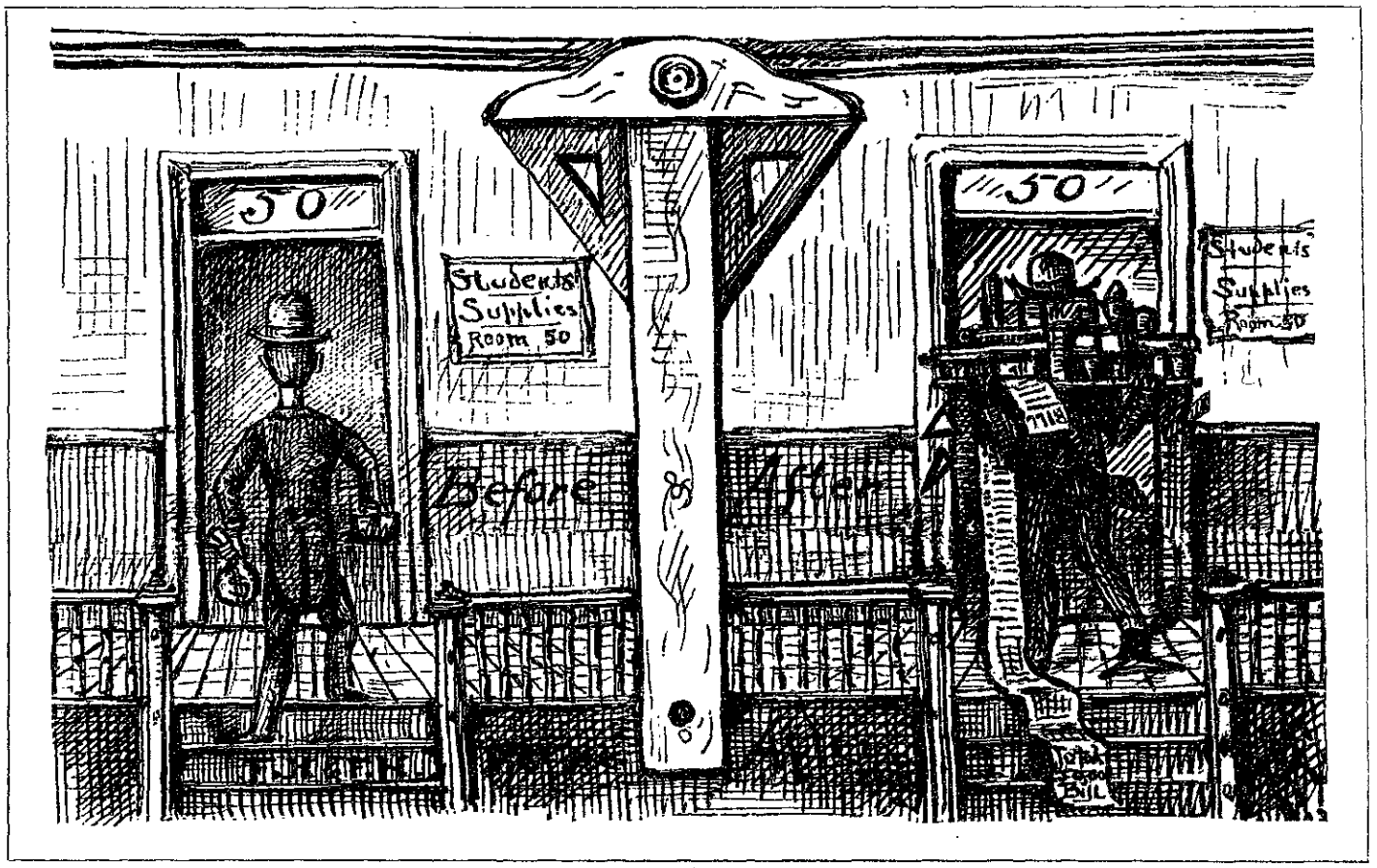
A doctor went out for a day's hunting, and on coming home, complained that he had n't killed anything. "That 's because you did not tend to your legitimate business," said his wife. —*Ex.*

Mr. Parvenue. — "James, how many t's in Boston?"

