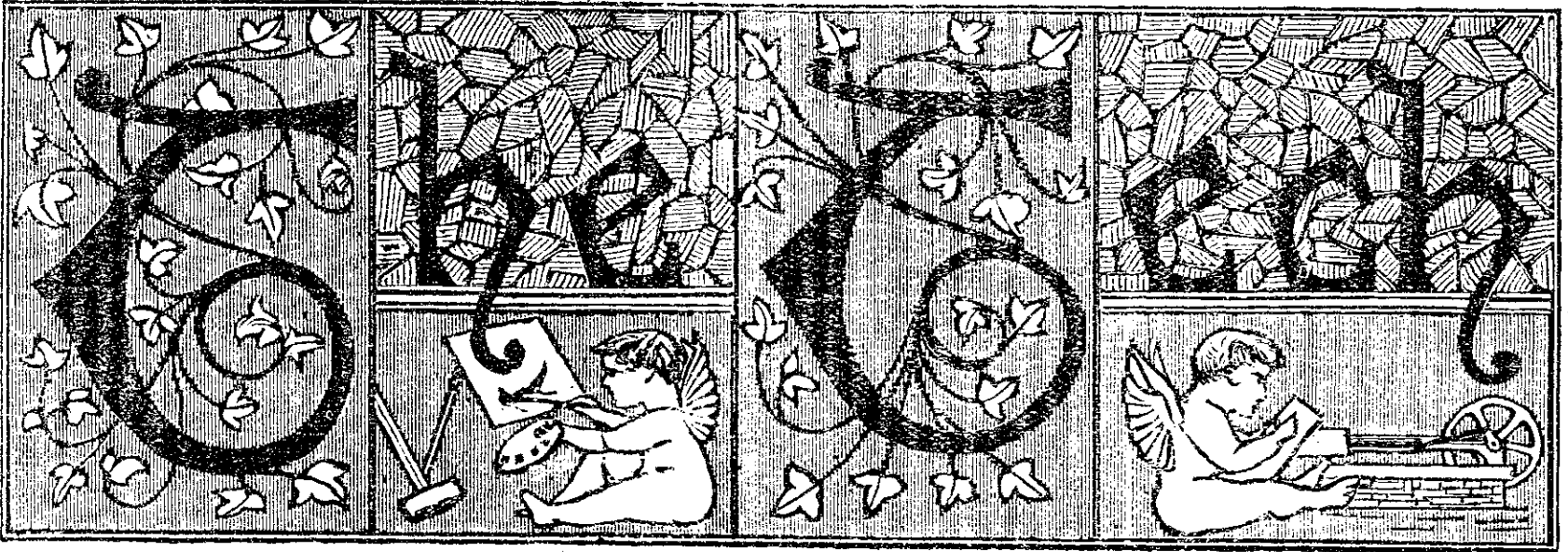
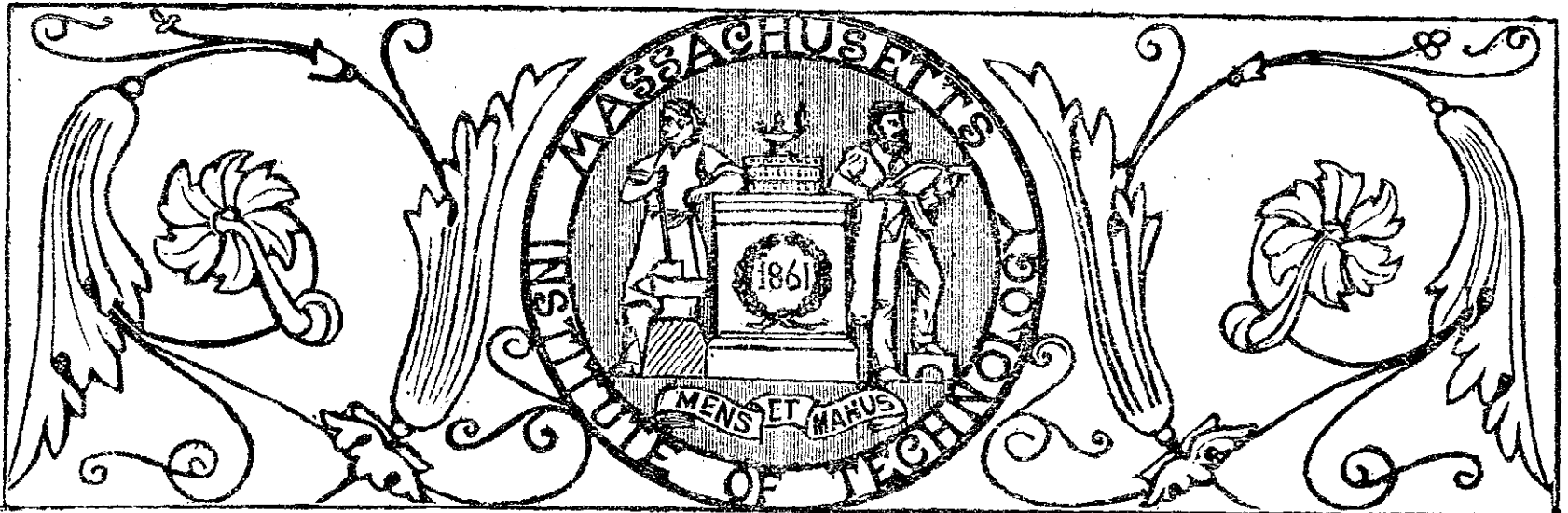




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WE regret to announce to our readers the resignation of Mr. Arthur D. Little, as editor-in-chief of this paper. Mr. Little has been connected with THE TECH since its foundation, and was the only one

of the original editors on the staff.

The position of editor-in-chief on THE TECH is no sinecure, and the time required by a student to do his regular work at the Institute leaves few extra moments for literary work. That this labor be made lighter is imperative; and during the present term it is probable that the division of work among the editors will be such as to relieve in part the editor-in-chief and give each member of the staff more experience in the mechanical work of the paper.

The improved condition of THE TECH under Mr. Little's direction has been apparent to all,

and the management will be fortunate indeed if they can secure as able an editor to fill the vacancy.

UNDER existing circumstances the man who comes to the Institute with the intention of studying hard will run serious danger of losing his reputation as a social success, and on the other hand your "jolly good fellow" is pretty certain to find himself brought up with a round turn some fine day. In point of fact it is impossible to do justice to one's studies and to one's friends at the same time, and sooner or later the choice must be made between the two alternatives.

