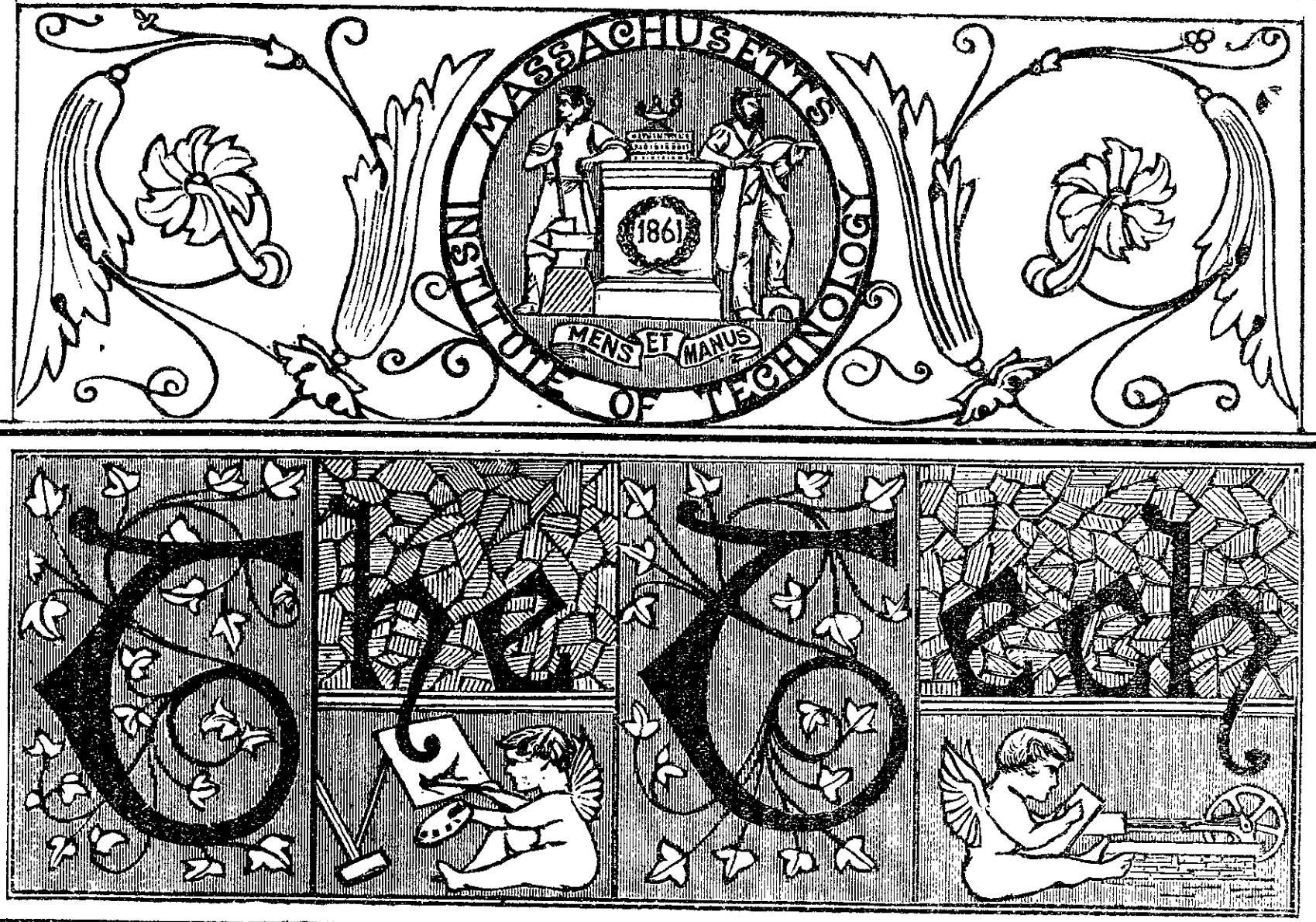

TECH

March 25,
1885.
Vol. IV. No. 12.

Entered at the P. O. at Boston, Mass., as Second-Class matter.

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The Tech.

VOL. IV. BOSTON, MARCH 25, 1885. No. 12.

THE TECH.

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

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

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

ONE of the difficulties in the management of the Institute's affairs is the arrangement of the studies in a tabular view which shall be, as far as possible, satisfactory alike to students and professors. The complexity of this problem is due to the many conditions which must be fulfilled, requiring a suitable time for all lectures, recitations, drawing, laboratory and shopwork of each class, and on alternate days where practicable, but without interference of exercises for either instructors or students; requiring also a judicious arrangement of the blank spaces on the schedule, and attention to the time of day when exercises ought to take place.

Any one familiar with the great number of studies occupying the members of our different classes, and their widely differing natures, will see what an undertaking the preparation of the tabular view is.

Now, although in most cases the arrangement seems very satisfactory, there is still a chance for improvement in one direction. The more solid, scientific work does not seem suitable for the hour from twelve to one o'clock. This hour is generally given to the lighter work of the languages or English studies, or to drawing or the laboratory; but Sophomore physics seem to hold out, from year to year, against the rule. This course of lectures is, at its time, one of the most difficult which a Tech encounters; yet he is obliged to struggle with all the intricate reasonings, explanations, and descriptions, given in a lecture, at a time when he is exhausted by a morning's work, sleepy and hungry, — even faint, sometimes, unless he shall have fortified himself with a sandwich or an apple just before entering the lecture-room. If these lectures could be given an hour earlier, the result would certainly be greater comfort to the class, better attention, and consequently a better understanding of the subject; while the time allowed the instructor for preparation of apparatus and blackboard notes would still seem ample.

