

D. TOY . . . TAILOR, 11 CHARLES STREET, NEAR BEACON STREET, BOSTON.

— AGENT FOR —

WHITAKER,

34 Conduit Street and Regent Street, LONDON.
— ALSO AT —
BRIGHTON and LIVERPOOL, ENGLAND.

HATTERS AND FURRIERS

TO STUDENTS,  TO LADIES.

D. P. ILSLEY & CO.

It is our aim to keep constantly on hand any article of wearing apparel usually to be obtained in any first-class hat and fur establishments.

We keep a full stock of English, French and American hats for Ladies, Gentlemen and Children.

Our importations are from personal selections.

381 Washington St.

(Opposite FRANKLIN),

BOSTON.



MESSENGER BROS. & JONES,
TAILORS

—AND—

IMPORTERS,

388 WASHINGTON STREET,

BOSTON.

Ladies' Garments a Specialty.

**F. L. DUNNE,
TAILOR.**

Novelties for Spring, now Open for Inspection. 
338 Washington Street.

The Tech.

VOL. II.

BOSTON, APRIL 4, 1883.

No. 13.

THE TECH.

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

BOARD OF DIRECTORS, 1882-3.

H. WARD LEONARD, '83, <i>Pres.</i>	FREDERICK L. SMITH, '84.
GEORGE J. FORAN, '83, <i>Sec.</i>	WALTER H. BUNCE, '84.
I. W. LITCHFIELD, '85, <i>Treas.</i>	ROLAND. G. GAMWELL, '86

EDITORS.

HARVEY S. CHASE, '83, <i>Editor in Chief.</i>	G. L. R. FRENCH, '84.
HORACE B. GALE, '83.	ARTHUR D. LITTLE, '85.
J. G. EPPENDORFF, '83.	FRANK L. LOCKE, '86.
FRANK TENNEY, '83.	R. W. HARDON, <i>Adv't Agt.</i>
T. W. ROBINSON, '84.	

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

For sale by A. WILLIAMS & Co.

ALFRED MUDGE & SON, PRINTERS, 34 SCHOOL STREET, BOSTON.



WE are glad to announce that '83 is certainly to have a class supper, and equally glad to commend the action of the class in voting to exclude wine from the bill of fare on that occasion. This course, which was decided upon after considerable discussion in the class meeting last week, is the same that has generally been followed at the Institute on similar occasions, and is a custom that deserves to be continued. Aside from the manifest injustice of calling upon all the members of the class to pay for what the majority do not want, it is not promotive of that harmony which is above all desirable in an affair of this kind to include in the *menu viands* of which only a few would care to partake, and to the use of which some are strongly opposed. It is safe to say that at the supper of '83, the

first, as it is the last, opportunity which the members will have of meeting together socially as a class, entire harmony and good feeling will prevail, and the action of the class in removing the only cause that could possibly tend to discord is eminently creditable to it. We should be reluctant to suppose that there are any members of the class who cannot enjoy a good supper without wine, and feel sure that the occasion will prove that the wits of '83 do not need to be sharpened by artificial means.

WE would like to correct a few mistakes which occurred in the article on the new building, in the last number. The reading-room adjoining the physical laboratory will be especially devoted to books on physics and the natural sciences, while the library for general use will probably be placed in the present physical laboratory. As the TECH office on this account cannot be in the new building, we sincerely hope that some effort will soon be made to secure a room in the lower part of the present edifice. Another slight mistake was that the heat room was called the electrical room, and *vice versa*.

THE action of the gymnasium committee in refusing the use of the gymnasium to the class of '86 for their contemplated dance on Saturday next appears to us rather hasty and ill-advised. It would seem that some better method might have been found for the upper classes to express their disapproval of the course of '86, than by attempting to prohibit the gymnasium dance, and the action, we fear, must, to many of the upper classmen and to outsiders, appear somewhat petty and rather to be deplored.

Steam and Water Power used in Manufactures in the United States.

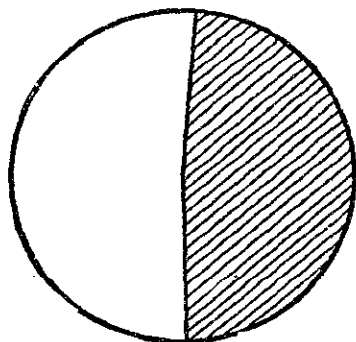
IN the "Compendium of the Tenth Census," recently published at Washington, are given the statistics of the steam and water power used in manufactures, from which the following synopsis is taken:—

In 1880 there were 85,923 establishments engaged in productive industry using steam or water power, with 55,404 water wheels and 1,225,379 horse-power, 72,304 steam boilers, 56,483 steam engines and 2,185,458 horse-power, making a total of 3,410,837 horse-power from steam and water.

