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STUDENTS
OF THE
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MAY 14, 1885
AND 1886

1885
1886

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William Barton Rogers.

*A dear, good man, whose noble life
Was full of kindly acts and useful deeds:
In time of small beginnings,
His the arm that made provision for our growing needs.
The strength that marked his sincere mind
He used with fervor for the truth and right;
And then at last his lamp of life
Went out where it had shed its greatest light.*

I. W. L.

THE Rogers Memorial Tablet, which as students past or present of the Institute it has been our privilege to erect, is an acknowledgment of the admiration and profound affection which inspired all who came in contact with the simple, kindly nature of William Barton Rogers. As founder of the Institute and its first president, its heart and soul for many years; as the man of science, exact yet comprehensive, quick to perceive truth and eager to impart it; as the teacher, patient, but with an enthusiasm which could not fail to be contagious, we honor him and recognize our debt. So much we have in common with all who are acquainted with his life and work, but the spirit which found expression in the erection of the tablet had a deeper spring than this. As students of

the Institute we could but feel that the kindly interest which he had for us simply as young men and women was augmented by an almost fatherly regard. In his later years he could hardly have known our faces, much less our names, but the grace and sincerity of his genial recognition as we met him about the school showed clearly that time could not wither the kindness of his heart. And so we knew him, moving among us, ending his life like a summer day, whose beauty is most apparent as the sun goes down.

The lack of any exercises to attend a formal presentation of the tablet to the Institute is to be regretted. It would not have mattered how quiet or unobtrusive the ceremony that acknowledged the presence of the tablet,—its simplicity would have been the measure of its fitness,—but some public recognition should have been taken of the occasion, if only that we might have heard once more from the lips of some of President Rogers's associates the noble record of his life.

THE new standard time, which in this region is that of the meridian of Philadelphia, went into effect on Sunday, Nov. 18, at noon. On that day, at noon of Boston time, the city clocks were stopped and were started again when the fall of the time-ball on the Equitable Building, at 12 hours 15 minutes 44.05 seconds of Boston time, or noon Philadelphia time, was signalled by the fire-alarm bells on the various churches and public buildings throughout the city. The earlier sunset on that day was quite perceptible, and it is a fact to be noted that Nov. 18, 1883, in Boston, was nearly sixteen minutes longer than the day is ever likely to be again.

As might have been inferred from the fact that President Walker was one of the advocates

of the change, the new standard was adopted at the Institute on Monday, Nov. 19, notice having been previously given to that effect. The afternoon exercises now begin at 2.15, or at about the same local time as before, in order, as it seems, to still have two hours of daylight. At the Lowell Mills, too, work begins fifteen minutes earlier in the morning and closes fifteen minutes earlier in the evening, that there may be as much daylight work as by the old schedule. At the United States signal stations all observations are taken at fixed hours of Washington time. In this city these were formerly twenty-three minutes earlier than Boston time, but are now only eight minutes earlier, so that the eleven-o'clock night observation, which was formerly made at 11.23 P. M., local time, is now taken at 11.08 P. M. of the standard time, and so with the others. More instances of this sort might be cited, but it is thought that these are sufficient to show how the new system lends itself to every-day affairs.

Under the new arrangement the Institute student who lives out of town can congratulate himself, these cold mornings, on allowing the sun sixteen minutes more time to warm the frosty air than formerly, before he himself is obliged to leave his downy couch, while, in the afternoon, by leaving the Institute at 4.15, he may be able to take an earlier train home, and so still have as much time there as before.

THE number of men present at the mass meeting upon Tuesday, the 28th, showed fairly the manner in which such a call is received among us. A meeting is called to take action upon a question which concerns the whole school, and possibly thirty men take the trouble to attend. They dislike to take the responsibility of acting for the entire Institute, and yet they know from experience that were another meeting called the attendance would be no larger. Such a lack of interest is a small return for the labor of those who have served upon the committees, and we trust that hereafter more members of the school will be willing to undergo a slight personal inconvenience in order to

evinced an interest and public spirit where their Alma Mater is concerned.

BEFORE last year no prominent society existed among the students of the Institute for musical improvement. The Minstrels had no precedent; but they worked hard, rehearsed often, and gave an entertainment which was a perfect success. This year a glee club has been organized, with the objects of musical culture among the members and pleasant reunions among the students in general. The club hopes, from time to time, to be able to give some slight entertainment to its friends, and thus to draw the friendship closer by firm bonds. There is no reason why a society of this sort should not succeed here, as similar ones have done in most other of our modern colleges. We have at least as many men to select from as some colleges which have had very excellent glee clubs. All that is needed is a helpful interest from the students and an earnest desire to do well from the members of the club itself.

THE greatest disadvantage under which THE TECH at present labors is the total lack of suitable accommodations. The growing needs of the Institute crowded us out of the small room which had previously served as an office, and at the beginning of the year the paper found itself with no house or home but its castles in Spain, which seem too far off to be available. We have looked forward to the time when THE TECH might hold its meetings and receive its friends in cosy quarters adjoining a well-stocked reading-room, and we are not without hope at present. The removal of the physical laboratory to the new building will relieve the present crowded state of things, and THE TECH hopes to profit by the changes which will follow.

SUBSCRIBERS failing to receive any copies of the paper to which they are entitled are requested to notify the secretary of the directors by postal or otherwise, and the matter will receive immediate attention.

A Trip to Orkney and Shetland.

DURING the past summer I made a short trip to the islands lying to the north of Scotland. The vessel in which we sailed was the "St. Magnus," and the place of departure Leith.

It was a beautiful morning, the water without a ripple, the sun breaking through the morning mists. Our course lay along the north shore of the Firth of Forth, which is dotted with villages, whose red-tiled roofs and crow-stepped gables retain the quaint look that has in great measure vanished from less retired places. Leaving the Firth and entering the North Sea, we passed the Bell Rock lighthouse, then skirted the coast till off Aberdeen, at which place we were advertised to call.

Finding that the ship would remain for some hours, we determined to visit the town. On account of the difficulty of working the gray granite of which the city is almost entirely built, there is but little ornamental stone work. The prevalence of plain sills and lintels gives an appearance of straightness and stiffness that is not altogether pleasing. In some of the churches there is fine wood carving, but still the lack of carved stone. The whole look of the city is somewhat cold and gray.

During the afternoon we sailed along the Aberdeenshire coast and retired early, after a long and tiring day. The accommodations on board these boats are not by any means palatial. I was in a deck cabin, about fourteen feet by eight, in which there were eight persons. There seemed to be no arrangements for ventilation, and it was impossible to open any of the ports.

When I came on deck next morning the coast of Mainland (as the Orknadians call the largest island of the group) was close on our port side. The islands are not so rugged on the east side as on the west; still the rocks we passed looked sufficiently forbidding. After two hours' steaming we arrived at Kirkwall, the capital of the Orkney Islands.

The Cathedral of St. Magnus is a striking object as the town is approached from the sea,

standing out above the surrounding houses. It is a fine specimen of the Roman style of architecture. Part of it is still used as a place of worship, but to this we could not gain access. It is curious to see this great church among these lonely islands, and to think of the power that brought it there. The other chief object of interest is the Bishop's Palace. It is about as old as the cathedral and has a warlike appearance. On the front of the main tower there is a niche with a statue of some saint, which looks a little out of place.

Well pleased with what we had seen and only regretting that we had not time to visit the Stones of Stennis, which, after Stonehenge, are the most extensive Druidical remains in Great Britain, we returned to our steamer.

While winding our northward course through the narrow channels that divide the islands, I asked the captain if he considered the tide strong. He replied that it was slack tide, and that the current was not over four knots, but that at flood tide it would run eight knots. Leaving the Orkney Islands the scene was beautiful, as we looked back upon the group set in a smooth and sparkling sea and bathed in sunshine.