Clerk. — "Only one, sir."

Mr. P. — "So I supposed. Hand me an eraser."

Impoverished aristocrat: "What dish, waitah, combines the greatest, ah, luxury with the least expense?" Waiter: "Codfish and cream, fifteen cents." I. A.: "And how much for the codfish, ah, plain?" Waiter: "Same price, sir." I. A.: "Waitah, bring me some, ah, cream." — *Lampoon.*



This is a Freshman so bold,
Laden with silver and gold;
With a smile that is bland,
And his purse in his hand,
He goes where the supplies are sold.

This is that Freshman so bold,
But *minus* his silver and gold;
His greenbacks likewise
Have gone for *supplies*,
And the *bill*, — oh, see it unrolled!

Three Irishmen had four guineas to be equally divided between them. After several unsuccessful efforts by two of them, the third settled the business thus: "There are two for you two, and here are two for me, too." — *Williams Athenæum.*

Logic. — Precocious Miss: "What does 'dyspepsia' mean, grandpapa?" Grandpapa (an old sea-captain): "'Dyspepsia,' my dear, comes from two Greek words meaning 'hard to digest.'" Precocious Miss: "Then we might call your stories 'dyspepsia,' might n't we, grandpapa?" — *Chaff.*

"I declare!" exclaimed Fogg at the dinner table to-day, "this is the most affectionate pie I ever saw." "Affectionate pie!" cried everybody at the table, including the landlady. "Yes," said Foggy; "the upper and lower crusts are so confoundedly affectionate that they couldn't get anything between them." — *Athenæum.*

While returning from school one muddy day, Tommy fell into the gutter, with the result that it was rather hard to decide which was mud and which was Tommy. When he arrived home, the following dialogue occurred: Tommy: "B-o-o-o-o! I've fallen down!" Ma: "You bad boy! In those new knickerbockers, too!" Tommy (never at a loss for an excuse): "B-o-o-o-o! I had n't time to take them off when I felt myself going." — *Ex.*

The few men who were privileged to go to Rowe, Mass., with Prof. Crosby, in the early part of the month, highly enjoyed the inspection of the Davis Pyrite mine. It is sunk about 300 feet into the vein, which varies from ten to fourteen feet in thickness. The "hade" is about ten degrees. The hanging wall is a slaty schist; the foot wall has some quartz. The ore is an aggregation of small crystals, which break apart quite easily. It is used largely for making sulphuric acid. The ore is mined by underhand stoping.

An Unexpected Reply.

When Bishop Whittaker was in Candelarra, Nevada, he took a stroll in the outskirts of the camp with a party of ladies and gentlemen. A man was seen laboriously turning a windlass which hoisted from a shaft a bucket filled with rock.

The only thing remarkable about the man at the windlass was his hat, the crown of which was cut clean off, allowing the hot sun to pour down on a perfectly bald head, some waggish friends having recommended this arrangement as sure to produce a crop of hair.

The Bishop and his party stood watching the man toiling and grunting at his heavy labor for several minutes, and then the kind-hearted clergyman spoke up with concern, and said, — "My friend, why don't you cover up your head? This hot sun will affect your brain."

"Brain, is it?" cried the man. "Be jabers, an' if I had any brains, d' ye think I 'd be here haulin up this bucket?"

THE TECH.

Volume IV.

Is published in the interests of the students of the Massachusetts Institute of Technology, and is our recognized organ in our various social and business relations.

Friends of the Institute are cordially invited to subscribe.

All subscriptions should be sent to

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Treasurer of "The Tech."

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MR. THEODORE STEBBINS,

General Advertising Agent of "The Tech."

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

BOYLSTON STREET, BOSTON.

THIS school of industrial science was opened in February, 1865. The first class graduated in 1868. The school is devoted to the teaching of science as applied to the various engineering professions: viz., civil, mechanical, and mining engineering, as well as to architecture, chemistry, and natural history, physics and electrical engineering, and metallurgy.

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.

FRANCIS A. WALKER, President.