The courses laid out are framed for those who come to fit themselves for special professions, who are aware of the value of the time spent here, and desire to make the most of the present opportunity. In some instances the amount of work required is considerably in excess of what can be done thoroughly, and as every one knows such a state of things is bad in its direct results by forming slovenly habits of study, and in its discouraging effect on one's mind to say nothing of the physical injury consequent. Now the remedy can only come by first examining thoroughly the grievance and getting the opinions of the majority, and the thing thus naturally resolves itself into a class affair, and one which commends itself especially to the hard-worked student.

We prophesy that the action of the Amherst College Faculty will before long be followed by other institutions, and a better communication established between that body and the students; not that we desire to resemble a college, indeed, we think that is just the element not to be wished for here. But for each class to have some simple organization which will insure a class record, enable members of the class to

know one another better than a mere recitation-room acquaintance admits of, and be the place where class opinions and class progresses may be exchanged and compared.

A gentleman of wide experience and sound sense, in speaking of this same matter to the writer, said in a most impressive manner, "Make friends of your fellow-students; for you cannot tell where or how you may meet them or need their friendship in future life," and we fear this is not sufficiently realized in the busy life at the Institute.

Those who have pulled through the long years and hard examinations are not, as a rule, the ones who are the most regular club members; but there *is* a platform where the whole class can meet without detriment to its duties, with marked advantages in way of class information and friendships, discussion of proper health measures (a thing sadly neglected in the Tabular View), and a reasonable enjoyment in which all can share. We heartily commend and indorse the action of '85 in inaugurating a system in which classmates may meet fraternally and without the expense which debars so many from simple recreation.

AMID all the developments and improvements recently made or contemplated at the Institute, there seems to us to be one lacking. The department of mathematics, though recognized and emphasized in importance, has apparently lagged behind in the general advance. It is true that a very large proportion of our students continue their mathematical studies through the Calculus; but who thinks of going further? And in the limited time allowed, those who do take the prescribed course get little but the merest rudiments of the subjects, only so much as may be indispensable for the comprehension of the more advanced professional work of some of the courses.

We would by no means advocate the imposition of abstruse and perhaps impractical studies upon the already ample work of the fourth year; but we do believe that time could well be afforded for teaching and learning both the Differen-

tial and Integral Calculus more thoroughly. If this, however, cannot be arranged, we think there is room for improvement in another direction. Let the man whose work in other directions precludes his fulfilling more than the present requirements do that, and go on with his applied mathematics; but let some provision be made for the one who is not thus limited, or who has a stronger inclination in this direction. Let him be enabled not only to do the regular work more thoroughly, but also to continue his pure mathematics to the completion of his four years' course.

We have considered only the case of regular students; but a similar argument would apply with even greater force to that of specials.

The Institute is, of course, a technical rather than a purely scientific school; but should not the higher mathematics find as ready place in the curriculum of the former as well as certain other studies we could mention?

Even in comparison with the classical literary institutions around us, our mathematical training, though superior probably in its average development, is certainly far inferior in its maximum.

WE are very glad to note the improvement, of which the '86 miners get the benefit, in the amount of surveying practice given, which is the same as for the Civils. It ought to be so, for a mining engineer really requires to be a skilful surveyor. It is coming also to be a necessity for mining engineers or mine superintendents to know thoroughly about the setting up of machines and boilers, and to recognize the various good points of engines for special purposes.

DURING the past term THE TECH has labored under the disadvantage of being without an office, and for this reason the secretary has not been able to do his work as promptly as he would like. The changes now being made in the Rogers Building will no doubt result in leaving a suitable room in which to conduct our business, and we will be glad if subscribers will notify us immediately of any irregularities.

The Chicago Water System.

THE inhabitants of Chicago consume daily over sixty million gallons of water for domestic and manufacturing purposes, or about one hundred and ten gallons per individual, an average said to be greater than that of any other city in the United States; and yet it has the reputation of being a very dusty, dirty city! The system by which this supply is obtained may be interesting, as it is unusual in some of its principal features.

In 1839, Chicago being a city of about 4,200 inhabitants, a company was formed for the purpose of supplying the city with water, which it pumped from the shore of Lake Michigan into a small reservoir, using for this purpose an engine of 25 horse-power. The rapid growth of the city increased the size and importance of the system; in 1851 (population 30,000) the water was drawn through a pipe from a reservoir six hundred feet from shore, and distributed by a two hundred horse-power engine; in 1866 the population was 138,000, and the engines pumped over 6,000,000 gallons a day, their capacity being 20,000,000 gallons. But by this time the presence of innumerable small fishes in the lake reservoir, and the contamination of the water near shore by distilleries, packing houses and city sewage made the supply dangerous to health; and it was finally resolved, as a means of obtaining pure water, to tap the bottom of the lake, opposite the city and two miles from shore, by a tunnel, through which the water could be brought. Experiments showed that the lake bottom, from the shore to this point, was composed of a layer of sand of varying thickness, below which was a stratum of stiff blue clay, through which the tunnel would pass.

Ground was broken for the shore shaft in March, 1864, but a difficulty was immediately encountered in the shape of a layer of quicksand, which rendered the proposed masonry walls impracticable. After some delay there was substituted a series of cast-iron cylinders, nine feet inside diameter, and one and one half inches thick, in ten-foot sections, and below these the

shaft was lined with masonry, its inside diameter being eight feet. On reaching a sufficient depth a turn was made and work was begun towards the east, on the tunnel, its floor being sixty-nine feet below the water level. The line of direction was established by buoys in the lake at the proposed terminus, and below ground by a drift extending westward from the bottom of the shaft, and having at its extremity a chamber, in which a transit was mounted; the line once fixed was extended with some difficulty, on account of the uncertain atmosphere, during the subsequent work, candles being used as points of sight.

Two shifts of miners, the first for rough work, the second for "trimming," each shift working eight hours, advanced the tunnel about twelve feet per day, the clay being carried on a railroad — mule power — to the shaft, hoisted and carried off; besides clay there were also encountered a few pockets of quicksand, several large boulders, one of which had to be blasted, and numerous leaks of inflammable gas. During the remaining eight hours of each day a shift of masons, following the "trimmers," lined the part just excavated with eight inches of brick, toothed and cemented, laid by the aid of patterns and arches of iron. Fears were entertained of a break in the roof, in advance of the masonry; but though the paddle-wheels of steamers passing overhead were sometimes heard, no accident happened.