But we had not long to enjoy the picture, as we soon left the most northern point of Orkney and entered the Roost, the troubled strait that separates it from Shetland. Half-way across we passed the Fair Island, which is said to be inhabited by descendants of some of the shipwrecked Spaniards of the "Armada." North of this we ran into a fog-bank, which retarded our progress. Creeping along the east side of the islands, now and again heading due east into the North Sea as the fog thickened, we arrived off Lerwick, our goal. The captain failed to cheer us by saying that if the fog did not clear off we should spend the night rolling about outside the harbor. However, in half an hour we got in, the fog lifting for a few minutes, only to close more densely when we were safely at anchor. We found the roadstead crowded with fishing-vessels bedecked with flags, among which we threaded our way until we brought up close to the town.

The steamer was soon surrounded by a fleet of small boats, of which the first to be attended to was the mail-boat; next came the hotel-boats, in one of which we landed. We succeeded in securing pleasant rooms overlooking the harbor.

It being late in the afternoon, we could do little but take a short walk. On our return we sat down to talk and read, until at last it began to dawn upon us that in those latitudes there was no prospect of its getting dark, and that if we intended to retire it must be done by daylight.

The town was crowded in great part by fishermen, whose costumes were sometimes picturesque, generally dirty.

In answer to our inquiries we had learned that it was St. John's eve, and that the gay fishing-vessels were Dutch *jagers* whose crews had come to celebrate on the morrow.

Lerwick has two principal streets, one old and near the harbor, the other newer and upon the crest of the slope on which the town stands. The houses in the old street are as a rule crowded with their gable ends to the street, though occasionally one is set cornerwise, while only a few of the newer buildings, generally banks or hotels, face in the modern manner. The old street is flagged throughout, having no sidewalks, or rather being all sidewalk; it varies in width from eight to twenty feet, and is intersected by lanes or closes which separate the houses. These appeared anything but clean and had most curious names, one of which, Hangcliff Lane, clings to my memory.

In summer the islanders fish, in winter I know not what they do, — possibly smoke. The women in summer carry peat from the hills to the town in baskets which they bear on their backs, knitting industriously as they go. The products of their work are the much-prized Shetland shawls. The wool of which they are made is not sheared, but pulled from the backs of the sheep, and is never dyed. It is said that it is a good test of the quality of a shawl if it can be pulled through a finger ring.

The lack of trees on these islands is noticed

by the stranger. A few stunted bushes barely existing behind a wall and cut off level with the top of it are all that can be found; even these are the result of great care, since Orkney lies north of the tree limit.

The fine harbor of Lerwick is formed by the island Brescia, on which are the remains of a Pictish village. A short distance from Lerwick is a Pictish fort. It consists of a rudely circular building resembling a heap of stones placed in a lake, and joined to the shore by a stone pier. There is another of these forts with a round tower on Mousa, an island in this group.

On the east side of Brescia there is a grand cave, but as it requires a smooth sea to enter it, and as it had been blowing from the east since we arrived, it was too rough for us to visit it.

We drove across the island to Scalloway, where there is a ruined castle built by the earls of Zetland. The country we drove through seemed divided into peat-mosses, pasture, and arable land. The cultivation on the farms seemed to be good and was chiefly in the valley of Tingwall. I was told that the more northerly island, Unst, is also well cultivated. The valleys contain numerous lochs which abound with trout, but are seldom fished. The islands are indented by arms of the sea, called *voes*, which at one place reduce the width of Mainland to a few yards.

The herring-curing establishments of Shetland are started with foreign (that is to say, Scotch) capital, the natives being held down by the injurious system in which the landlord says, "You fish in my boat, with my lines, sell me the fish you catch, and buy everything of me."

Our steamer was posted to sail at six P. M., and we were told that a gun would be fired one hour before she sailed. Eight came and no gun was fired; on inquiring as to the cause of the delay, we were told that we were waiting for a steamer from the north. The steamer arrived at nine and we left at half past eleven.

It was still quite light, and as we left the harbor we got a view of the rocks on the east side of Brescia, especially the Giant's Leg, a

great mass separated from the cliff below, yet joined with it above.

It was quite rough, and as the ship went plunging and staggering south we got a view of Lumburgh Head, to the west of which is Fitful Head, both familiar to the readers of Scott's "Pirate." Crossing Lumburgh Roost, the "St. Magnus" did some pitching that I shall not attempt to describe. In the morning we went into Kirkwall and had a short interval of peace. Walls in Orkney resemble rows of gravestones, being made of flags set on end. Flags are one of the exports of the islands.

Leaving the Orkneys we passed the lofty rocks off South Ronaldsha, and crossing the Penland Firth arrived at Wick; here the captain found it far too rough to enter the bay, so he put back to Sinclair Bay, where we landed and embarked passengers in boats, an exciting operation in the sea that was running.

Early next morning we arrived at Aberdeen, where I found that the rest of the party (a good working majority) were tired of tossing in the North Sea and desired to return to Edinburgh by rail, a course which was accordingly adopted.

C. W.

The Tilly Foster Iron Mine.

[Abstract of notes made by the Mining Engineers of '84, M. I. T., during their excursion of Nov. 9, 1883]

THIS mine is located about two miles south of Brewsters, N. Y., on the New York City and Northern Railroad. Its superintendent is Mr. Andrew Cosgriff; the mining engineer is Lewis G. Engel, a graduate of the Columbia School of Mines.

The ore is the magnetic oxide, $Fe_3 O_4$, and is bedded as a lenticular mass of the shape of a meniscus, surrounded by a very hard banded gneiss (the "country rock"), mixed with more or less serpentine, calcite, magnesian silicates, pyrite, and pyrrholite. Portions of the bed had been dislocated and folded over by faulting, the concave side of the meniscus thus forming the foot-wall, which has a dip of about 66° . Formerly the mine was an open pit, but now there are three inclined shafts, running down against the foot-

wall, two of which start from the bottom of the old pit, while the third starts from the top of a high point of land to the northward of the other two.

There are five levels, beginning at one hundred feet, and each succeeding level one hundred feet below the former. The entrance to the adits forming the one hundred-foot level are on the sides of the pit forming the old mine. The second level is about thirty-five feet below the bottom of the old pit. The greater part of the work appeared to be carried on in the fourth and fifth levels, the latter of which has not as yet been fully explored, the drift along the foot walk and the perpendicular side drifts being opened up at the time. Exploration and prospecting are carried on by means of a No. 7 prospecting drill made by the American Diamond Rock Boring Company of New York,—a machine which will bore vertically, horizontally, or in any direction for a distance of eight hundred feet.

Weight when set up, 1,350 lbs.; weight of heaviest piece packed for shipment, 450 lbs.; diameter of bit, 2 inches; size of core, $1\frac{3}{8}$ inches; cost, about \$3,000. A perfect core of the entire distance bored is registered by this machine. The bottom of the old pit is on a level with Croton Lake when the latter is at high-water mark, and being situated on a peninsula jutting into the lake, a good deal of water flows into the mine through the interstices between the strata. In the south shaft near the two-hundred-foot level, a dam has been built to keep the water from flowing to the bottom of the mine, and thus entailing a greater expenditure of power in removing it. A Cornish lifting pump elevates about forty thousand gallons of water per day from a large "sump" near the pump shaft, to a reservoir on top of the hill, from whence it is allowed to percolate or filter through a brick partition wall into another walled compartment and is drawn from there for use in the boilers. Small pumps driven by compressed air force the water from along the drifts into the main sump; and thus the question of how deep they can go evidently depends upon how long they can afford to pump.