At the ninth census there were reported from 51,018 water wheels 1,130,431 horse-power, and from 40,191 steam engines 1,215,711 horse-power, making a total of 2,346,142 horse-power in steam and water. This would show an increase from 1870 to 1880 of 45.38 per cent in the total amount of power used in manufactures.

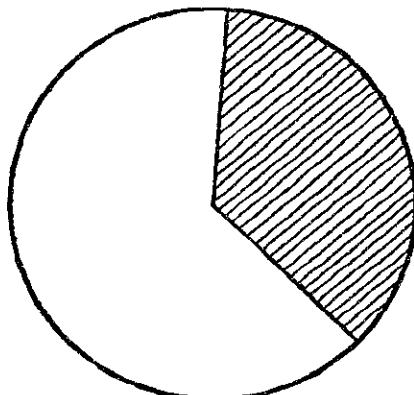
In 1870, of the total power reported, 48.18 per cent was water power and 51.82 per cent steam power. In 1880, only 35.93 per cent of the total was water power, against 64.07 per cent steam power. These facts are represented graphically in Figs. 1 and 2. The area of each circle is proportional to the total amount of power reported. Each circle is divided into two segments, the areas of which are proportional to the total amount of steam and water power as reported in 1870 and in 1880. The shaded areas refer to water power.

Fig 1.



1870.

Fig 2.



1880.

The following table shows the total amounts of power reported for some of the leading industries in 1870 and 1880, and the percentage of increase from 1870 to 1880, in the amounts of power used in each of these industries.

KIND OF INDUSTRY.	TOTAL HORSE-POWER.		Percentage of increase.
	1870.	1880.	
Lumber Mills.....	641,665	821,928	28.09
Flouring and Grist Mills.	576,686	771,201	33.73
Iron and Steel Works....	170,675	397,247	132.75
Cotton Mills.....	146,040	275,504	88.65
Paper Mills.....	53,218	123,912	132.84
Woollen Mills	85,101	106,507	25.15

The next table shows the relative importance of steam and water power for these industries in 1870 and in 1880.

KIND OF INDUSTRY.	1870.		1880.	
	PER CENT OF		PER CENT OF	
	Water Power.	Steam Power.	Water Power.	Steam Power.
Lumber Mills.....	50.93	49.07	33.91	66.09
Flouring and Grist Mills.	70.74	29.26	60.94	36.06
Iron and Steel Works....	9.72	90.28	4.16	95.84
Cotton Mills	67.84	32.16	53.99	46.01
Paper Mills.....	78.25	21.75	70.70	29.30
Woollen Mills	62.17	37.83	50.33	49.67

These facts are shown graphically in Figs. 3 and 4. Here, as before, areas are proportional to amounts of power, shaded areas corresponding to water power.

Fig. 3.