THE value of a thorough knowledge of business, and its customs and laws, is not without vast importance in any practical professional man's life. Indeed, its importance is so great, that without such knowledge the carrying on of any work of construction of importance would be a practical impossibility. Scientific knowledge such as is gained by books and instruction, while of vital importance, must be supplemented and ably seconded by a good business capacity in order to make its possessor a successful man. A thorough knowledge of the methods, together with a practical experience in the dealing with men, and with contractors and corporations, is what is needed. The contractor who undertakes a piece of work under the super

intendence and direction of a professional man, soon finds out whether the latter thoroughly understands his position or not; and, if there is neglect and mismanagement, whether it is due to ignorance or shiftlessness. In the latter case, the work is sure to prove unsatisfactory, and as such reflects on the reputation and standing of the person in charge.

The attempting of any important work without such business capacity is thus extremely hazardous. With such facts in view, the acquirement of a thorough business knowledge and experience, is one of the first duties of an engineer or practical professional man. Such knowledge can only be acquired by actual experience and contact with business men in every-day life. The best and surest method of obtaining it is by securing such a position as will give the opportunity of observation together with the gradual intrusting of authority and widening of powers, till sufficient actual experience is gained, and confidence and ability acquired to enable the possessor to stand alone as a thoroughly competent manager.

WE hope that readers of THE TECH will not "skip" the "Noticeable Articles," thinking they merely form an index of scientific papers or other references which they could not or would not find time to attend to. Most of the matter in this department consists of extracts from, and comments upon articles of general interest in the best magazines; and the suggestions made by the principal contributor, in regard to reading and thinking, mental or physical culture, will be appreciated by all those who manage to spare a few occasional hours for recreation of this kind.

MR. FRED H. NEWELL, '85, has been elected to the Board of Editors of THE TECH, his duties beginning with the next number. Mr. Newell has previously shown his interest in the paper, by the contribution of several articles, and is consequently received by his colaborers as a friend, rather than a newcomer.

A French Lesson.

'T was a bright and moonlight evening,
  And we wandered on the shore,
Quite alone and unmolested,
  As we oft had done before.

First we talked about my college,
  (While she tried my heart to wrench
With sweet smiles and blushing glances,)
  Then she chanced to speak of French.

"Decline *un baiser*, please," she murmured,
  While closer to my side she drew;
'T was very wrong, I know, but yet,
  I could not well decline; could you?

F. W. H.

Water Supply in Smaller Cities and Towns.

WITHIN the past ten or fifteen years a manifest increase of attention has been paid to the subject of water supply, especially in the New England States. A glance at the charters granted by the Legislatures of the several States to towns and private corporations, for the purpose of water supply, shows proof of this. People are beginning to realize the dangers of well-pollution arising in closely populated districts, and learning by the experience of their neighbors the convenience, security and cheapness of a system of public water supply. An example of its cheapness may be shown in the following manner: A majority of private companies furnish water at about $5.00 per faucet per year. Thus a householder can for the sum of $5.00 per year supply his house with an abundant supply of pure water. Should he choose to rely on his well, he still has the cost of keeping it, his cistern and pumps in repair, and this added to the interest on the cost of the well amounts, in the average, to about $15.00. Add to this the labor of pumping, — cannot the plying of a pump handle be estimated in dollars and cents?

The public nature of a water supply requires special legislative action for each particular case. The process in New England States is as follows: The town or company petitions the Legislature to be allowed to take water from certain definite localities to supply certain defi-

nite places. This petition is referred to the legislative committee on water supply, which appoints a day for a hearing on the petition and requires the petition to be published in local papers. At the appointed hearing, the petitioners and those interested for or against the petition appear before the committee and state their arguments. If the committee sees sufficient ground for reporting the bill, it does so, and it then becomes part of the regular business of the Legislature, to be taken up in turn. The committee may order amendments to the bill before reporting it, or reject it altogether. Another legal point which may arise is the requirement in this State that all plans of dams, which by breakage would endanger life or property, must be submitted to the county commissioners for the county in which they occur.

The supplying of a small city or town offers much less difficulty than a large city on account of the small quantity needed. This can be supplied by comparatively small streams, which can be kept free from impurities at a small expense. With a large city this case is different. The large quantity needed necessitates often a number of sources, and presents many knotty problems in providing a sufficiently pure and abundant supply. When possible, a gravity system is the most desirable, provided it can be furnished at a less cost than the capitalized cost of pumping from a nearer source, combined with the first cost of the nearer works. The limits of a gravity supply will be found in many cases very exacting, and pumping is by far the most common for our smaller communities. When pumping is employed, to avoid the cost and difficulty of continuous pumping, a reservoir is located on a conveniently near summit and filled as often as necessary, the town or city being supplied by the reservoir. A system of direct pumping called the Holly system has been tried, but in all cases reported has resulted in complete failure as regards the essential objects of a water supply. Its engines are costly and complicated, differing essentially from the ordinary pumps by the large air chambers to even out the pressure and capability of slow rate of speed. Such engines are extremely uneconomical in their working, and are liable to derangement.

To avoid the cost of expensive earthen reservoirs, and to get head where sufficiently high locations are not attainable, stand pipes or tanks are often used. These are constructed of wrought iron boiler plates, and arranged for complete circulation in the interior. To accomplish this the supply pipe is carried nearly to the top, while at its base a check valve is arranged so that the water can only flow out, all coming in being carried to the top and showered down. Such stand pipes or tanks usually contain about a day's supply, and are kept constantly full by the pumps. They are located so as to have the field of distribution between them and the pumps if possible, to give a circulation in the piping. Pumping machinery is often duplicated when a stand pipe is used, to prevent danger from breaks in the pump ordinarily used. Pumps especially designed in style and size for supplying, one the daily demand, and one the fire service, are often used.