When work had been carried to about 4,000 feet from shore, operations were commenced at the lake terminus. A pentagonal structure of wood, forty feet high and nearly one hundred feet across, called the Crib, was built on shore, floated into the required position, filled with stones and sunk to the thirty-foot bottom; in a well through its centre was placed an upright pipe, composed of iron cylinders nine feet in diameter, two and one-quarter inches thick, and in nine foot sections; the lower edge of this pipe, reaching the bottom of the lake, sank by its own weight and a little additional pressure twenty-three feet farther, and from this point, fifty-three feet from the water level, a shaft of the same diameter as the cylinders was sunk to

a depth of sixty-seven feet, where excavations for the tunnel were also commenced.

After this, work was carried on simultaneously at both ends until the sections were one hundred feet apart, when a small drift was run through the remaining distance to ascertain how the lines were likely to meet; it was found that, notwithstanding the difficulties of taking observations and conforming to them, the error was only a few inches, and corrections having been made, the walls were continued until they met, and on Dec. 6, 1866, the ceremony of completion took place. It then remained to fill in the chambers used in construction, cleanse the interior, make final inspections, etc., and on March 25, 1867, the new system was inaugurated.

This tunnel, as completed, is oval in section, its height being five feet two inches, width five feet, inside the masonry; its length is 10,587 feet, and capacity fifty-seven million gallons per twenty-four hours. It connects the Crib with the north pumping works, and sufficed to supply the city until 1872, when a new one was begun, similar to the first; this latter starts at the Crib, and reaching the shore at about the same place is continued by a "land extension" passing under the city to the west pumping works which were started in November, 1876. The new tunnel is 31,490 feet in total length; inside measure, seven feet two inches and seven feet; capacity, about one hundred million gallons daily.

The cost of the old tunnel, including all preliminary and other expenses, was \$457,844.95; the new one, including the west pumping works building (\$189,660.39) and engines (\$244,612.23) and works at the Crib, cost \$1,638,249.92. Connecting with the pumping works termination and shaft of each tunnel is a well, from which water is taken by the pumping engines; at the other termination the Crib, now a substantial brick and stone structure, besides protecting the cylinders from waves, ice, and ships, serves also as a light-house. The tunnels are connected, so that either can be emptied, and the other at the same time used by both works.

The course of the water, then, is as follows:

It enters the cylinders at the Crib through gates some distance below the lake level, where the temperature, varying from about 65° in August to near the freezing point in December or January, averages 45°; sinking through the lake shaft, it flows through the tunnels and seeks its level, through shafts and connections, in the wells under the pumping works; it is then taken in by the engines and forced through 36-inch delivery pipes into the city mains, whence it finds its way through over five hundred miles of pipe to over half a million consumers. The delivery pipes from the engines at each works connect with the base of a tower containing a "stand pipe"; each of these is a vertical tube of iron, open at the top, that at the north works being three feet, that at the west works five feet, internal diameter; in these the water rises to a height proportional to the pressure under which it is delivered, averaging about one hundred feet, and this liquid column acts as a regulator to the engines; the stand pipe also affords a means of escape to the air which is continually forced into the air chambers of the engines, and which would be an annoyance if allowed to enter the mains in any considerable quantity.

The supply through the tunnels is at present ample, and the pressure in the pipes sufficient to raise water to the tops of ordinary sized buildings in places remote from the works; but the constant rapid growth of the city has rendered necessary a doubling of the pumping capacity of the west works, which, when completed, will increase the present total capacity by thirty million gallons daily; notwithstanding this fact, the establishment of works in the south division of the city is now being considered.

The enormous amount of city sewage poured into the lake is beginning to affect the water, even at the distance of the Crib, and a plan has been proposed for taking the supply at a point twelve or fifteen miles farther north; if any such plan is adopted it will be made sufficiently permanent to secure to Chicago that blessing which all Boston readers of THE TECH will appreciate, — a constant and abundant supply of clear, wholesome water.

T. W. F.

The Ventilation of "The New Building."

A WISE man improveth his opportunities; hence, as students of the Institute, it behooves us to become acquainted with the practical workings of the buildings we occupy; accordingly do we now turn our attention to the ventilation of the new building.

As will be readily seen, the heating and ventilation, although closely connected, are distinct and may easily be separated; thus, in a general way, the system of ventilation is as follows: Fresh air from the external atmosphere is admitted to a large chamber in the basement, where it is set in motion by "the fan," kept constantly rotating during the day. Thence, under slight pressure, it slowly circulates through the sub-basement, an open room extending beneath the entire building and four feet in height; flues, in the main longitudinal and transverse walls of the building, now convey the air to the several rooms, which it enters by registers elevated eight feet from the floor, the foul air passing out by other apertures in the walls placed near the floor, and which lead into outlet ducts connected with the free air through the top of the building.

When it is desired to heat the building, as is necessary during the greater part of the school year, the air before entering the receiving chamber passes over steam coils which raise the temperature to about 60°. Supplementary coils at the base of each inlet flue supply any additional heat needed in the several rooms.

The aim in all this has been to secure the circulation of an abundant supply of pure air. To this end have been constructed large inlets, free spaces between the coils, open fan area, and wide flues.

The external inlet, an area of one hundred square feet, is on the east side of the building, and opens directly upon a broad surface of steam coils heated by live steam from the boilers of the Porter-Allen engine in the Rogers Building. This main stack is so arranged as to offer a free space of over one hundred and twenty square feet between the coils, thus allowing the air unrestrained passage in and about them. It is capa-

ble of raising from 3,000,000 to 4,000,000 cubic feet of air per hour from 10° to 60°, the capacity of the building being about 740,000 cubic feet.*

The fan-mouth or aperture into the air chamber is nine feet in diameter, again offering an easy inlet to the air, which at this stage is blowing nearly a gale.

The fan itself is twelve feet in diameter, and is provided with twelve vanes; as now run, it makes eighty revolutions per minute, giving a possibility of change of air in the entire building with the winter supply every fifteen minutes, while with the summer supply every twelve minutes.

With a temperature of about 60° the air circulates slowly through the sub-basement, the pleasant moisture of the concrete bottom and solid walls communicating to it little if any humidity.