The ventilation of the mine is secured by natural means. In winter the air passes down by way of two shafts in the bottom of the old mine, and up and out through the third shaft on the hill-top. In summer the currents are reversed, the air passing down the higher shaft, which contains a larger column of cool and consequently heavier air that sinks down in its effort to establish equilibrium. This sinking down drives the air up the other shafts in endeavoring to establish equality of pressure; but as fast as the air in the shorter column rises to the surface, it is heated by the sun and warmer surrounding atmosphere, and expands and rises.

This expansion diminishes the pressure on the base of the shorter column of air, and the larger column of the north shaft, in its effort to supply this deficiency, produces the upward currents in the short shaft, which continues until the atmospheric conditions are reversed, and the temperature of the air below the surface is higher than the temperature of the air outside, when the high shaft again has the upward current.

The hoisting is done by drum and wire rope, actuated by an engine at the top of the old pit and about sixty yards from the dumping tower. From the latter an inclined tramway on the dip of the bed (66°) leads to the bottom of the middle shaft. The ore is brought from the different "platts" and "rooms" on small boiler-iron cars, running upon rails laid along the foot-wall adits and lateral galleries to the foot of the shaft, where it is loaded into "skips" attached to the wire rope. The "skips" are of boiler-iron, about six feet long, and will hold four (small!) men. The skips on arriving at the surface are, by an ingenious automatic arrangement, dumped into regular platform cars. These cars are weighed when empty, filled as above stated, then weighed again, the ore sorted by hand and then broken up for the furnace, and all rock and waste removed. The cars are again weighed with the clean ore: the difference in weight gives the loss in sorting and picking over. The hoisting drum runs loose upon a sleeve in lowering the empty skip, but on hoisting it is firmly

locked to the sleeve by a friction clutch much after the model of the extension arms of an umbrella.

The hoisting is done by pneumatic signals; a piston worked at the top operates another piston (by an air pulse), which is attached to the hammer of a gong at the desired level. The mines are at present lighted by ordinary miners' hat lamps, but electric lights are about to be introduced.

The party was composed of Prof. Richards and Messrs. Park, Knapp, Doane, Haines, Sturgis, Lyle, Neuman, Bunce.

The Bridge.

A NEW STORY WITH A MORAL.

I STOOD on the bridge one morning,
Close by the Brooklyn tower,
And cast my eyes o'er the cities,
'T was about the shopping hour.
Far down below were the waters
Where excursion steamers lay,
And ferry-boats making commotion
Whistling for right of way;
Then battling the eddying currents,
A little yacht sailed by,
And one of her wicked sailors
Had a spy-glass to his eye,
And as the boat lay tossing
Upon a steamer's swell,
He looked at girls on the ferry-boats,
And criticised them well.
How often, oh how often,
In the days that had gone by,
Had he stood within that cockpit,
With the spy-glass to his eye.
How often, ah how often,
Fair maidens thus he'd eyed,
Making them turn their faces,
And look to the other side.

And now the boat came restless,
And wobbled to and fro,
And the swinging boom above him
Hit his head a fearful blow.
He's now on the floor of the cockpit,
Where naught but his legs I see,
And no thought of sorrow or sadness
Casts a shadow over me;
For I thought how many hundreds
Of care-encumbered men,
Each bearing his market basket,
Laughed as they saw him then.

For ever and for ever,
 Yes everywhere he goes,
 Hard though he tries to hide it,
 He wears a broken nose,
 And ever the sad reflection,
 As it passes through his head,
 Will make him forget the maidens
 And look aloft instead.

D. W.

The Legend of an Old English House.

IN England, quite a good many years ago, when life and property were not so secure as at the present time, the old houses or castles were often furnished with concealed chambers, the very existence of which was unknown to any one save the inheritor of the estate and titles. This and the secret of entrance to it were solemnly revealed, usually on his death-bed, by the sole possessor of the knowledge.

The facts related below, which are founded on authentic history, were influential in producing an act of Parliament which decreed that thereafter the existence of all secret chambers should be made known to the state and to Parliament.

In one of these old castles lived Henry Blanc (ancestor of the late Mr. P——), a man about thirty-five years old, cultivated, of high literary tastes, and withal much given to the writings of Lord Bacon. He was subject to periods of mental aberration, which sometimes lasted for several years at a time, and were liable to be brought on by any great excitement. At these times he seemed to lose all connection with his former life and surroundings, to merely exist, when suddenly he would emerge from this cloud and resume his life as though no break had occurred.

For years there had been a strong attachment between himself and his cousin Beatrix, though it had been steadily opposed by her parents because of political feuds, which were very fierce in those days, between the families; and to settle the matter finally the girl was married to a man for whom she had no affection, but who had large influence at court and would prove a strong ally.

The result of this was of course unhappiness, and Beatrix had her thoughts more than ever

directed towards her cousin. . . . At last it appeared that she could bear it no longer, and she resolved to leave her husband's house and fly with Henry. Their plans were laid for leaving England and travelling on the Continent, and it seemed as if nothing could happen to prevent their success. It was the fall of the year, and preparatory to sailing the next day a room had been made ready for the fair cousin in the old castle, with a bright, cheerful fire and numerous lamps, and they having arrived about twilight, Beatrix was escorted to this chamber by Henry, —and this chamber was the concealed one, whose existence was known only to him, —surrounded by huge, thick walls, with scarce an opening.

After some little time he left her, saying that he should be absent only a few moments, and went to his library to select some of his favorite books to take with them on the morrow. While there he was suddenly seized with a dizziness, and before he could reach a chair he fell, striking his head against the hard wood, and becoming unconscious. When he recovered consciousness his malady had rendered him helpless and his mental faculties were a blank. In this state he continued for years, though after a time his physical strength returned to him. Nearly seven years after the flight of Beatrix from her husband, our friend Henry emerged from his stupor, his brain cleared, and he took up his life just where he had dropped it, thinking that he had but just left his beloved cousin a few moments before. He hastened to go back. The catches of the door seemed to go hard. On going into the chamber he was somewhat surprised to find it cold and dark, but thinking nothing about it, he turned back to get a light.

And now he saw Beatrix kneeling there before the hearth. He started forward with an exclamation of delight and touched her gently on the shoulder, when, horrible to relate, the figure fell to ashes upon the floor, with a clatter of bones, kept only in place so long by the stiff silk dress! The terrible sight and the shock of returning ideas overwhelmed the poor man; he fell to the ground, and the next day was found by his people — dead. C. S. R.

A Layman's Lay.

NIGHTMARE.

By the author of "Rot."

IT was a noble horse-car horse
 Who for the sidewalk sighed,
 He came of an ancient race-horse race,
 And to drudge hurt his prudish pride.

- He gave a jerk: the brake-chain broke,
 He stepped on a tow-boy's toe.
 Adown his cheeks the tear-drops tore,—
 He was drowned in their flooding flow.

Communication.

MR. EDITOR:—While at the chemical apparatus supply room a few days since, the writer overheard fault-finding remarks between Freshmen about the amount of time wasted in waiting for apparatus, etc., and hence would suggest that they make a few inquiries as to the number of students who must daily call at the same hours for apparatus, and would also remind them that all these stores must pass through one pair of hands.

If, after these reflections, these students have neither the time nor patience to await their turn, let them petition for a special assistant in that department, who all acknowledge is much needed, and not utter their complaints in the presence of the one who is doing her utmost to serve them.

X. Y.

It would be from three to several cents in the pocket of Mr. Keely, of Keely motor fame, if he could only persuade the government to buy his air-castles and use them for lighthouses.