The system with a storage reservoir is perhaps the best after the gravity system, the direct pumping with stand pipe next, and the direct pumping alone, last.

The probability of a visit this summer from the dreaded Asiatic cholera is awakening a new interest in sanitary matters. To give pure air, ground and water is the province of sanitarians. Sewerage and drainage accomplish the first two, when rightly applied and used. The third is the object of the public water supply.

February Weather on Blue Hill.

THE Blue Hill Meteorological Observatory, described in TECH No. 4, is the highest station within ten miles of the Atlantic coast, and hence the observations made there have a special interest. The observatory was formally opened Feb. 1, 1885, since which time observations have been taken every eight hours, synchronous with those of the United States Signal Service.

February will long be remembered for its

persistent cold, it being in many places the coldest month ever known. The mean temperature for February at Blue Hill was 16°.5, or 4°.0 lower than at Boston, taking the Signal Service records as a standard of comparison. The difference in height of the stations is five hundred and twenty feet, giving a decrease of one degree for each one hundred and thirty feet of elevation, which is a much more rapid rate than the normal; but this may be explained by remembering that the heated air of the city, rising, causes the Signal Service thermometers to register abnormally high. The maximum and minimum thermometers at Blue Hill recorded each 2°.4 lower than the same instruments at Boston. As might be expected, the relative humidity was considerably higher at the elevated station, the difference amounting to eleven per cent. The mean air pressure, reduced to sea level, differed but 0.003 inch from that at Boston.

The most marked characteristic of the observations at Blue Hill was the great velocity of the wind. The total movement for the month was more than 14,278 miles, exceeding that at Boston by fifty-five per cent; it, in turn, being surpassed in nearly the same ratio by the movement on Mt. Washington, which is probably the most windy place in the world. With this single exception, the writer does not think the Blue Hill record was equalled at any of the Signal Stations east of the Mississippi. The highest velocity registered was seventy-four miles per hour, when both anemometers were blown away, and part of the record was, therefore, lost. The writer has found that at low level stations, such as Boston, the average hourly velocity of the wind is greater in the day-time than during the night; but that at high altitudes, such as on Mt. Washington, this is reversed and there is a very marked increase of velocity during the night, and at Blue Hill this was found to be true in a less degree.

A difference between Blue Hill and mountain stations in general was the small precipitation, which amounted to only 1.18 inches, or 1.82 inches less than at Boston; but this was partly due to the difficulty of collecting the rain and snow in the gauge on account of the high winds. A curious phenomenon observed during a very dense fog was the formation of genuine frost-work an inch or two in length. This frost-work is one of the peculiarities of Mt. Washington, where it often attains a length of as many feet, always growing toward the wind. The Cold-Wave Flag, the circular concerning which THE TECH was kind enough to publish in No. 9, was displayed four times during the month, and each warning was justified by a decided fall of temperature.

Dr. Draper's anemometer and anemoscope, for recording continuously the velocity and direction of the wind, are now in use at the observatory, and a Draper recording barometer is also being built. With the exception of the one at Providence, it is thought that this will be the only self-recording barometer in use in New England, and it is believed that many fluctuations of the mercury, which occur between the readings of an ordinary barometer, will here be shown.

In conclusion, it should be said that much of the regularity and accuracy of the observations of the past month was owing to the care and skill of the observer, Mr. W. P. Gerrish.

A. L. R.

Jean, un enfant petit,
Dans un recoin s'assit,
Mangeant une tourte du Noël,
Il y mit, puis, son pouce,
Tira une prune bien douce
Et, "Quel grand garçon," dit-il.

Nursery rhyme par E. Pithet.

Removal of a Salamander from a Blast Furnace.

IT was the fortune of the writer, last summer, to be in the neighborhood of an iron furnace which was in trouble; in fact something had been bothering it for almost six months, and the "belly," as it is technically called, was evidently the seat of the disorder. Chemists were consulted, but their prescriptions proved of no avail. A dreaded salamander was from the first suspected as being the cause of the disturbance, and later on these suspicions changed almost to certainty.

Therefore it was decided to run continuously, assuming this diagnosis as correct, and by increasing the heat of the blast and making the charges more fusible, to flux the intruder, little by little, and thus get rid of it. Accordingly the furnace was run at its highest heat, night and day, and was tapped every hour or two for several months; but things, instead of looking better, began to grow worse. The tapping hole was drilled higher and higher, and the "Time to tap" came more often, until the men, though shifted frequently, were thoroughly sick of it, for it was necessary to make up fresh mould beds at every tap; and moreover, tapping is a very fatiguing job, as any one who has tried it can testify. Their worry could not have lasted much longer, but it was brought to an unforeseen and sudden end, when it was found that the thick cast-iron pipes in which the blast was heated, by the burning of the waste gases from the furnace, had been melted and warped out of shape in the endeavors to raise the heat of the blast.

Nothing was left now but to shut down, tear out the lower part of the furnace, remove the sow, and then rebuild the hearth and replace the hot blast flues before starting up again.