The flues, of which there are over eighty, are three feet by one in section, and each is provided with a damper of easy access at the base so that the air supply may be turned from any room when not in use.

The total flue area aggregates one hundred and sixty-seven square feet, being shared as follows:—

Basement	19 sq. ft.
First floor (excluding halls)	21 "
Second floor	29.5 "
Third floor	36 "
Fourth floor	54 "

From the above figures it will appear that especial care has been taken to provide an abundant air supply for the chemical laboratories, nearly one third the flue area of the entire building being allotted to them.

To secure at all times a sufficient and constant quantity of air, each inlet register is provided with a separate flue; there being several registers in the larger rooms to facilitate an equal distribution of air and heat. Whenever possible, these flues have been built in the inte-

* It may be well to add that the halls are heated by radiation from the brick walls, ventilation being secured by open doors and general leakage; this, of course, is not included in the above 740,000.

rior walls; hence the course of the air about the rooms would be that of the natural currents from the inner to outer wall across the ceiling to the floor and out by the lower registers on the opposite side of the room. An upper register in each room, kept closed during winter but open in summer, conveys the warm air by the same channel, with the vitiated air away from the building.

The supplementary coils, heated by the waste steam from the engine which drives the fan, and by additional live steam when needed, are capable of raising the temperature of the air from that of the air chamber, namely, 60° to 100° ; so that, if at any time any room requires a temperature exceeding the former, the steam is admitted to that particular coil, and the valve adjusted to regulate the supply; in passing over the heated coils the air acquires a temperature sufficient to communicate to the rooms above the desired warmth. The temperature of the air as it reaches the rooms rarely reaches 100° , even in the coldest weather, and in ordinary weather does not exceed 80° , the aim being to supply large volumes of moderately heated air rather than a small quantity highly heated.

Communication with the basement from each room is promised, so that a change of temperature or air supply may be easily made, there being below in the mouth of each flue a thermometer and anemometer, thus indicating to the man in charge the probable temperature and rate of change of air in the rooms above. It is here that these regulations should be made, and not by closing the inlet registers; else all ventilation will cease.

It will seldom happen that all the rooms in the building will be needed at the same time; therefore a more frequent removal of air in the separate rooms than has been stated, the usual change being every ten or twelve minutes, the rate of change depending upon the use of the rooms.

This free circulation of currents may explain the otherwise unaccountable blowing of flames occasionally noticed in the organic laboratory.

Nothing new is claimed for the system except

large inlet areas and free space for the passage of the air, and even these might well be increased in size; thus the inlet registers, if still larger, would allow the air to ooze gently forth instead of issuing forcibly as a current. Neither is it claimed to lessen the expense of heating, but it is hoped to secure both perfect ventilation and uniform heating without need of open doors or windows, and thus to impart increased physical and intellectual vigor to the students.

X. Y.

The Remarkable Sunsets.

IT may be worth while to give a brief résumé of the facts connected with the late brilliant sunsets which have been observed in so many and various parts of the earth. There are three theories as to their cause more or less satisfactory. The first and most probable one is that the extreme violence of the eruption at Krakatoa in August last served to project volcanic matter into the upper strata of air where it was held in suspension, condensing the moisture, which thus reflects the red and orange light we have noticed. The explanation that they are due to unusually high strata of moist air with accompanying multitudes of ice particles is also possible; but Mr. R. A. Proctor thinks it is improbable on account of the absence of extraordinary meteorological phenomena, and the hypothesis which he has framed supposes "a cloud of meteoric dust encountered by the earth and received into the upper region of air," and thence penetrating slowly to the earth's surface.

In "Nature" for December 20, we may trace the apparent path taken by the volcanic dust from place to place, also the interesting results of examinations of it as brought down by the rain; and it is worth while to remark here that by either of the above theories a heavy precipitation of rain may be expected,—in other words, a wet winter. In the tropics the phenomena clothed themselves in green light, while in the higher latitudes the "red suns" are the characteristics.

Mr. McPherson, an eminent geologist now in Madrid, made an analysis of some fresh-fallen

snow, in which he found crystals of pyroxene, magnetic iron, volcanic glass, and hypersthene, all of which were found in an analysis of the volcanic ashes from the eruption of Java. Travelers assure us that the sun seen through the fine dust of a Sahara wind has a decidedly blue color.

Mr. W. H. Preece adds to the above theory (Mr. Norman Lockyer's) by bringing in the factor of electrical repulsion. He says: "If we assume that the mass of volcanic matter projected with such force was highly electrified, then it must have been electrified with the same sign as that of the earth, viz., negative. Therefore, when the force of projection had exhausted itself, the cloud of matter would be subject to two other forces besides gravity: the repulsion of the electrified earth, and the self-repulsion of each particle of electrified dust. The first would determine the tenuity of the cloud, for the lighter the particles the further they would be repelled, and the heavier the particles the quicker they would descend. It is quite possible to conceive that they might be so minute and so highly electrified as to reach the utmost confines of our atmosphere, where they would remain as long as they remained electrified. The second repulsive force would cause the particles to spread out continuously in a horizontal plane until they would cover an area determined only by their quantity."

Mr. Preece goes on to cite, as a proof that this theory is not a fanciful one, the behavior of smoke, which on calm days will, as all must have observed, rise to some determined height, and then gradually spread itself at an equal and constant distance from the surface, like a great flat pall. He also cites instances of the repulsion of two lines of smoke, and advances the theory of the negative electrification of smoke.

The subject is a most interesting one to investigate, and Cowper seems to have had these phenomena in mind when he wrote, —

"Fires from beneath, and meteors from above
Portentuos, unexampled, unexplained,
Have kindled beacons in the skies, and th' old
And crazy earth has had her shaking fits
More frequent, and foregone her usual rest."

C. S. R.

Alumni Association, M. I. T.

THE annual meeting and dinner of the Association was held at Young's Hotel, Thursday evening, Jan. 17. Officers were elected as follows: —

President, — Howard A. Carson, '69.

Vice-President, — Samuel E. Tinkham, '73.

Secretary, — George F. Swain, '77.

Member of Executive Committee, — Samuel M. Felton, Jr., '73.

Member of Alumni Committee on School, — J. R. Edmonds, '69.

The committee in charge of the Rogers Memorial Fund reported in favor of applying the income in such a manner as to aid travels of observation connected with the studies of the recipient, or to furnish him means for carrying on scientific researches which might appear worthy of encouragement.