A professional poet in this classic town advertises that he will set words to music for two cents a line. This is truly a case of onomatopœia, — adaptation of sound, — two cents.

We have been informed that every man in Gilmore's band is so finished a musician that he can be called upon at any time for a solo. Perhaps so; but how about the man who plays the bass drum?

A year ago to-morrow the V. L.'s presented a striking example of a stuffed club. — Now is the time to subscribe.

List of Publications, M. I. T.

[In order to make this record as complete as possible, professors, alumni, and students of the Institute are requested to send us the titles of any books, pamphlets, or periodical articles which they may publish promptly as they appear.]

Allen, Walter S. ('79).—With G. R. Underwood.—*Sur un produit de l'oxydation de la diéthylbenzine.* *Bull. Soc. Chim.*, XL (1883), 100.

Clark, T. M. (Prof.)—The Architect as a Sanitarian. *Sanitary Engineer*, Sept. 6, 1883. Also in *American Architect*.

— Building Superintendence. A manual for young architects. 1 vol. 8vo, pp. 336. J. R. Osgood & Co, Boston, 1883.

Crosby, W. O. ('76).—On the Classification and Origin of Joint Structures. *Proc. Bost. Soc. Nat. Hist.*, XXII, 72-85. Abstract in *Proc. Am. Assoc.*, XXXI (1882), 409-411.

— Origin of Continents. *Geol. Mag. N. S.*, Dec. II, X (1883), 241-252.

Howe, Henry M. ('71).—A suggested Cure for Blast Furnace Chills. In full in *Trans. Am. Inst. Min. Eng.*, XI (1882.)

— A Systematic Nomenclature for Minerals. *Id.* XI (1882).

Hyatt, Alpheus (Prof.)—Transformation of Planorbis at Steinheim, with remarks on the effects of gravity upon the forms of shells and animals. *Am. Naturalist*, V (1882), 441-453.

— Genus Meekoceras, with remarks on species. *U. S. Geol. and Geog. Survey of Territories*, 1878, Pt. I (Hayden), 112-117. (1883).

— Boston Society of Natural History's Collection of Minerals. *Science*, I, 436, 437. (May 18, 1883.)

Lanza, Gæetano (Prof.)—Transverse Strength of large Spruce Beams. [Abstract.] *Proc. Am. Assoc.*, XXXI (1882), 311-314.

— The Transverse Strength of Wooden Beams. *Journ. Assoc. Eng., Societies*, II (1883), 133-136.

— Transverse Strength of Timber. A series of, in *Am. Architect*, beginning November, 1883.

Lewis, Wilfred ('75).—Speeding Engine Lathes. *Mechanics*, I, No. 16. (April, 1882.)

— Application of Logarithms to Problems in Gearing. *Proc. Eng. Club of Phila.*, III, No. 2. (June, 1882.)

— Comparative Strength of Spur and Bevel Gears. *Mechanics*, IV, No. 90. (Sept., 1883.)

Lyle, David A., U. S. A. ('84).—Locusts as Food for Man. *Pop. Sci. Monthly*, XXIII (1883), 531-535. (August, 1883.)

Nichols, W. R. ('69).—On the Use of Lead for Conveying and Storing Water. A series of articles in *Sanitary Engineer*, beginning Nov. 15, 1883.

Ordway, John M. (Prof.)—Report on the Covering of Steam Pipes. Special Report, No. 14, of the Boston Manufacturers Mutual Fire Insurance Company. Pph. 8vo, pp. — Boston, 1883.

Pickering, W. H. ('79).—Evolution of the American Trotting Horse. *Am. Jour. Sci.*, XXVI (1883), 378, 379.

Underwood, G. R. ('83).—See Allen, Walter S.

Wead, Chas. K. (Certif. '72).—On a Mean Direction Integrating Anemometer. *Proc. Am. Assoc.*, XXXI (1882), 147.

Department Notes.

Charles William Siemens, the distinguished English scientist, engineer, and electrician, is dead, at the age of sixty-three years.

An art critic says Trinity Church is a hybrid structure, between Gothic and Ionic.

The six-column problem is slowly crystallizing upon paper, in how many various and wondrous forms remains to be seen.

The Brooks Locomotive Works, at Dunkirk, N. Y., have an evening school for apprentices connected with their works. Attendance is obligatory, and prizes are offered for the greatest improvement in studies. For the most progress in draughting the reward is a situation in the draughting department of the establishment.

Mr. W. T. Ripley, '82, of Rutland, Vt., has obtained Letters Patent under date of Oct. 2, 1883, for an "Automatic Sand and Water Feeding Device for Stone Sawing Machines." The sand is mixed with water and fed to the saws by air pressure, which is made to act upon the sand through a specially constructed valve. The sand may be used several times.

According to the *Electrician*, Cornell University has opened a course in electrical engineering this year. The requirements for admission are the same as to the other technical courses, civil and mechanical engineering, etc., which have long been established. The student of electrical engineering spends considerable time in the laboratory, where he does exactly what the engineer needs to do in a factory or office.

At a recent meeting of the Society of Arts, Prof. Ordway gave the results of his experiments on steam-pipe coverings, his conclusions being that hair-felt was the best non-conductor, but had a disadvantage in its liability to scorch; this being remedied by raising the felt from contact with the pipe, it made a first-class covering at a fair price. A simple way of using a cheap grade of straw board, rendered practically incombustible by water glass, either by itself or in combination with felt or other substances, was explained and recommended.

Noticeable Articles.

FORTNIGHTLY, September. R. W. Emerson: an Ethical Study, by Henry Norman. An ingenious expansion of two lines from that most entertaining of poems, Mr. Lowell's "Fable for Critics."

"A Greek head on right Yankee shoulders, whose range
Has Olympus for one pole, for t' other the Exchange?"

ATLANTIC, November. Ezra Ripley, D. D., from the papers of Mr. Emerson. Dr. Ripley was minister of Concord, and occupant of the "Old Manse."

FORTNIGHTLY, October. "The Foreign Policy of France," by Paul Leroy Beaulieu: a defence of the Tonkin, Tunis, and Madagascar expeditions, by an eminent French economist.

Mr. Irving's Interpretations of Shakespeare, by E. R. Russell.

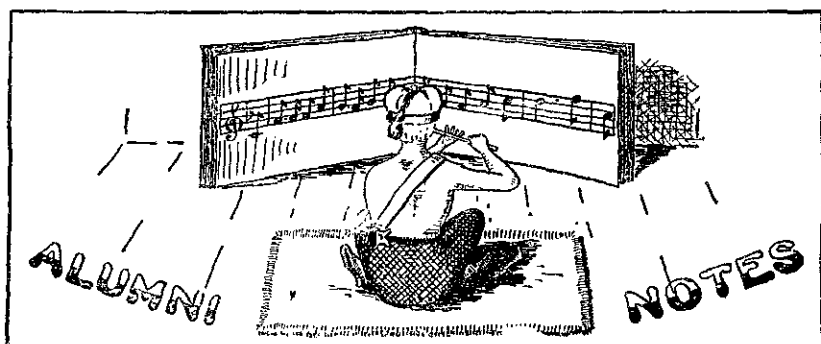
"Indian Princes at Home," by Sir Lepell Griffin. "There appeared in a recent number of the 'Nineteenth Century' an article on the spoliation of India, by Mr. J. Seymour Keay, which for ignorance, presumption, and misrepresentation of fact is perhaps unsurpassed in the literature of political abuse. . . . Although I have no intention of following Mr. Keay into the mire, his article is useful as suggesting some observations on the native chiefs of India." [The student of English politics, and especially of England's rule in India, should note the interesting volume by Prof. Sceley, Professor of Modern History in English, Cambridge, entitled "The Expansion of England," just reprinted by Roberts Bros.]