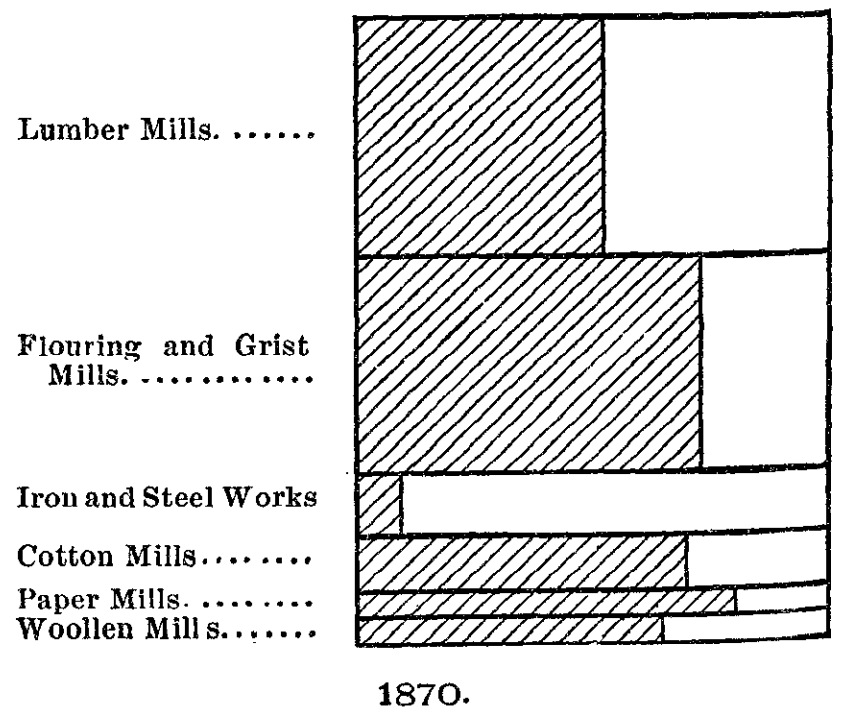
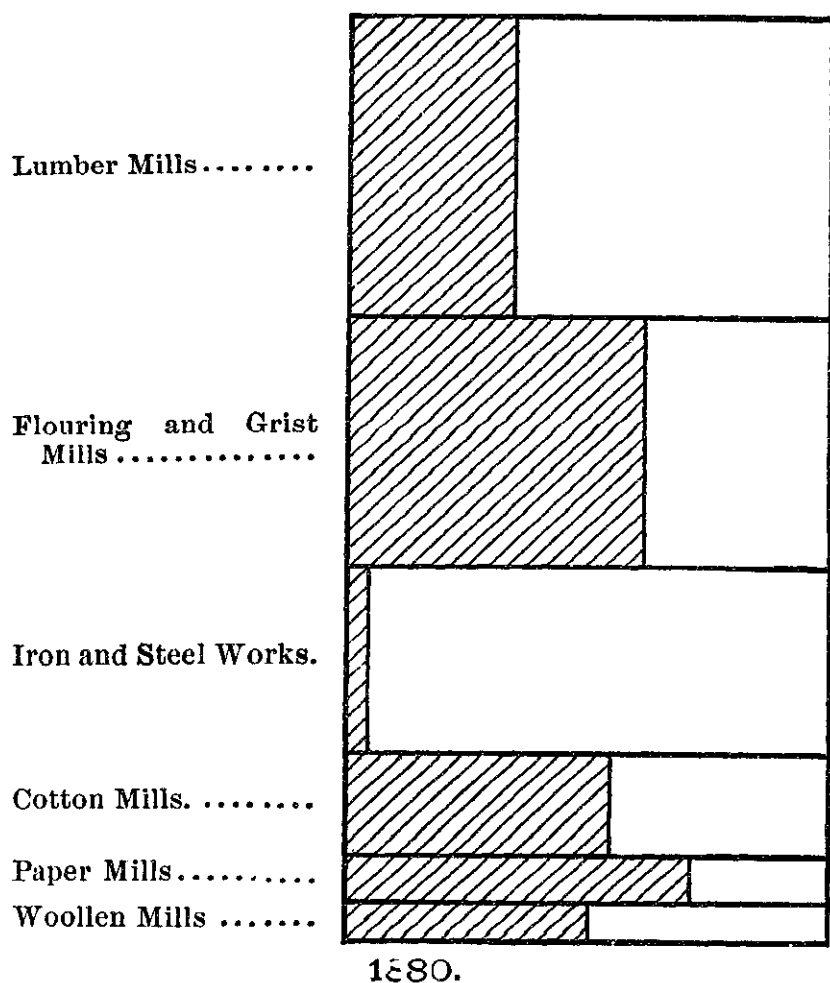


Fig. 4.



1880.

A. L. R.

Roger and I.

WE had agreed to go out this evening, Roger and I, and when we met at dinner, I said to Roger, "This is a progressive age, let us not be left behind. I saw in the paper that on this evening Mrs. Phantom would hold a materialization seance at 8 P. M., at — C — d Square, and if it suits you I move that we go." He agreed, and ten minutes of eight found us ringing at Mrs. Phantom's door.

We were ushered in and asked to lay aside our coats, as we might be uncomfortably warm if we kept them on. When we were seated, I looked around me, and found only one other man among the circle, and he, I afterwards found, was the manager. To my right was a large cabinet draped with heavy curtains. On my left sat a lady who had had a vision that Noah would come. She had been here six evenings to see him. "Do say that he will come," said she; "that he will be wafted from the clouds and sail down to us." I said that I

should like to see the gentleman, but, owing to the "fall of the prophet," I did not think that there would be water enough to float him.