Blast furnaces, by the way, are built for just such emergencies, and are so mounted that when the hearth is torn out the stack rests securely on six or more iron columns about eight feet high. No time was now to be lost. Masons were set to work and soon demolished the laboratory, when every one saw with astonishment that what was supposed to be an ordinary, every-day sow had grown to be a colossal hog, which Barnum would have payed thousands for, if it could have played cards or told fortunes; and it would have been sold to him gladly for half that sum, with twenty per centoff, if he had wanted it.

No one was curious enough to invent a method of weighing this mass, but its weight was estimated to be between twenty and thirty tons.

Salamanders, or sows, are generally started by the chilling in the bottom of the furnace of a portion of the iron, or of difficultly fusible slag, and are slowly enlarged by successive layers being chilled around them, unless by raising the heat of the blast, and increasing the amount of fuel and the fusibility of the slags they can be melted out.

This course of treatment failed in the present case from the fact that the hearth had been made of inferior fire brick, so that when the heat was raised the fire brick burned out and thus gave the hearth an area more than double what it should have been. Thus the heat, instead of being intensified, was distributed over a large area, and only served to keep the surface of the sow pasty, so that the successive additions would adhere more firmly.

Now here was a problem that was very perplexing. The mass was three feet thick, and had a horizontal diameter of about seven feet. It was therefore too large to be pulled out between two of the columns, likewise too large to be buried, just where it was, by undermining it. Blasting was out of the question, for powder would not have shaken it, and dynamite or nitroglycerine, if employed, would have to be used in such quantities as to blow the furnace into bits; for this was no tender beast, but was composed of the toughest wrought iron that good magnetite and charcoal could make. Two days were spent pounding it with sledge hammers, trying to reduce its size by breaking off the edges, so that it could be pulled between the pillars; but hardly ten pounds were removed, although the men relieved each other every few minutes. This idea was of course abandoned, on account of dulness in the iron trade, and because the demand for pen-knives and watch-springs was light at the time.

It was next offered to an enthusiastic mineral collector as a cabinet specimen, but was sadly refused.

It really began to look easier to move the furnace and works to another site and leave the fire-eater mistress of the situation; but luckily there was a last resort, as there always is in such cases, and that was to go through the laborious process of raising the mass inch by inch with jack-screws, crowbars, steel rails, beams, tackles, hoists, ropes and chains, up on edge.

It was then just small enough to be rolled very carefully under the sill on which the stack was built.

This was a ticklish job, for any sudden lurch would have broken chains, ropes, rails, crowbars, etc., knocked one or more pillars out from under the furnace and brought the whole chimney down in hopeless ruin.

When the sow was safely poised, so that it would not strike the rim of the furnace on falling, a hole was dug, both wide and deep, just in front of it, and after having its photograph taken by a strolling photographer, it toppled with a tremendous plunge into its grave; here it will in all probability remain undisturbed until the end of time, unless some man of a future century discovers it and has it shipped to the Smithsonian Institution, thinking that it is a remarkable meteorite. The old sow lies buried in cold silence beneath the spot where many a bright little pig will yet make its bed in the sand, unconscious of its unwieldy ancestor.

The following, taken from the Stevens Institute *Indicator*, appeared in the *Railroad Gazette* for March 6, headed: —

"STEVENS INSTITUTE EQUATIONS."

(Materials of Engineering at Stevens seem to correspond somewhat to Applied Mechanics of the M. I. T.)

"For the benefit of those reciting on Materials of Engineering, we publish the following as a mathematically correct conclusion from the statement of Prof. Thurston, that the Factor of Safety is a Factor of Ignorance. Hence we have,

Factor of Safety	=	Factor of Ignorance.
Safety	=	Ignorance.
hence Safe	=	Ignorant.
and a safe man in Materials of Eng.	=	an ignorant man in M. of Eng.

Axiom: two things equal to the same thing are equal to each other. ∴ A student ignorant in Materials of Engineering is safe to pass in it."

The Junior Class Dinner.

Nearly seventy members, past and present, of the class of '86 assembled at the Hotel Vendôme, on Friday evening, the 13th of March, to eat their third annual dinner. The guests were received in one of the reception-rooms of the hotel, where a few minutes were spent in greeting former members of the class, and, promptly at eight o'clock, all proceeded to the adjoining dining-room. The *menus* were of neat but simple construction, tied with the Tech colors, and bearing the admonition: —

"Lay on, Macduff;
And damn'd be him that first cries, 'hold, enough!'"

After a short preliminary address from the class president, the whole company immediately laid on to the eatables, and no cries of enough were heard, until two solid hours had passed. The cigars then being lighted, the class president rose, amid a halo of tobacco smoke, and introduced Mr. Geo. A. Ricker as toast-master. The following toasts were then responded to: The Faculty, Mr. Locke; '86, Mr Duff; the Civils, Mr. Stickney; the Mechanicals, Mr. Leach; the Miners, Mr. Simpson; the Chemists, Mr. Low; the Electricals, Mr. Stebbins; the General Courses, Mr. Bartlett; Ex-Members, Mr. Pope; THE TECH, Mr. Chadbourn; the "Literary Record," Mr. Whitney; the 2 G, Mr. Ingalls; Σ X, Mr. Wood; Hammer and Tongs, Mr. Taylor; Athletics, Mr. Robbins; the Ladies, Mr. Neave. These were interspersed with singing by a quartet, consisting of Howard, Fletcher, Leach, and S. F. Smith; a flute solo, by Mr. Lynde, and readings by Mr. Simpson.

The wooden spoon for the man who ate the most was awarded to Mr. Farner, who had been in training for this event for some time, and on the present occasion had eaten nothing for more than twenty-four hours. The gentleman of chromium fame, who won the championship last year, was a close second, and received a vote of honorable mention.