CONTEMPORARY, September. "The Work of Trades Unions," by George Howell. Some of the statistics contained in this article will surprise a reader who is not familiar with the subject. The Amalgamated Society of Engineers had in 1881 412 branches, containing 46,101 members, with an income of £132,506, and an expenditure of £116,293. The Friendly Society of Iron Founders had 108 branches, 11,209 members, an income of £38,777, and an expenditure of £36,535. The Amalgamated Carpenters and Joiners have 363 branches, 18,765 members, with an income of £44,714. The common idea is that this income is expended in the support of strikes, yet the iron founders spent in 1881 only £261 on strikes, and generally the influence of these great associations is exerted to prevent strikes. A good account of them is to be found in Mr. Howell's own "Conflict of Capital and Labor," and in "The Trades Unions of England."

Read also in this connection the vigorous address to the Trades Union Congress by Frederic Harrison, on the Progress of Labor, in the "Contemporary" for October.

The cheap republication of the "Fortnightly," "Contemporary," and "Nineteenth Century" has been discontinued. I hope, however, to be able to put the English editions into the new reading-room.

W. P. A.



THE marriage of James G. Woolworth, '78, to Miss Lillian F. Rawson, of Providence, R. I., took place at the Beneficent Congregational Church in that city Oct 24.

IGNATIO BONILLAS, '84. — Peritō (Sup't) de Minas de la provincia de Magdalena, Sonora, Mexico.

C. H. PEABODY, '77. — Instructor in applied mechanics, M. I. T., formerly Ass't Prof. Mech. Eng. and Physics, Illinois Industrial University.

PETER SCHWAMB, '78. — Instructor in Mech Eng. M. I. T., formerly draughtsman at Hinckley Locomotive Works.

B. F. COPELAND, '85. — Fancy farming, Dedham, Mass.

GEO. F. BRYANT, '83. — Assistant in office of Locks and Canals, Lowell, Mass.

PARRY KENNARD, '84. — U.S. Bunting Co., Lowell, Mass.

OAKES AMES, '85. — Kinsley Iron Co., Canton, Mass.

F. T. BARDWELL, '83. — Engineering department, Holyoke Water Power Co., Holyoke, Mass.

AUSTIN C. CHILD, '85. — On a cattle ranch, Coleman, Texas.

W. H. SHOCKLEY, '75. — Sup't Mt. Diablo Mill and Mining Co., Candelaria, Nev. The company employs ninety-three men, and has produced \$445,000 in silver during the past eight months. The wages of miners is \$4.00 for ten hours; of assayers, \$5.00 a day. Surveyors get \$2.50 a day and expenses; but there is little work for them in this section.

E. D. MELLEEN, '84. — 307 Broadway, Cambridgeport, Mass., with Curtis Davis & Co.

F. M. PALMER, '75. — Ass't Eng. Essex Water Power Co., Lawrence.

F. W. WHITTIER, '80. — Ass't Eng. Essex Water Power Co., Lawrence.

JOHN H. ROSS, '82, has just returned from a three months' trip abroad.

G. T. JARVIS, '84. — Train Despatcher, Mexican Central R. R., City of Mexico.

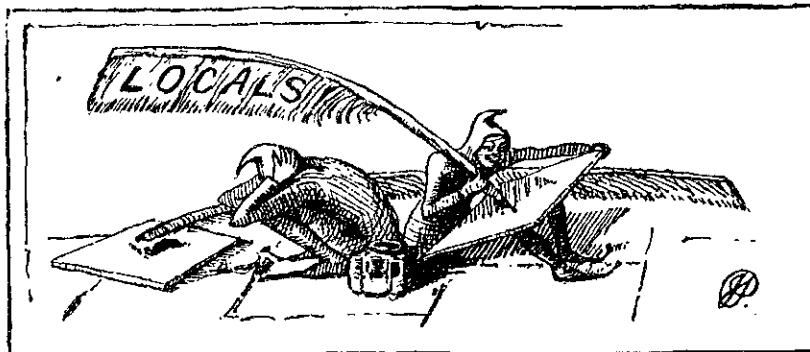
H. F. OTIS, '84. — With Arthur Little, architect, 85 Devonshire Street, Boston, Mass.

G. F. LULL, '84. — With Penobscot Chemical Fibre Co., West Great Works, Me.

F. J. KINGSBURY, '85. — With Scovil Brass Co., Waterbury, Conn.

THOMAS B. CARSON, '82. — American Glucose Co., Iowa City, Iowa.

WM. B. FULLER, '83. — Mandan, Dakota, Lock Box 63, Ass't Eng. of Tracks, Bridges, and Buildings, Dakota and Missouri Divisions of Northern Pacific R. R.



Holidays are coming!

No skating Thanksgiving.

The Winslow Rink is open.

Been to the foreign fair yet?

Good luck to the '87 foot-ball team!

Senior mechanics will soon be over.

The Glee Club is in need of first tenors.

A good outlook for the base-ball players.

Mr. Norris, '84, visited the Institute last week.

The roster of the battalion will soon be published.

New type throughout this time. How do you like it?

Have you seen the changes in the mechanical laboratory?

Where will the base-ball men practise during the winter?

The bicyclers are making the most of this open November.

The B. Y. M. C. A. gymnasium was opened a week ago last Thursday.

The Sophomore miners have made good progress in surveying this year.

The Sophomores are rejoicing at having finished descriptive astronomy.

The electricals no longer have to ink in their plates in descriptive geometry.

Let us have a hop in the architects' room for dedication of the new building.

Maj. Locke expects to have his first exhibition drill by the last of December.

Mr. Baldwin and Mr. Rotch will start on their locomotive trip Thanksgiving Day.

The Glee Club holds its rehearsals in Choral Hall in the B. Y. M. C. A. building.

Bad weather has interfered with the field work of the civils but twice during the whole term.

'86 has elected Mr. Winsor and Mr. Shove members of the gymnasium committee.

ΣX has just initiated two new members, — Mr. F. W. Putnam and Mr. C. Wood, both '86.

The electrical engineers expect to be at work in the new laboratories soon after Thanksgiving.

The afternoon recitations are now to commence at a quarter past two, on account of the change of time.

The junior division in English do not use the new two-cent stamp; that is by no means loud enough for them.

Mr. J. W. Hatch, formerly of '86, visited the Institute the other day. His health is considerably improved since last year.

An '85 miner announced in class the other day that according to Fresenius a certain precipitate was to be carefully washed with dilute water.

The senior mechanicals and a few others, accompanied by Prof. Lanza, visited the government testing machine, at Watertown, week before last.

Mr. J. E. Ryan has arrived in town from the Black Hills. After attending to some business matters here he will sail for Europe on a short business trip.

The even temperature in the new building was very enjoyable while the cold weather lasted; but many are the complaints of the heat on these warm days.

Lectures in decoration and in Greek and Roman architectural history are to begin after the ground is frozen. It is expected that it will be cold enough by that time.

Astonishing urbanity. *Professor (thinking the question superfluous, but wishing to make sure).* Who in the class knows a white pine tree when he sees it? (*A single hand is raised.*) *Professor.* What is the difference between a white pine and a hard pine? *Student (who raised his hand before).* Don't know. Never saw a hard pine.

A third-year chemist was seen the other day patiently filtering his distilled water, — not so senseless an operation as might at first sight appear, since the water furnished by the old apparatus has been quite turbid lately. Prof. Wing, however, is drawing plans for a new piece

of apparatus, which will probably be placed in the Kidder laboratory.