At eight the medium appeared, and, after taking a seat in the cabinet, the gas was nearly turned down, and we requested to join hands and sing.

Immediately, Roger, who is trying for a leading part in the minstrels, started "Hold the Fort." But, alas! he sung both base and soprano, and spoiled it all. We sang again, and I bribed Roger not to sing.

We were now told that the electricity was imperfect, but if we would try to help them, the friends all around would like to speak to us. How I wished that he of electrical fame were with us to set all aright! But I said nothing.

After singing twice more (by request), the medium suddenly said, "Here comes some one who wants to be recognized." From behind the curtain came a man clad in dark trousers and a light dressing-gown, and he beckoned to Roger. Roger went towards him and said, "How do you do this evening, sir?"

Spirit. — "Don't you recognize me?"

Roger. — "I can't say that I do, sir."

The spirit retired, but returned with a skull cap and an oar.

Spirit. — "Do you recognize me now?"

Roger did not, and it was a failure; but I was sorry that he had not spoken to the lady on my left, for I know — Ah! it was he

Two minutes (seemed like two hours).

Medium. — "Tommy's come. Does anybody know Tommy?"

I said I thought I did, and, sure enough, it was Tommy of last year, — Tommy, the papyrograph boy. I loved him. When they took up a collection for the postman, had he not brought the box first to me?

I said, "How do you do, Tommy; are you not sorry that you left the Technology?" He expressed repentance, and said that he had come back to say that he had stolen three sheets of papyrograph paper; and, once, only once,

when he thought nobody was looking, he had sat down when he should have been printing. I told him that I knew that he was forgiven, but was glad that he had confessed for the benefit of the present boy. As I got through speaking he went away.

Medium. — "Polly wants to speak to you."

"Polly," I said, putting my hand to my heart, "is it Pol. E. Con?" I knew her. Last year I used to stand around and listen while the upper classmen spoke of her virtues. It was last year that hopes were in my breast of seeing her this year, of knowing her, and, perhaps — but it is over now.* She told me that she had been called away from our world by the great spirit, Census; but when I told her that I was sorry she had left us, — I among many who felt the same, — she gave me great hopes that she would be allowed to come back to this world in a short year.

Mary came to see me, — Mary and her son, — but I was so overcome that I could not speak to her.

At last the circle broke up, and Roger and I left to put on our overcoats. They were gone! I sat down and told Roger that I should not go without my overcoat.†

The manager suggested that some one of the strangers had taken the material; but, as they were all ladies, I doubted it, and started to look in a closet. The manager went first, and, upon opening the door, there hung the coats. He apologized; but we left, voting that materialization was a good thing, though we should not wear our overcoats next time. R. W. H.

[Since writing the above a friend of mine has related a similar experience to me. At a seance at which he attended a Boston man put some tacks upon the carpet. The spirit of Goethe came forth, and, with the confidence which becomes one from the other world, came towards the circle. Wonderful to relate, when he alighted upon a tack he so far forgot himself and his native tongue as to swear in English H.]

* I mean to intimate nothing more than that she might have H-onored me.

† Cost me \$75 at Messenger Bros. & Jones first of the winter (bill not paid).

The '85 Class Supper.

YOUNG'S Hotel, on the evening of March 22, was the scene of the first class supper of '85. At a few minutes before eight those holding soup coupons filed into the supper-room to the number of forty-five, and distributed themselves around the table. It was at this juncture that a member of the class became suddenly conspicuous by his absence, and a search committee was accordingly appointed, who visited the bar and consulted the register, but still the vacant chair.

Notwithstanding the fact, as stated by Lieut. Winslow, that 1,185,000 oysters perish to one that arrives at maturity, the committee had, by dint of several weeks' effort, secured a sufficient number of the mollusks to go around, which they accordingly did on the half-shell by way of initiation. Then followed the more substantial portion of the entertainment, the strictly temperance features of which were relieved by Roman punch, whose consistency was all that brought it from under the bar of excommunication.

Meanwhile the exterior of the *menu* had attracted no less marked attention. Upon it appeared a cosy fireplace, where, along the heavy lambrequin, and just distinguishable in flames, appeared the legend, "Class of '85." The tiles at the sides bore allusions to the various departments of the Institute, and from a curious combination of shadows on the hearth resulted the initials of our Alma Mater's somewhat extended name. The whole was admirably conceived and executed, and was the work of the class secretary, Mr. Litchfield.