It was voted to have a class cup, and a committee of six was appointed to see that no member of the class eloped or took other unfair advantages of the others.

Singing took up the rest of the evening, and in the small hours of the morning the meeting adjourned, by request, to the sidewalk, where, after howling themselves hoarse, they finally dispersed.

Thanks are due to our professors for their tender consideration of our feelings the next morning.

Anecdote.

ONCE upon a time, in one of our Western towns, the wife of a certain John Smith had fallen into a comatose state, or trance, and was supposed by all around her to be dead. She was accordingly placed in a coffin, which was carried lengthwise across the seat of the carriage, the husband and two or three select friends being inside the vehicle. Just as the team turned up the road to the cemetery, the coffin struck heavily against a stone post, and the shock was such as to rouse the woman out of her trancelike state. She knocked against the side of the box, attracting thus the driver's attention, was taken out, recovered, and lived several years thereafter.

At length, however, she died, and her husband was once more carrying her remains to the burying-place. Just before reaching the spot where the miraculous return to this life had taken place, he leaned out of the window and shouted up to the driver, "Say, look out for that post!"

Communications.

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

TO THE EDITOR OF THE TECH:

It is hardly probable that the committee on the Senior ball will be obliged to dispose of any tickets to outsiders in order to defray the expenses, — a course which could be caused only by most unusual indifference on the part of the students, — or that they will do so to gratify friends outside the Institute, at the serious expense of that class courtesy which is symbolized in the giving of the ball. Of those students, however, whose means and public spirit lead them to subscribe to the ball, but who, for one reason or another, will be unable to use their tickets in person, it may be well to call the attention to two points: First, as the Senior ball, unlike the afternoon parties, is of an inter-class nature, it *is* and should be *kept* a strictly Institute affair, and accordingly, before transferring a ticket to an outsider, it would be well to look around the circle of one's friends for some Tech, who, while honestly unable to subscribe to the ball, would enjoy its pleasures as much as any one; secondly, that in any case, it is preferable to accommodate a gentleman who intends to bring a fair companion, rather than an inveterate and persistent "stag."

At an ideal party, the sexes are nearly equal in numbers; or, since a lady can make no effort to fill up her order, the preponderance should be slightly on the side of the gentlemen. There certainly should not be such an excess of the latter, however, as there was a year ago. At a college like ours, where the regular work consumes so much time that non-residents have only very limited opportunity to make acquaintances among the gentler sex, all who *have* been fortunate in that respect should escort *at least* one damsel to the ball, for their comrades' benefit as well as their own. The "natives" should properly "go them one better" in order to provide for such of their friends as have been really unable to secure a companion.

By due attention to these brief hints, any student and worshipper of Terpsichore can do as much towards the practical success of the ball as if he were a most energetic committee man.

'87.

The man who addressed a letter to the "instetoot of tecknowledgey" was evidently not a believer in phonetic spelling.

The following conundrum was elaborated by a conclave of chemists: "Why is the M. I. T. like a pung?" Because it is hard to catch on to, hard to hang on to, and hard to keep up with, if you once get a little "off," but a good many do hang on who are bound to be "bounced" sooner or later.

Noticeable Articles.

THE best paper in *Macmillan's*, for February, is a review of the life and letters of George Eliot, by John Morley. It is an excellent estimate of that great but gloomy writer; and the reader who can turn to it might read along with it a paper on her novels, by the same critic, in the number for August, 1866. The concluding paragraph of the latter article seems to me to sum up pretty much the whole of the philosophy of rhetoric. "I have only to notice one thing more," says Mr. Morley, himself one of the ablest of living English writers and thinkers, "and that is how thoroughly these novels show to people who write, that style is not the result of reading, but of thinking. It is not the assiduous cultivation of a style as such, but the cultivation of the intellect and feelings, which produces good writing. Style comes of brooding over ideas, not words. It is because George Eliot lets ideas lie long and ripen in her own mind that their fruitage of expression is so delicate in flavor, and so rich and diversified in color."

In *Macmillan's*, for March, there is a discriminating article in that most famous of all English legal writers, Sir William Blackstone, whose well-known commentaries can no longer be considered the last word on the philosophy of English law. In the same number, to turn to a very different subject, the story entitled "The Millionaire's Cousin" is completed; and a new one, "Mrs. Dymond," is begun. The latter is by Mrs. Ritchie, Thackeray's daughter, and will no doubt be as pleasant as her other charming stories. The former is by the author of that capital novel, "A Chelsea Householder," who turned out to be a lady, the Hon. Emily Lawless.

Macmillan's, for March, also contains a short paper entitled "A Southern View of the Election of Cleveland," which all opponents of his election had better read.

In the March number of the *Andover Review*, the new organ of the more liberal wing of the so-called Orthodox sect, there is an admirable paper by Prof. G. Stanley Hall, now of Johns Hopkins University, on the study of philosophy by college students. By philosophy, Prof. Hall means not a mere juggling with unintelligible words, but a dealing with the great world of mind in the same genuine fashion in which the student of physical science deals with the great world of matter. "No university," he says justly, "is truly universal that ignores large sections of human nature, or cultivates it only in spots." And very weighty are his remarks on the necessity of harmonious development of all the faculties, bodily and mental, to the securing of healthful success. "While the intellect may work correctly," says Prof. Hall, — and no man is better acquainted with all the valuable results of recent psychological investigation, — "with much physical infirmity, a single feeble part of the body cannot be without some ill-effect on the sanity of sentiments, restricting the full and healthy flow of emotional life which nature seems to offer to no class of young men more certainly than to those entering upon college life. Not only during rapid growth, but for years after, the vital processes are directed to the body at large; the brain and mind are somewhat sluggish and retarded. If these are crowded, *e. g.*, some other part of the body is more or less starved and dwarfed, accident or hereditary weakness determining from which organ or tissue nutrition should be diverted. Chest, stature, stomach, muscles, teeth, spinal cord or brain texture may suffer, — to collapse at the very beginning of senescence."