Mr. W. H. Osgood, '85, earned a banjo very neatly a short time ago. Messrs. Fairbanks & Cole had at the Institute Fair a case of twenty-two banjos, each finely inlaid with mother-of-pearl. A prize was offered to the one who could guess nearest the number of pieces. Mr. Osgood guessed 4,847, — the exact number, — and received a beautiful banjo as his prize.

It will seem a pity if the new building be finally devoted exclusively to work, without first having some sort of enjoyable dedication. It is to be hoped that something will be done in order that this opportunity may not be lost. If a few interested members of the Institute would take hold and get up a dance or something of the sort, no doubt they would receive the support of a majority of the students. The architects' room would make a delightful dancing hall, — large, airy, easy of access, and, after the removal of the desks, with an open floor.

The contract for the '84 class photographs has been given to Messrs. Ritz & Hastings, whose work for '83 gave great satisfaction. The following are the very low rates offered to the class: One dozen cabinets, \$4.00; second dozen, \$3.00; subsequent dozen, \$2.50. One dozen cards, \$2.50; subsequent dozens, \$1.50. Three dozen cabinets ordered at same time, \$8 90. Sittings will be given between the first of January and the first of April, in order that the pictures may be in the hands of the class as soon as possible.

On Thursday last the captain of the Harvard foot-ball team received a communication from the athletic committee of the faculty forbidding the eleven to play any intercollegiate match games until substantial changes have been made in the official rules of the Intercollegiate Association. The action of the committee was the result of their belief that the games under these rules have begun to degenerate from a manly, if rough, sport into brutal and dangerous contests. The decision has taken the Harvard students completely by surprise.

Athletic Notes.

THE response to the call for a meeting of those who were interested in the formation of a Base-Ball Association was most encouraging. About fifty men were present at the first meeting and nearly as many at the second, held for the adoption of a constitution and the election of officers.

The following officers were chosen:—

President, Charles F. Spring, '85.

Vice-President, J. C. Duff, '86.

Secretary and Treasurer, A. H. Twombly, '87.

Board of Directors, Frank E. Sands, '85, Carleton, '87

The association will probably unite with the Beacons in securing a place for practice during the winter. All men who intend to try for the nine are requested to hand their names to some officer of the association at once.

For the association to be an entire success, it is necessary that its membership should be as large as possible, in order that the necessary expenses may be provided for without heavily taxing a few men. It does not seem fair that men should give their time and work for the nine, and be called upon to defray all their expenses. Let all men, therefore, who wish the nine to be a success, join the association and in this manner show that they are willing to do their part to make it one.

At a meeting of the Athletic Club held Nov. 15, it was voted to hold a fall meeting, as soon as the executive committee could make the necessary arrangements. The advisability of having boxing and wrestling at the games was discussed, but was left to discretion of the executive committee. Messrs. Baldwin, Bunce, and Spring were appointed as a committee to report upon the adoption of a shingle.

It was decided to have a hare and hounds run on Saturday, Nov. 24, and Messrs. Bunce and Spring were appointed to act as hares.

The class tugs of war this year promise to be very exciting. '85, who has held the championship for the last two years, has lost two of its men, and if it retains its supremacy this

year will have to make a great exertion. '84 and '86 have also lost some of their best men, and this will tend to place the teams upon an equality in this respect. '87 is as yet an unknown quantity, but from its large numbers ought to present a first-class team.

The game of foot-ball on Tuesday last, at Quincy, resulted in a score of one touch-down for the Institute Freshmen to nothing for the Adams Academy team.

TUFTS vs. M. I. T., '87. — Saturday, Nov. 17, the Freshmen foot-ball team went to College Hill to play the eleven of Tufts College. Game was called at quarter to four, the Techs kicking off. Fletcher soon got the ball, and breaking through Tufts' rush line, carried it almost to Tufts' goal before he was stopped. Winsor then scored a touch-down from which Douglas kicked a goal. Tufts now kicked the ball down to '87's goal and kept it there until Twombly secured it, and by a good run carried it back to Tufts' end of the field, when time was called.

The second inning was opened by Tufts kicking the ball down to the Institutes' goal, where, after hard work, Smith made a touch-down from which Day kicked a goal. The Techs then gradually worked the ball down to Tufts' goal, where they kept it until the end of the second half-hour, when the game was declared a tie. Cooley, Winsor, Twombly, and Fletcher did the best work for '87, and Day for Tufts. Tufts — rushers, Smith, Snapback, Sargent, N. St. Dennis, S. St. Dennis, Fynn, Cook. Quarter-back: De Coster. Half-backs: Griswold, Day (capt.). Back: Borden.

M. I. T. '87 — rushers: Hunt, Cabot, Mahon, Fletcher, Shortall, La Trobe, Cooley (capt.). Quarter-back: Douglass, Half-backs: Winsor, Twombly. Back: Dorrance.

Umpire for Tufts, Mr. Crosby; umpire for '87, Mr. Connery; referee, Mr. Kirkam, '87.

WHEN Bob Burdette lectures in Boston he finds that the editor's-draw is a *full house*.

It is hard to believe, as you smell the burning sulphur, that matches are really made in heaven.

The College World.

HARVARD. — The *Advocate* would correct the current impression that the college committee is in general like the popular senator, high courts of justice, and the like, which are cropping out in many of our colleges, and says this committee is simply an avenue of communication between faculty and students, without regard to the discipline of the students. — The ladies of the executive committee of the Society for Collegiate Instruction (the Harvard Annex) have raised \$67,000 toward an endowment fund. — 1,600 students at Harvard; 1,534 at Ann Arbor.

ELSEWHERE. — The Yale Foot-Ball Association has a surplus of nearly \$1,000; a new athletic field has just been opened; the college recently received a bequest of \$100,000.

The Columbia boat club has withdrawn from the contest for the Childs cup.

Tuition fees at Princeton are less than at any other Eastern college, Rutgers excepted. The *Princetonian* protests against the idea that theirs is an expensive college. They give average maximum and minimum expenditures as \$700 and \$290, respectively.

The lighting of the library at Columbia has been provided for by the appropriation of \$7,000 for the introduction of the Edison incandescent system.

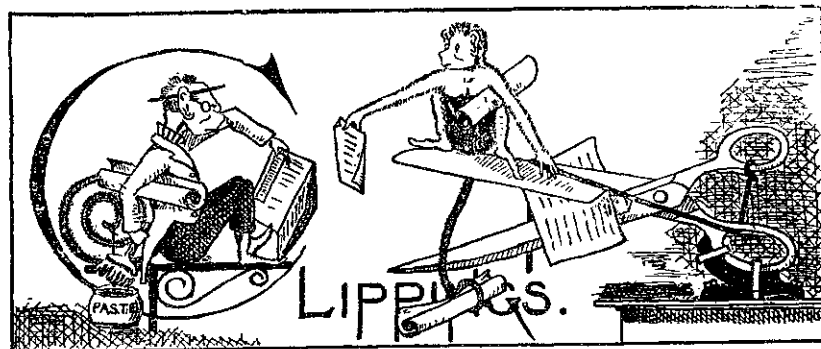
Bowdoin is feeling happy under its new system of government, and we remark the absence of hazing this year.

Columbia is to have a new paper, — the *Columbian*, — which will make its appearance next term.

Dr. Hopkins recently lectured to the Sophomores of Columbia on the classic phrase, "I should smile."

The course at the University of Pennsylvania is now five years. The standard of admission has lately been raised, however, and the course will probably be shortened to four years.

There is talk of founding a large university at Milwaukee, Wis.



Her Photograph.

I know the photographer pinned
A little white card on the screen,
When he 'd wrapped up his head in a cloth
And focussed his picture machine;
And as he turned back to the chair,
I am equally certain that he
Said, "Won't you look right at this card?"
Yet she seems to be looking at me.