During the progress of a little game the class president, Mr. Pratt, arose, and in a few happily turned words introduced Mr. Litchfield as toast-master for the evening. Mr. Litchfield accepted the responsibility by filling his glass with water, and then speaking briefly of the dead founder of the Institute, — of all we owe him, of the beauty of his character and the purity of his life, called upon the class to drink to the memory of President Rogers, which was

then done, standing and in silence. Turning then from the founder to the founded, Mr. Robinson was called upon to answer for the Institute. Then followed Mr. Richardson for the instructors, and Mr. Pratt for '85. After various derogatory similes had been indulged in by the toast-master, the departments were taken up in the order below:—

Civils. — Messrs. Worthington and Williams.

Miners and Chemists. — Mr. Robertson.

Architects. — Mr. Harding.

Electricals. — Mr. Dawes.

To their credit be it noted that not a man said he was too full for utterance.

The remaining toasts were then proposed and responded to as indicated:—

Σ. M. E. — Mr. Richards.

2 G. — Mr. Fiske.

Athletic Club. — Mr. J. L. Kimball.

THE TECH — Mr. Little.

The Battalion. — Mr. Richards.

Ex-Members. — Mr. J. M. Kimball.

Minstrels. — Mr. Spalding.

Freshmen. — Mr. McKim.

Chapel. — Mr. Spring.

The responses, which were all received with enthusiasm, were particularly noticeable for the many truly witty things which they contained; and notwithstanding the number and frequency of the toasts, there was not the least external symptom of alcoholic endosmosis.

In answering for the "Minstrels," Mr. Spalding gave an exhibition of his wonderful skill upon the bones, and received a well merited vote of thanks. Then came the "Freshmen," and here the confidence of the toast-master forsook him for the first time, as he confessed with tears in his eyes to having searched in vain through "Cruden's Concordance," "Webster's Unabridged," and the revised "Encyclopædia" for words to clothe his subject. He could say no more, but the class coming to his rescue, filled its glasses with that beverage so natural to the youthful subjects of the toast and drank their health in milk.

When these ceremonies had been duly hon-

ored, an hour or more was devoted to music and reminiscence. A vote of thanks was tendered Mr. Litchfield for the greatly admired *menu*, and another for his efforts as toast-master. The committee also received a merited acknowledgment of the obligation of the class.

As the members separated, each party gave the other a hearty cheer, and before an hour after midnight the last man was on his doorsteps fumbling for the latch-key as he conscientiously cheered himself.

MR. EDITOR:— We had about made up our minds that the Freshmen did not know exactly what they did know, and were somewhat doubtful if they knew that; but we were mistaken.

They have at last put their brilliant little heads together, and after due meditation decided to substitute a supper for the usual semi-annual dance.

Not a supper to be participated in by the upper classmen. Oh, no! Probably our typical Freshman has a too open heart, or rather too open stomach, to wish any of the upper members of the Institute to lower themselves by breaking bread or drinking milk with himself; or, perhaps, he fears that the two hundred and fifty dollars subscribed for his ball will not be more than enough to satisfy his own and his comrades' delicate appetites.

At any rate, there will be no Freshman ball this year. Not that this is anything new to the Institute at large; but the brilliancy of the idea of *reconsidering* the question of a dance at this eleventh hour, and, the ball being laid aside, the brain requisite for the conception of a supper to take its place,—that is what we want appreciated, if possible.

If the dance had been permitted to die a natural death, and nothing put in to take its place, we might have done our thinking in private; but, like the last straw on the camel's back, this is too much.

'86 started with every promise of leaving behind it an enviable reputation, and an example

worthy to be looked up to and followed by future classes. What reputation does it bear to-day? The largest and yet the smallest class that ever entered the Institute. Truly, appearances are deceptive. ARE.

The Freshman Ball.

MR. EDITOR:— Much blame has been cast on the present Freshman class, principally by upper classmen, for the simple reason that '86 has transgressed a so-called custom by deciding not to give a Freshman ball this year. Bitter and sore are the feelings against us. We are aware that to put in a plea supporting the recent action of the class is decidedly against public opinion at the Institute; but a few words might justly be said on our side.