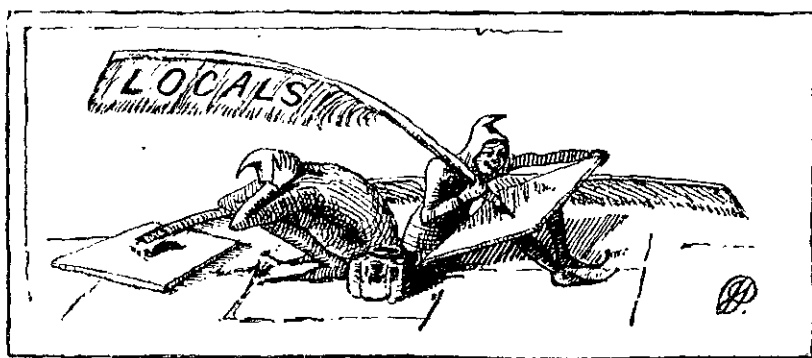
The after-dinner speeches were begun by President Walker, who reviewed the history of the last year of prosperity through which the Institute has passed, describing at length the laboratories and shops.

Gen. Walker having taken his seat, the President made some remarks about industrial education, and hoped the new shops might be named, in honor of him who founded the system in this country, the "Runkle Shops." Prof. J. D. Runkle replied with a short speech in his usual happy manner.

The President next introduced THE TECH. Prof. Nichols responding, declared himself for the time being "a representative of the press." He thought an Institute paper was a good thing, and wanted to see the "TECH" succeed. The articles were manly in their tone, and, for students, well written. A great improvement has been shown in the paper this year.

Remarks were made on the new course in Biology and Natural History, by Drs. Williams and Minot. Both strongly indorsed it.

Addresses were also made by Messrs. Howland, Swain, Miss Glover and Mr. Tolman, the retired president, after which the meeting adjourned.



Mac is an uncle — Uncle Hugh.

How about Huntington Hall for a TECH office?

Now is the time to subscribe — for the new catalogue.

The alterations in the mechanical laboratory are nearly completed.

Dime-show parties will be the correct thing for Freshmen this term.

The Glee Club will now begin rehearsals again for another concert.

The reports of the examinations were very prompt this year. Oh, yes!

Mr. C. H. Woodbury, '86, has two pictures in the present Art Club Exhibition.

The Class of '73 held its annual supper at Young's hotel last Friday evening.

The Freshman examination in English is reported to have been unusually hard.

It is a fact as comforting as it is paradoxical that the semi-annuals come but once a year.

Mr. Harvey S. Chase, '83, is engaged at the Manchester Cotton Mills. Copeland, '85, is also engaged.

The appearance of the papyrograph office is much improved this year under its new management.

An error was made in the last TECH. There are only ten miners from '86, instead of fourteen, as stated.

The architects are to have water-color sketching in the afternoon this term instead of in the morning, as hitherto.

The statement, made in the daily papers, that Prof. Crosby is to undertake a geological survey of Georgia is untrue.

Of the sixteen classes which have graduated from the Institute, thirteen are represented here by instructors and professors.

Must have sounded like thunder in the secretary's office during vacation — so many startling reports, all at once, you know.

The Institute was represented by Prof. Otis at the convention of professors of modern languages recently held at Columbia College.

A class of nineteen girls from Boston University has just commenced work in the physical laboratory. Now is the time to subscribe.

Why are not the architectural casts which still remain in Rogers moved either to the department of architecture or to the Art Museum?

The physical laboratory apparatus has nearly all been removed to the new building. The biological laboratory will be ready for use in a few days.

Mr. Henry L. Daniells, one of victims of the Gay Head disaster, was not a student at the Institute as reported, but was attending the Normal Art School.

Several of the architects have been availing themselves of the weekly lectures in mythology at the Art Museum; they promise to form a very interesting course.

There have been many visitors to the Margaret Cheney Memorial Room during the last few weeks. The young ladies are to be congratulated on having taken possession of their delightful sitting-room.

The senior civils have begun their thesis work. Mr. Carr is busy with "Sewerage for a Small City," and Mr. French with "Transportation of Freight by Ferry between the Eastern and New York and New England Railroads."

A course of twelve lectures is now being delivered before the Lowell Institute on "Mineral Physiology," by T. Sterry Hunt, LL. D., F. R. S. The lectures come on Tuesday and Friday evenings. Prof. Hunt was formerly a professor at the Institute.

The Association of the Class of '85 will meet at Young's, Saturday evening, Feb. 9, at 7.45 o'clock. The entertainment committee consists of Messrs. Richards, Fry, Williams, Plaisted, and Litchfield. A committee will be appointed to make arrangements for a class supper.

Under Prof. Sedgwick's supervision, the deso-

late waste, erewhile the physical laboratory, is blossoming into a biological laboratory. The space would seem to be commodious and ample. Certainly it indicates a great advance, present or prospective, in biological work at the Institute.

Unless the amount of "standing matter" in the new catalogue is unusually diminished by radical changes in that fascinating pamphlet, it seems as if the work of preparation need not be very arduous; no more so, we trust, than answering the constant volley of interrogatories in the office.

With all due modesty and deference to the superior judgment of those in authority, THE TECH would respectfully suggest that it would receive proposals to prepare the coming(?) or any future catalogue, — provided, of course, that it be allowed to designate by appropriate marks all non-subscribers and delinquents.

As numerous individuals have called at the TECH office to inquire for the new catalogues, and as several written applications have been received therefor, we would kindly but firmly say to our readers, as we have to the aforesaid individuals, that such inquiries are fraught with extreme peril, and if carried *beyond* our office, a condition, perhaps a suspension, will surely follow.

Vacation grants no rest to "John" and his satellites, and many are the changes they have wrought in our absence.

The whilom reading-room and library is to be no longer the Freshman grinding-mill; the place where the munificent liberality of THE TECH provides good literature for the use of its subscribers and other students (as "the rain falls upon the just and upon the unjust"); the one which affords a doubtful refuge to the meetings of our unsheltered, roomless, directorial, and editorial boards. But soon it is to justify the brief legend — "President" — over its portals. What real and imaginary terrors will invest the spot, still almost echoing with the revelry of the last TECH meeting!