And after arranging her chin,
And twisting and turning her head,
And adjusting the folds of her dress,
I am sure the photographer said,
"Now please for a moment sit still
And smile till you hear me count three,"
As he whisked off the camera's cap;
Yet she seems to be smiling on me.

I presume that she thought it a bore,
And that she was quite ill at ease;
Saw little black specks in her eyes,
And felt a temptation to sneeze;
That she wondered how long it would take,
And what sort of a picture 't would be;
And yet, when I look at the face,
She seems to be thinking of me.

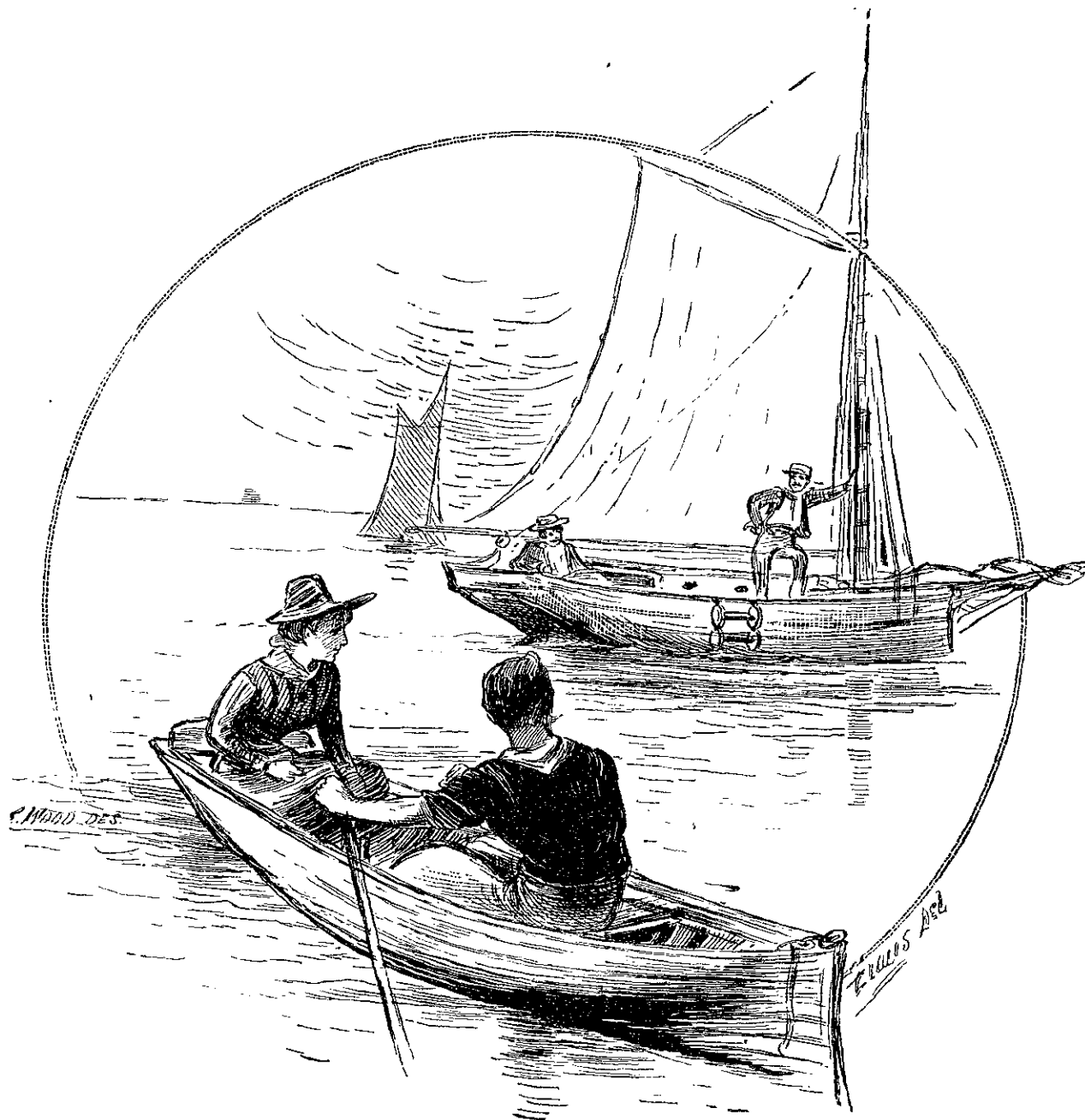
And when the brief seconds were passed,
And the artist had said, "That is all,"
I presume, as she rose from the chair,
She only said, "When shall I call?"
But the message that waits on these lips,
That smiling, half parted, I see,
Is as sweet and as fair as her face;
And it seems to be waiting for me.

WALTER LEARNED, in *Life*.

Translation in condensed French class: *Il est louable de travailler, et blâmable de ne pas le faire.*
Student's translation: It is praiseworthy to travel, but blamable not to pay fare.

"I say, old fellow, you have n't said anything brilliant yet, and it is now eleven o'clock."

"Oh, well, I'm a night blooming serious."



Miss Vassar, '87, who has just been shown over the yacht: "I do think it's just too cosey for anything! And do you really leave those cute little steps out all the time you stay here?. I should think you'd be afraid they'd float away when the tide rises."

If a body meet a body
Looking very sad,
Then a body knows a body
Failed to get an "ad."
If a body meet a body
Looking very bright,
Then a body knows a body's
"Ads" are going right.

The Magnet.

Old lady to gruff old gentleman: "Ah, I was once like that fair one myself."

Gruff old gentleman: "Yes; once is n't many times, though."

It is all well enough to make hay while the sun shines, but you want to gather melons in the dark of the moon. *Life.*

PRACTICAL PROVERBS.

For New York City. — Tammany cooks spoil the broth.

For the poker player. — None so blind as those that won't ante.

If a man wants to know how many friends he has, the only thing necessary is for him to have a billiard table in his house.

NOYES BROTHERS,

WASHINGTON, Cor. SUMMER STREET, BOSTON, U. S. A.

Full Evening Dress Shirts, in the late English fashion, constantly on hand and made to special measure for any occasion. Always correct in style.

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

All grades of English underwear and hosiery in silk and merino wool.

The famous London Tan Street Gloves, \$1.35 every pair, warranted.

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ENGLISH STYLES OF COLLARS.

ENGLISH NECKWEAR, "TECH COLORS."

GOLD, SILVER AND BUCKHORN

MOUNTED CANES & UMBRELLAS

FINE COTTON HOSE 50 CTS. A PAIR.

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LONG DRESSING GOWNS.

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Smith & Stedman,

MEN'S

— FINE —

FURNISHINGS,

Latest Styles,

NECKWEAR,

GLOVES,

CANES, ETC.,

— 343 —

Washington Street.

On Saturday, the 17th, the class in mechanics, '84, with a number of other classmen, visited the testing machine at the Watertown Arsenal. Half the fellows went out on the 7.45 train, and had completed their examination when the remainder arrived at 9.30. Through Prof. Lanza's explanation all obtained a clear idea of the working of the machine, which is a hydraulic one, with capacity of a million pounds for compression or tension. Many thanks are due to the gentleman in charge for his kindness in allowing our visit, which was of much interest and profit.

There is talk of founding a large university at Milwaukee, Wis.

PREPARATION

FOR THE

Mass. Institute of Technology

Is a specialty at CHAUNCY-HALL SCHOOL, Boston, Mass., and its remarkable success can be ascertained from the Chairman and Secretary of the Faculty of the Institute.

It aims to fit its candidates so thoroughly that they will not be weighted by "conditions" to be made up after entering, when all their powers are needed for their regular work.