Because for two or three years it has been customary for the entering class to give a ball complimentary to all the students, there is no reason why the present class should do so. Neither has any class a right to expect it simply because they have given it to those that went before.

Every class has undeniably a perfect right and privilege to act as it thinks proper in such matters, unbiassed by previous classes; nor is it under any obligations whatever to any other. This being the case, if it should not see fit to give the ball, nobody has any business to complain.

Many think that what they term our failure was due to the unwillingness of many to contribute for it; but this is not the case. Sufficient had been subscribed to make the affair a success, had it been thought best to carry it forward. Little interest, it is true, had been manifested from the first, but nearly all had been willing to subscribe. For some reason or other matters had been put off until it became absolutely too late to give the ball, and when the affair was brought up for final action it was voted down by a large majority. This decision certainly shows the independence of the class, and should be respected, if not relished.

It has been suggested that, should the next

year's entering class give a Freshman ball, '86 would feel rather in the background.

If they conclude to do so, very well; that is no concern of ours; but we think it may be said for a large number of the class, that we sincerely hope this extravagant custom — if it may be called a custom — will soon cease, and be supplanted by other and more equally divided amusements, in which all may participate, and not those alone who have long bank accounts at their disposal. A DISSENTER.

Athletics.

A LARGE audience assembled last Saturday afternoon in the new gymnasium to witness the annual in-door spring games of the Massachusetts Institute of Technology Athletic Club.

A number of the events were open to non-club members, and entries were had from the Union Athletic Club, Harvard Athletic Association, and Lynn Crescent Athletic Club.

The games, as a whole, compared very favorably with those of the last in-door spring meeting, and, relatively to our recent winter meeting, were a decided improvement. Running high-jump came first in the order of events. For this there were three entries: Kimball, '85, Haines, '84, and du Pont, '84. Kimball took first place, with a record of 5 ft. 1 in., with du Pont second at 5 ft.

This event more than any other on the programme showed lack of preparation, both Haines and Kimball falling considerably behind their previous record.

In the first bout at fencing, Leonard, '83, and McKim, '85, crossed foils. Leonard easily won, with a score of 7 points to 4.

The entries for sparring, which came next on the list, were H. A. Magoun, L. Sise, and F. E. Sands. Only Sands and Sise appeared. Sise was clearly the better man of the two and easily won the medal, though Sands pluckily withstood his opponent.

For the fence vault (handicapped to reach) four men appeared: Armstead, Lynn Crescent Athletic Club; Williams, Union Athletic Club;

Deshon, and Dearborn. Williams and Dearborn, having dropped out, the contest lay between Armstead and Deshon, who both cleared 6 ft. $3\frac{3}{4}$ in.

Deshon was awarded the medal because of his handicap. C. H. Atkinson, Harvard Athletic Association, who had entered for the event, did not appear, and Haines, '84, withdrew.

The running high-kick, next on the order, was started at 7 ft., Haines, '84, du Pont, '84, and Phillips, Union Athletic Club, contesting.

The event proved one of the most exciting of the afternoon, and was warmly applauded. Haines dropped out first, with a record of 8 ft. 4 in. Gradually the pan arose 8 ft. 6 in., 7 in., 8 in., which both du Pont and Phillips covered. Another inch was added. It was too much for du Pont, and he failed. At the first two attempts, Phillips also failed, and a tie seemed more than probable; but at his third and last endeavor success crowned his efforts and he squarely touched the plate giving him first place, with a record of 8 ft. $9\frac{1}{2}$ in., du Pont second, with 8 ft. 8 in. This surpassed any record made at Harvard during the recent sports, and is one of the best, if not the best, record in the country.

In the fencing (second bout), Tompkins, '83, easily defeated Fiske, '85, by a score of 7 points to 2. The third bout, which was between Ober, Union Athletic Club, and Pierce, '83, proved of considerable more interest than the former two. Both men were well up in the use of the foils, and it was only by the close score of 7 points to 6 that Ober took first place.

The middle-weight tug of war (600 lbs., 5 minutes' limit) was contested by the Institute team, F. M. Haines, '84, captain, F. O. Harri-man, '83, F. B. Richards, '83, and S. B. Win-sor, '86, anchor, and the Lynn Crescent Athletic Club team, T. Tully, captain, A. Liscomb, J. Wiswall, and B. A. Robinson, anchor. The drop was even, but quick work by the Technology boys put the rope 3 inches in their favor which, however, they were unable to hold, and the ribbon went back gradually to the line and over to

the Crescents. Time was called with the rope 4 in. in favor of the Lynn team.