The extra space in the new reading-room will supply a needed want. Too often of late has it

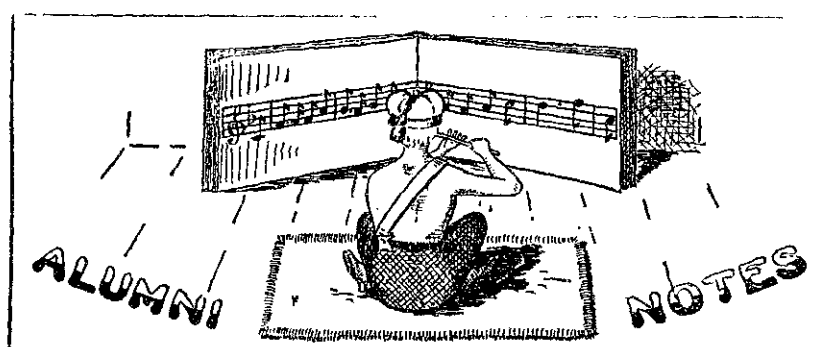
been impossible to find a place for study, to say nothing of writing, or reading the exchanges.

Let us hope that if many of the nondescript books, pamphlets, and reports of the present library find a place in the new, their purpose and general *ràison d' être* will be more obvious than heretofore.

Messrs. Alfred Mudge & Son, whose imprint THE TECH bears, and to whose liberal interpretation of our contract much of the mechanical excellence of the paper is due, are now settled in their new and commodious quarters, No. 24 Franklin Street, where they have greatly increased facilities.

During vacation the instructors and an extra corps of machinists and carpenters have been busy at the shops, setting up new machines and preparing stock for the coming term. In the machine shop five speed lathes, two engine lathes, and a grinding machine are expected soon; the large planer and the shaping machine have been belted up. Pratt & Whitney and Brown & Sharp furnish the new machinery. The short vise-benches in the machine shop will be removed, and the vacant floor-space occupied by four rows of long file-benches. The wash-room in the machine shop, with accommodation for twenty-five, has been completed. In the carpenter shop are two new jig saws and a swing saw for cutting off plank. A large planing machine is also among the additions. A pattern maker's lathe is being put in position in the wood-turning room. This will be one of the most useful tools in the shop. It will accommodate a stick $4\frac{1}{2}$ feet long and 3 feet in diameter, while on the left of the headstock the spindle is terminated by a face plate, where a wheel of 8 feet in diameter can be turned off. A very serious objection to the present arrangement of the wood-turning lathes is the fact that the operator stands in his own light.

As interesting locals were scarce during vacation, we have endeavored to say a word about the new catalogue. It leaked out, however, that we had these severe things to say about it, and hence its appearance Thursday. We take everything back.



FRANK A. MAY.

Among the many lives so sadly brought to a close in the recent terrible wreck of the steamship "City of Columbus" not one was more beloved than the subject of this sketch, and the news of his sudden death caused a shock which will not be readily forgotten by his friends. To the writer, who had so recently seen him in all the vigor of his manhood, he expressed his gratitude for success in the past and his hope for success in the future, but alas! how little he knew that he was so near the end of his life's journey! Mr. May was a graduate of the Institute in the class of 1874, and, during the years that he pursued his profession as engineer, had been connected with the New York & New England Railroad, the New York & Boston Inland Railroad, and the improved sewerage of the city of Boston. He had also testified as expert in several important cases in court. At the time of his death he was on his way to the South to make surveys on the Savannah River for the United States government. He died at the age of twenty-nine years.

C. F. R., '74.

Died at Lakewood, N. J., Jan. 17, 1874, James A. Field, '73, aged 36 years.

The class of '75, M. I. T., partook of its annual supper at Young's Hotel, last Friday evening, fourteen members participating. During the evening appropriate mention was made of the death of Frank A. May, who was a partial member of the class. These officers were elected: President, Thomas Hibbard; Vice-President, H. E. Stowe; Secretary and Treasurer, John Cabot; Class Historian, E. A. W. Hammatt.

Department Notes.

The new four-cylinder engine which has been on trial on the Boston and Albany Railroad for a week past is said to be making a poor showing, because the grades are so heavy that the compounding arrangement won't work. When run as an ordinary double cylinder engine, it eats up more fuel than the heaviest engines on the road, and draws no more cars.

An electric headlight for locomotives was exhibited at Munich at the recent exhibition. The current is supplied by a dynamo placed on the top of the boiler behind the smoke stack, and driven by an independent engine. The lamp is arranged to turn automatically on curves, so as to light the track at all times. The light was visible at a distance of two and one half miles.

On the 25th and 26th of October, there fell at Hilo, Hawaii, $17\frac{15}{100}$ inches of rain in twenty-two hours, by rain-gauge.

M. Mermet recommends the use of nickel crucibles instead of silver in chemical manipulations. They are slightly attacked by melted potash; but silver itself is somewhat liable to this action. The first cost of nickel crucibles is much less than silver, and they have the great advantage of melting at a higher temperature.

We doubt if many persons know to what extent minerals and gems occur in the United States. There are eighty-eight minerals used as gems, twelve of which are found only in the States. Paris, Me., is the only place where systematic mining of precious stones is carried on; but they are gathered on the surface in many places, as sapphires in Montana, moss agate in Colorado, and rubies in New Mexico and Arizona, where they occur in the sand, and often on ant-hills. Tourmalines have been taken from Mt. Mica, Me., to the value of \$58,000. Agate at Lake Superior. Hiddenite to the value of \$75,000 has been taken from Stony Point, N. C. Rock crystal comes from various places, and is sold as "Lake George" or "Cape May" "diamonds." The clear crystal for optical purposes comes almost entirely from Brazil.

The sun stones and the moon stones come from Pennsylvania and Virginia. Nearly all the polishing of stones is done in Germany. Jet occurs in Colorado and Texas. Spene occurs in beautiful transparent yellow crystals, often of large size, in Delaware County, Pa. Diamonds are occasionally found in this country, one having been found near Richmond, Va., weighing, after cutting, over ten carats. It was an octahedron, and was worth \$5,000.

It will not be long before there will be an addition to the mining machinery of the country in the shape of an improved rock pulverizer, the principle of which consists of two saucer-shaped disks coming nearly together on one axle, but revolving in opposite directions, into which the rock is fed from the centre. Thus the two surfaces of rock grinding on one another at very high speed mutually reduce each other to a fine powder, there being no wear on the machine except at the axles.