The School is within two minutes' walk of the Institute, affording to the teachers, who are preparing the candidates, unequalled opportunities for consulting the professors.

Successful preparation is made also for College and for Business. Chauncy Hall is the *oldest and largest* private school in Boston.

COLLINS & FAIRBANKS,

Opera Crush Hats,

Silk Hats,

Felt and Cloth Hats.

STYLES SPECIALLY ADAPTED TO YOUNG MEN.

English Hats.

CLUB HATS AND CAPS MADE TO ORDER.

Leather Hat Boxes,

Umbrellas,

Walking Sticks.

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(Opposite Macullar, Parker & Co.)

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 for articles broken is required.

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

FRANCIS A. WALKER, President.

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Sunny days are not at a premium in our department; we want some artificial clouds in the shape of window shades.

A novel has appeared at Vas-sar, written by one of the students, and entitled "A Foolish Virgin," which, if we may judge from the criticism in the "Miscellany," has not proved a decided success.

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The great popularity of this brand has caused certain parties to place on sale base imitations; the public is cautioned to observe that our signature appears on every package of Genuine RICHMOND STRAIGHT CUT CIGARETTES.

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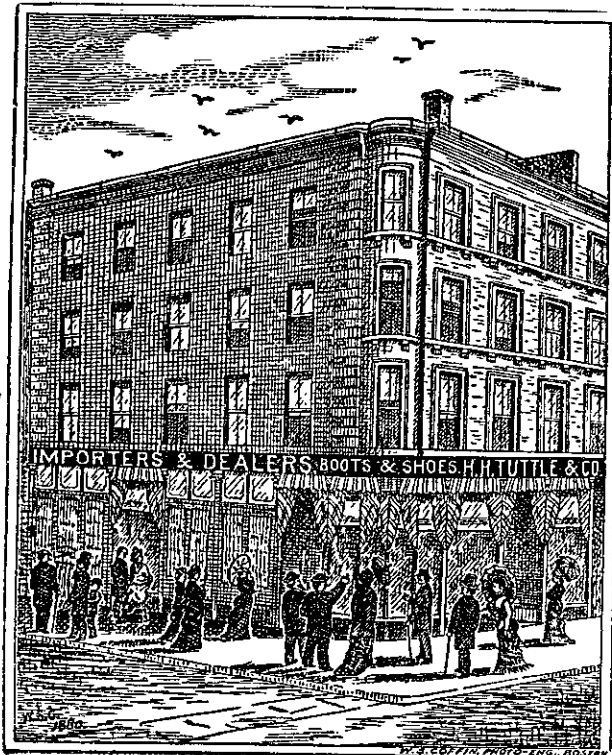
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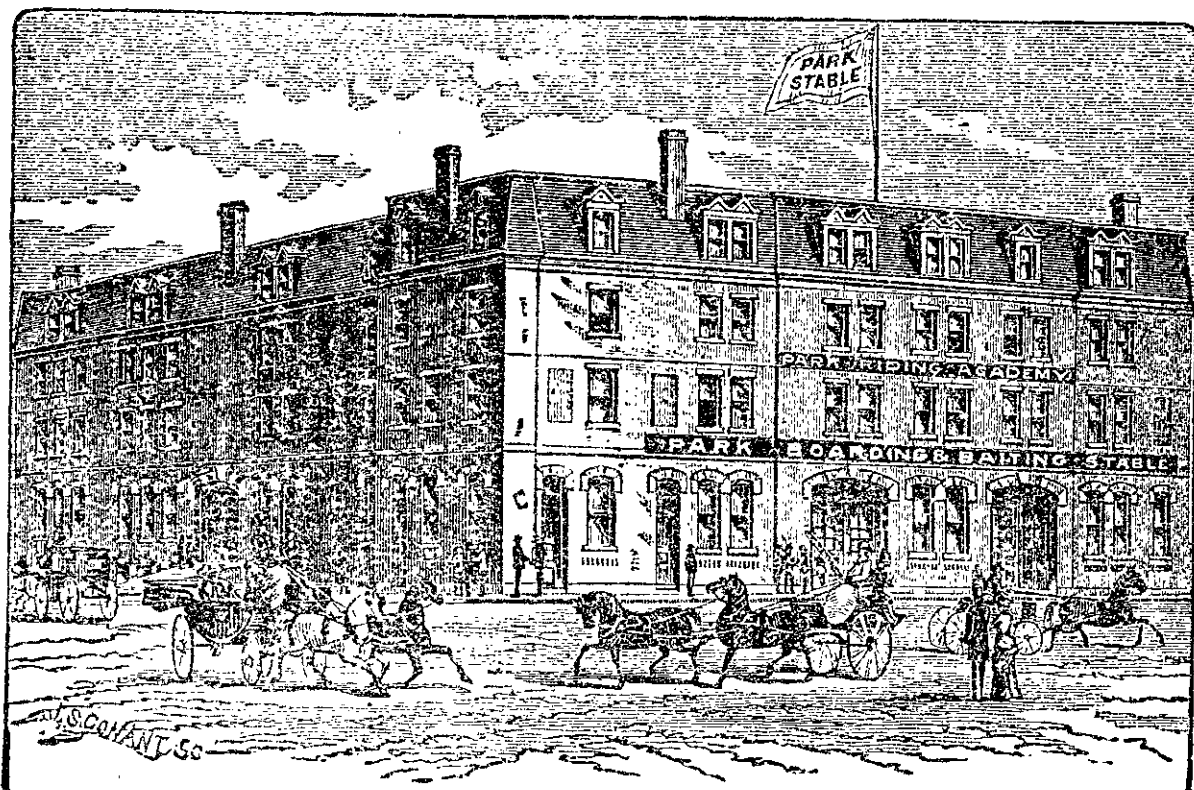
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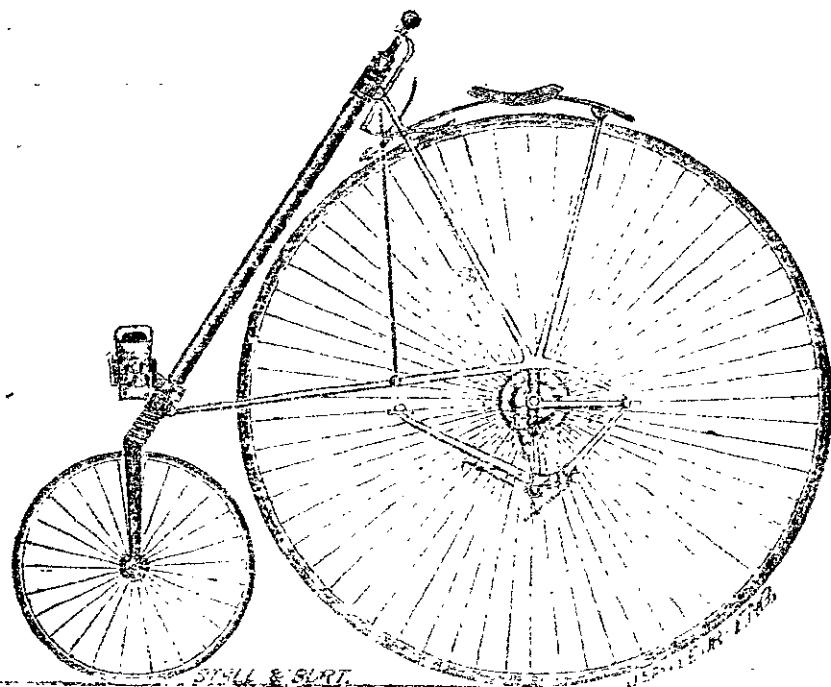
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