Thus, no folly can be greater than for a college student to endanger his mental or his physical health by overstudy, and no condemnation too severe for the instructor who either encourages or exacts it. On the other hand, there is nothing unhealthy in hard study within due limits, but the very reverse; and the student who for a manly purpose elects "to scorn delights and live laborious days" will not repent it, provided he knows the limits of his powers and takes care to learn all that physiology can teach him about the care of his bodily health. Prof. Hall's suggestion respecting the sanitary supervision of college students is a most important one. W. P. A.

Non-conducting coverings for steam pipes, — *Boston Journal of Commerce*, Feb. 21, *et seq.* Prof. Ordway, of the Institute, conducted a valuable and extensive set of experiments on coverings for steam pipes a few years ago, and the results of these experiments are given in this article, which was read before the American Society of Mechanical Engineers, by Mr. C. J. H. Woodbury.

Outing for April begins a new volume, and appears in a new cover. It has been much enlarged and is now a magazine of one hundred and twenty-five pages. In the current number, prominent articles are, an account of an ocean yacht race, an interesting paper on whist, and a series of letters on the Adriondack Forests, from eminent public men, including President Walker.

The most interesting paper to college men is "Foot-ball in America," by Capt. E. L. Richards, Jr., of Yale, in which he eloquently defends the sport. He says in the course of his article: —

"While it may be said, in illustration of the head-work required in foot-ball, that, before the recent match with Princeton, the line of march for the Yale team from the kick-off, with the requisite plays, was accurately traced out on paper, the Yale team, with one slight error, carried out that plan of tactics, and in three minutes and a half they had crossed Princeton's goal-line. This is the game which is pictured as won by brute force. It is really won by the greater coolness and the quicker thinking."

The Telephone Company threatened to remove the telephone from Rogers Building, if its use by students was not stopped.

Department Notes.

The library of the mining department has been increased by several valuable works.

A chemist was heard to remark that when his battery decomposition was complete, hypo-porous acid would be evolved.

Surveying is no longer to be taught to the miners of the Junior class, so much complaint having been made about the lack of time in the chemical laboratory.

The "Portfolio Club" of the Architects met at the Quincy House on the 18th inst. After the transaction of necessary business, a paper was read by Mr. Schmidt, and musical selections were given by other members.

An invitation to visit the Wakefield Water Works Pumping Station, and examine the pumping machinery in operation, has been extended to the fourth-year civils by Percy M. Blake, the engineer who designed and constructed the works.

The fourth-year Mechanicals are to have a course of lectures by Prof. Cross, on Electrical Machinery. The class has begun regular work in the Applied Mechanics laboratory and in the mechanism and operation of the Institute's cotton-mill machinery.

The third-year miners who were instrumental in having historical geology made a required study in their course, are now repenting their haste. They come forth from their lectures on the festive trilobite, and other useful Silurian animals, a set of sadder but wiser men.

The fourth-year Civils visited Chestnut Hill Reservoir on Saturday, the 14th. The gate-houses at the outlet, at the divisions between the basins and at the Sudbury Conduit inlet, were inspected and the valve mechanism explained. Mr. Fitzgerald's apparatus for measurement of rainfall and evaporation in reservoirs were also seen. A trip through the Sudbury River Conduit seems to be the proper thing for next spring.

The third year Mechanicals are having a course of twelve lectures in Surveying.

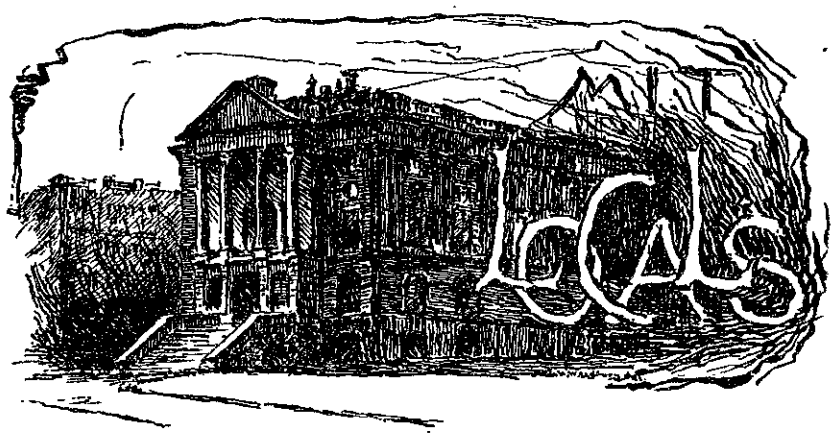
Assistant Prof. Burton lectured before the third and fourth year Civils on Wednesday, the 11th, on Gridley Bryant and the old Granite Road at Quincy, Mass. It will be remembered that this is now established as the oldest railroad in the country, being established in 18 7.

The fourth-year Mechanicals conducted two boiler tests last week, on Monday and Wednesday. Operations began about five o'clock, A. M, and lasted until late in the afternoon, including water, coal, and air records, observations of temperature and barometric and steam pressure, calorimetric tests, etc. The experience of last term's tests had suggested improvements in apparatus and in the manner of carrying out the work, which aided in securing better results than before. These tests will hereafter be a part of the regular fourth-year work, and it is expected that in a few years a great deal of valuable material will accumulate in their results, as they will be carried on in connected series, with definite ideas of comparison under different conditions.