In the *Railroad Gazette* for January 18 is a short description of a new fourteen-wheel locomotive, now being built by the Central Pacific Railroad. The total weight of the engine and tender, fully equipped, will be 226,650 lbs., and the tractive power 278.6 lbs. for every pound of average pressure per square inch upon the pistons. It is estimated that the engine will be able to draw a train of cars weighing 584 tons up an incline of 116 feet to the mile. In connection with this article is a sketch of the engine and a plan showing its wheels on a 12-degree curve. This will be the most powerful engine in the world, and will probably be able to exert 50% more tractive force than the St. Gothard or French engine.

Fogg, speaking of a mutual friend who has just started a new venture:—"Yes, sir, he's a rising young man, if he does keep stationery." Jones, who is overwhelmed by the brilliancy of the remark, carefully avails himself of his first opportunity to shine by borrowed brightness, and remarks:—"Yes, sir, I always said he was a rising young man, if he did work in a bookstore."

The College World.

HARVARD.—The President in his recent report states that the authorities of the college "believe that college sports should be conducted as the amusement of amateurs, and not as the business of professionals." They are in favor of forbidding college clubs or crews to employ trainers to play or row with professionals, or to compete with clubs which adopt either of those practices. — The old medical school building is now used by the dental school.—It is expected that the law school will put a crew on the river to compete in the class races. A number of men are already in training at the gymnasium.—The University library has had an increase of 9,818 volumes during the year.—At the conference held last week between members of the Faculty and undergraduates, it transpired that the employment of professional trainers in athletics would be allowed.

YALE.—The bicycle club has taken to club training. The Harvard bicycle club has requested that at the May races, two races be reserved exclusively for Harvard and Yale contestants.—Yale successfully supports one daily paper, two fortnightlies, a monthly, and three annuals.—Twenty-five Freshmen are training for the class crew.—The Juniors have organized a class in gymnasium practice.—Souther, the catcher, says that the nine will be as good as last year's. Booth and Odell are to pitch.—Mr. A. E. Kent, who a year ago gave \$50,000 to erect a chemical laboratory for the academic department, has added \$25,000 to the original amount.—There has been serious trouble recently between the "Lit." editors and the Junior class in regard to the election of the new board of editors.

PRINCETON.—It is probable that boating will be given at Princeton; now let Columbia do likewise with foot-ball.—Eleven of the twenty-three honor men of '84 have entered the class since the Freshman year.—Princeton possesses the identical electrical machine used by Dr. Franklin.—The medical school, recently completed, cost \$325,000.



Little Girl (who considers the information on the Placard superfluous): "Why, I should think any one could see they were."

MODERN IMPROVEMENTS.

MR. SILVERCAMP (*who is looking over some sketches for a scriptural frieze for his new house*): Who are these?

ARTIST: The Twelve Apostles.

MR. SILVERCAMP: Now, look-a-here, Mister Painter, Jim ain't goin' to get ahead o' me on anything: you put fourteen in mine! — *Life*.

A Black Crook Company was recently compelled to disband. The ballet entered the "Home for Aged and Destitute Widows," and the scenery was shipped on to Chicago, to be used in the next Republican Convention. — *Ex*.

The man who began keeping a diary at the first of the year is still keeping it, but he now uses the pages as cigarette papers. — *Ex*.

CROSSING SWEEPER (*to swell*): "Merry Christmas, Captin! Pitch us a brown!" (*No answer.*) (*Insinuatingly*): "Ha' yer sich a thing as a bit o' cold puddin' about yer, Captin?" — *Punch*.

Maker of musical instrument, cheerfully rubbing his hands: "There, thank goodness, the bass fiddle is finished at last!" After a pause: "Ach, Himmel, if I have n't gone and left the glue-pot inside!" — *Ex*.

In the dim and distant future some antiquarian will come across a Saratoga trunk and excitedly exclaim: "Yes, it is true; they had giants in those days: here is one of their houses!" — *Ex*.

A woman's reason — Because.

Always on the wrong tack — the barefoot man. — *Life*.

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Besides the above distinctly professional courses, the Institute offers scientific courses of a less technical character, designed to give students a preparation for business callings. A four-years' course in biology, chemistry, and physics has been established, as preparatory to the professional study of medicine.

Modern languages are taught so far as is needed for the ready and accurate reading of scientific works and periodicals, and may be further pursued as a means of general training.

The constitutional and political history of England and the United States, political economy, and international law are taught, in a measure, to the students of all regular courses.

Applicants for admission to the Institute are examined in English grammar, geography, French, arithmetic, algebra, and geometry. A fuller statement of the requirements for admission will be found in the catalogue, which will be sent without charge on application.

A clear admission paper from any college of recognized character will be accepted as evidence of preparation, in place of an examination.

Graduates of colleges conferring degrees are presumed to have the necessary qualifications for entering the third-year class in any of the regular courses of the Institute, and will be so admitted provisionally, on the presentation of their diplomas.

The feature of instruction which has been most largely developed in the school is laboratory training, shop-work and field practice, to supplement, to illustrate, and to emphasize the instruction of the recitation and lecture room.

Surveying instruments are provided for field work in civil and topographical engineering. Extensive shops have been fitted up for the use of both hand and machine tools; and a laboratory of steam engineering has been established as a part of the instruction in mechanical engineering. Several steam boilers and steam engines of various types are available for experiments and tests. The department of mining engineering and metallurgy has the use of laboratories in which the milling and smelting of lead, copper, silver, and other ores, in economic quantities, are regularly performed by the students themselves. The classes in architecture supplement the work of the drawing and designing rooms by the examination of structures completed or in course of erection, and by practical experiment in the laboratory of applied mechanics, testing the strength of materials and working out problems in construction. The Kilder 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.

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The fee for tuition of students taking the full course is \$200 a year. Besides this, \$25 or \$30 are needed for books and instruments. There are no separate laboratory fees. Only payment for articles broken is required.