The Architects have just had another exhibition of problems. The Seniors had worked up designs for a bridge and pavilion, and a wrought-iron gate. The Juniors had designed a Greek Frontispiece.

It is to be hoped that the Seniors will not permit their generally admirable work to answer as an excuse for doing something bad occasionally, but certainly, in design and rendition, their drawings were far below the standard which they have established. The mentions were as follows: first, Mr. Maher; second, Mr. LaValle; third, Mr. Krucker; fourth, Mr. Benton. Whatever may have been the satisfaction with the mentions, there can be no doubt of the success of the "sub mentions" which may be described in a word as "simple but earnest."

The Juniors' problems were as a whole very successful, both in composition and rendition. The mentions were: first, Mr. Wakefield; second, Mr. Gardner; third, Mr. Loud; fourth, Mr. Shortall.



What has become of the Dartmouth Street "dorg"?

Dr. Wilson is giving a course of lectures on protoplasm before the Biological Club.

O. B. Tilton, '86, has been appointed superintendent of the Nashua Mills, Nashua, N. H.

Thought of Sophomores during optics lecture:—"O that *B——r* or *one o'clock* would come!"

Descarte's "Law of Signs," Tech version. "Drop them quietly over a front yard fence, if you meet a 'cop' on your way home."

In second-year physics. Lecturer:—"Here, gentlemen, is the analyzer, here the polarizer, and beyond them you see the dark Cross."

One student who got F on his last examination paper thinks it must stand for *fine*, and is glad the professor is so enthusiastic over his work.

It is rumored that the Freshmen have been compelled to resort to stringent measures in order to distract the laboratory instructors from the co-eds.

Does any one know the meaning of the gongs which ring in the hall of Rogers at irregular intervals? They seem to puzzle both professors and students.

A course of lectures on Railroad Economy and Finance are soon to be given by Mr. Arthur T. Hadley, of Yale College. The course comprises twelve lectures and commences the last of this month.

At their meeting last Thursday the Freshmen voted by a majority of *one* to leave to individual option the use of wine at their class supper, the arrangement of which is delegated to a committee of five.

Who painted the setter, on Dartmouth Street, green?

The little pamphlet, "Protection and Free Trade To-day," has been distributed throughout the Institute. It is a well-written discourse on this subject, with strong Protectionist views.

No one would have imagined that there was so much juice in the census as Gen. Walker has managed to squeeze out of it in his lectures at the Lowell Institute. — *Boston Evening Record.*

Through the kindness of the Janitor of the New Building, "Theodore," the occupants of Room 23 have at last discovered *which* the hot-air inlets are. They have been caged and labelled so as to prevent farther confusion.

Early arrivals at the Tech on Monday morning, March 16, were much surprised to see a sign over the door of Rogers Building which read as follows:—

"*No passing through.* (*Sewer Department.*)"

The second-year architects hold special sessions in Room 22, on Mondays, Wednesdays, and Fridays at one o'clock, for the study of Educational Architecture and Effects in Outlook, as illustrated by the buildings opposite.

Copies of TECHS Nos. 7 and 11, containing short locals on the heating of the New Building, have been forwarded to Mr. Frederick Tudor, the designer of the heating and ventilating apparatus, with the compliments of the editors.

At the evening high school of Boston, candidates for diplomas sign statements representing their proficiency to entitle them to that document, which is, thereupon, promptly granted. We cordially recommend this scheme to the Faculty as eminently calculated to give entire satisfaction to the maximum number of students.

An interesting and valuable lecture on the principles of gastronomy was given to the Sophomores recently by Prof. Atkinson. Subject: "The immediate and *tech*nical danger of eating lunch out of season." It will probably be followed by a second of the same nature from Prof. C., on "The *physical* undesirableness of pop-corn and molasses-cake as a stimulant."

It is expected that Prof. Lanza's book on Applied Mechanics will be ready within a month, as the last few pages are now being put in type.

The winter games of the Massachusetts Institute of Technology were held in Boston, Saturday afternoon. Harvard had representatives in nearly all the events, most of whom got either first or second place — *Yale News*. In consideration of the fact that Harvard won but two first and two second prizes, out of ten events, this is rather extraordinary information.

The Gymnasium party of the 14th inst. was, in point of numbers, the most successful one of the season. The only complaints made were of the quality of the floor and of the lateness with which the dancing began and the promptness with which it ceased. The former trouble, which caused an unusually large number of downfalls, was unavoidable, being largely due to the rosin still remaining on the floor from the games. The second was the result of an unaccountable want of punctuality on the part of the orchestra. In other respects the affair was most enjoyable. The managers were Mr. Locke, '86, and Messrs. Haskell, Shepard and Spaulding, all of '87.

The members of the Biological Department, with some gentlemen studying in the Laboratory, have organized a Club, which under the name of the "Biological Club," meets every Thursday afternoon.

The first meeting was held Feb. 19, when the Club listened to an address by Prof. Sedgwick on the "Rotation of Protoplasm in Plants," and by Dr. Wilson, on the "Development of the Eye."

The second meeting, Feb. 26, Miss O'Grady read a report of a paper on the "Absorption of Water in Plants," and Mr. Hargitt on "Cross-Breeding in Potatoes." Dr. Gardiner delivered an address on the "Development of the Human Epidermis."

The third meeting, Mr. Hargitt made some "Observations on Earthworms," and Prof. Sedgwick read a paper on the "Coagulation of Blood in the Terrapin."

The Club now numbers about twenty members, and great interest is felt in the work.

The College World.

HARVARD. — A number of students at the Medical School invited a prominent homœopathist to lecture to them on homœopathy, which invitation was accepted. The Faculty of the Medical School refused to allow a homœopathist to lecture there, and it had to be given elsewhere. — Henry Irving is to deliver an address before the Shakespeare Club. — Athletic games next Saturday. — There is an astonishing indifference to class dinners at Harvard, this year. — The Faculty has prohibited the advertising and public sale of tickets for the Hasty Pudding Club theatricals which are to be presented in New York on April 6 and 7.

YALE — The foot-ball trophies worn by the eleven this year are foot-balls of Roman gold with "Yale" in blue enamel one side, and "Champions of '84," on the other. — Yale has sixty-nine base balls won from various clubs, collegiate and amateur. — The Bicycle Club has fifty members. — Efforts are being made to revive the formerly popular hare and hounds club. — Placing a low estimate upon the annual expenses of five hundred students, the co-operative committee count upon a saving of $6,000 per annum.

COLUMBIA. — The School of Mines has a Photographic Society. — The prospects for base-ball next season are good. A number of men from the Law School have signified their intention to play. — The trustees of Columbia are considering whether it is advisable to establish an annex for the education of women. — The miners petitioned for the restoration of quantitative analysis to their course, and were granted six weeks in the fourth year.

ELSEWHERE — W. P. Page, of the University of Pennsylvania, broke the amateur record for the running high jump, last week, with a jump of 5 ft. $10\frac{1}{2}$ in. This is all the more remarkable from the fact that Page is but 5 ft. 7 in tall. — At a meeting of Dartmouth students Monday night, $1300, the largest amount ever raised there, was pledged for the support of the Base-Ball Association the coming season.

He 's Coloring His Pipe.

Intent he sits, as one absorbed in thought;
For book he cares not. Aye, he cares for nought,
But for that bit of meerschaum oddly wrought.
He 's coloring his pipe.

He puffs, then looks; he puffs and looks again
With careful scrutiny, for he would fain
See some slight color pierce the ghostly grain.
He 's coloring his pipe.

He holds it idly with a fond caress;
Hands off, for heaven's sake! you 'd never guess
The harm you might do in your thoughtlessness.
He 's coloring his pipe.

He smoketh like a chimney without let;
From affluence tobacco leads to debt;
Though pale and 'maciated, even yet
He 's coloring his pipe.

Yale Record.

Hard to beat — carpets. — *Life.*

A four-in-hand — four aces. — *Life.*

Yale has organized an anti-swearing society, — at least, so say the newspapers, — in which the penalty for swearing is the payment of drinks for the whole society. — *Crimson.*

Unfeeling boy. — "Better come away from that fire."

Augustus St. John Bourne (a bow-legged dude with tight trousers), — "Aw! why?"

Unfeeling boy. — It's warpin' you all out of shape." — *Life.*

FASHION GLEANINGS.

Walking dresses will be worn much longer than last year, on account of the hard times.

Arctic overshoes in the ball-room are not considered correct.

A scene in the Brooklyn Navy Yard.

Reporter. — "Hullo, hullo! What is all the excitement?"

Jack. — "Why, the Dolphin went up to Willett's Point, and has come back all right!" — *Graphic.*

Miss Parvenu. — "I was almost sorry, mamma, that you spoke so rudely to that poor little Mrs. Wilkins."

Mamma. — "Well, my dear, pray where *is* the satisfaction of being in the first society, if you cannot snub those who are out of it?"

A Kentuckian was a guest at a state dinner, and as often as his champagne glass was replenished he would drain its contents with an injured and dissatisfied expression on his face. Finally he turned to the gentleman who sat on his right. "I say, neighbor," he whispered, "ain't they goin' to give us anything to drink?" — *Ex.*

A New York lady recently engaged an English coachman. Staying rather late at a house on Fifty-fourth Street, she was anxious to get back as soon as possible by the most direct way. "John," said she, "shall we turn to the right or go straight up Madison Avenue?" "Lor, mum," John replied, "it don't make no hods to me, yer know." — *Ex.*

Smith. — "Do you see that villanous-looking man across the street?"

Jones. — "Yes, what of him?"

Smith. — "He has caused me more misery than any other man on the face of this earth, and one of these days I 'll pay him for it, as sure as I live!"

Jones. — "Why — what — who is he?"

Smith. — "He is my dentist."

AT THE HOP. *Miss Hyflying:* "I am very sorry, Mr. Dudeling, that I had no dance for your friend; but why did you urge him to take the seventh extra? Do you think they will get to it?"

Dudeling '88: "Well, no, but you know—er—(*intending to be highly complimentary*) the *chance* of a dance with some people is better than the *certainty* of one with others."

After a week of "Domestic Earthquake" at the Bijou Theatre, the popular comedians, Harrison and Gourlay, now present "Skipped by the Light of the Moon." It has previously been played here by the same company, and had a successful run. This comedy is one of the best now being played. "It's funny, very, very, very funny."

"Joshua Whitcomb" appears this week in his annual engagement at the Boston theatre. This play, in its lifelike delineation of New England life, has a never-waning interest to the public. Denman Thompson plays the title role, and has an excellent support.

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 departme it with a variety of looms is connected with this school. No charge for instruction is made.

FRANCIS A. WALKER, President.

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