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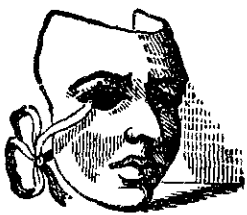
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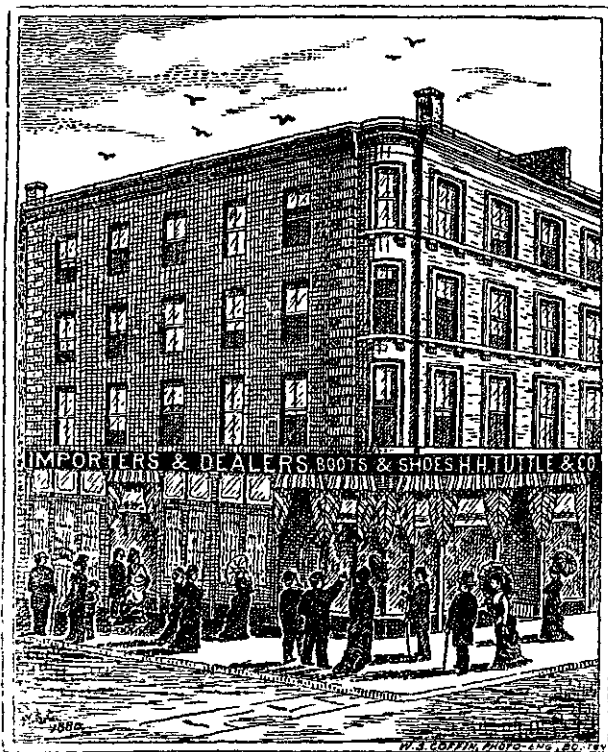


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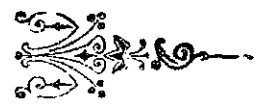
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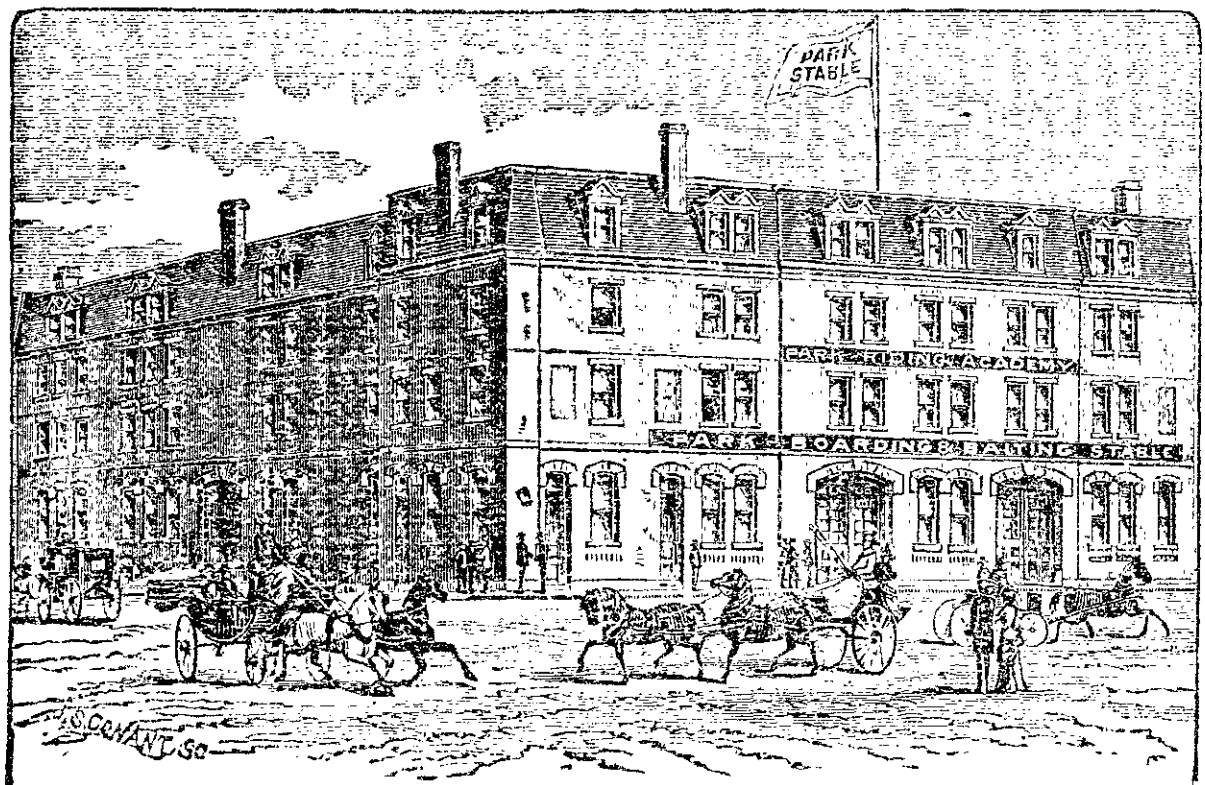
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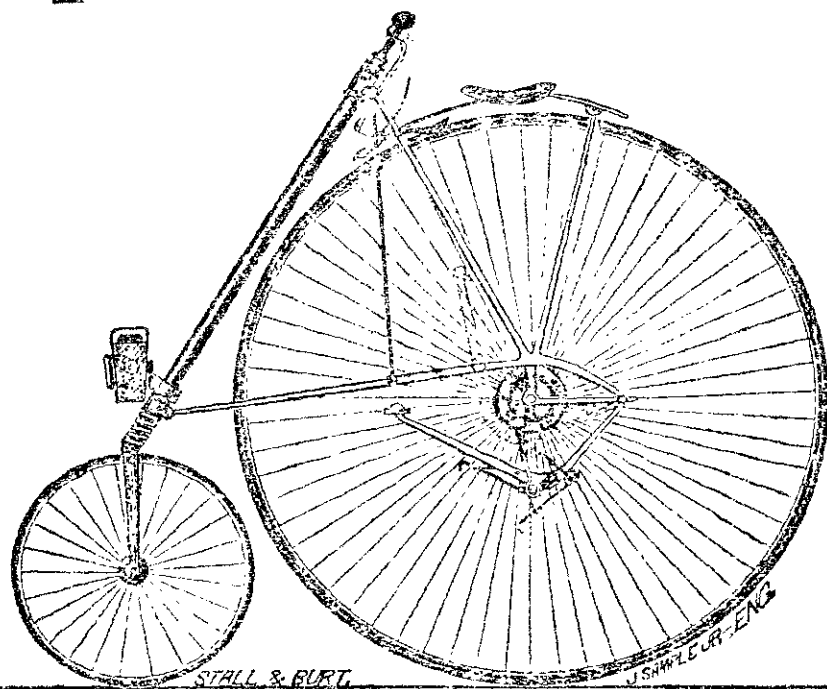
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