The fourth bout at fencing was between Leonard, '83, and Tompkins, '83, Ober having won the bye. Won by Leonard with a score of 7 points to 4.

For the standing high-jump there were three entries, Hines, '84, du Pont, '84, and Young, '86. Young received first medal by a record of 4 ft. $5\frac{1}{2}$ inches. Young is as yet rather young at the business, but jumped exceedingly well, considering the practice he has had.

The second heat of middle-weight tug-of-war contest was won by the Crescents by 14 in.

The light-weight tug-of-war contest was between teams No. 1, consisting of H. Hamill, captain and anchor, W. L. Dearborn, H. M. Wilson, and J. W. Hinkley, and No. 2, consisting of C. A. Deshon, captain and anchor, W. B. Douglass, G. W. Farmer, and J. J. Case. Won by team No. 2.

Putting the shot. For this event there were five entries, F. M. Haines, '84, J. G. Follans-see, Harvard Athletic Association, F. B. Young, '86, J. L. Williams, Union Athletic Club, and F. H. Cutter, '86. All the men, with the exception of Follansbee, appeared. Cutter put the ball 32 ft. 2 in., and took first place. Haines second, with 31 ft. 10 in.

The last event on the programme was the fifth and final bout at fencing, between Leonard and Ober. This was by far the most exciting of the series, both men being skilled swordsmen and very evenly matched. After some discussion, the prize was awarded Leonard, with a score of 7 points to 6.

Harvard, to say the least, acted rather strangely in keeping her tug-of-war team at home, with no better excuse for staying than that of too much *work* after the special endeavors made by the Institute to meet them.

Perhaps Harvard is growing studious in her old age. Perhaps they remembered the warm reception tendered them last year and thought the Institute "too far away and too expensive to reach."

Department Notes.

MCKIM, Mead & White, a well-known New York firm of architects, have the contract for all the stations on the Northern Pacific Railroad.

The architects in connection with the lectures on Heating and Ventilation have visited Sever Hall, Cambridge, the Boston Museum, Mason Building, Trinity Church, and other buildings. The new building will probably be heated in the same way that Sever Hall is, and so it was quite interesting to find out the defects and advantages of their system.

The senior architects have completed their frontispiece designs, and are now at work upon sketches for a gate lodge.

The *Mining and Engineering Journal*, March 3, has an article on the smelting of copper which, although impracticable at the Institute with its present resources, may be of some interest to those in the senior class who are now at work upon copper. The process is based upon the principle that when copper matte in a sufficiently heated molten state is exposed to the action of a strong blast, the iron and sulphur are oxidized, generating heat before it acts upon the copper. The ore is first reduced to a matte. Thirty-five per cent of copper and about twenty-six per cent of sulphur is thought to be the composition of the matte for the least loss of copper. The matte thus obtained is then treated in a Siemens furnace, which has a long bed, in order to utilize the flame, and strong enough to resist the corroding action of the iron. Each side of the furnace should have four or five tuyères so arranged that the blast will strike the molten metal at an angle of from thirty-five to forty degrees. The matte is mixed with rich oxidized ores and refinery slags, and put in the furnace. The charge is melted down, and some silicious flux put in if necessary. When the slag is liquid enough then it is skimmed off and silicious flux put in to saturate the oxidized iron formed during the following oxidizing pro-

cess. When the heat is high enough, the blast is put on. The jets of blast will stir up the molten bath, so that new particles will be oxidized; and this action is continued until most of the iron is scorified. At this stage the product consists chiefly of sulphide of copper. The blast is continued oxidizing the sulphur and copper to cupreous oxide. The cupreous oxide acts itself upon the sulphide of copper, reducing it to metallic copper, which sinks to the bottom. When most of the sulphur is oxidized the blast is shut off, and the metallic copper drawn off in the form of blister copper, which is refined in the usual way.

Major B. H. Green, chief engineer of the Mississippi and Rio Grande Road, has a tangent on his survey which is over one hundred miles in length. This is said to be the longest in the United States.

Only 394 miles of railroad have been reported built up to the present time, against 1,001 miles reported at a corresponding time last year.

Probably Stephenson's locomotive, the "Rocket," will occupy a place at the Chicago Exhibition.

The new Fall River steamer "Pilgrim" had its Edison plant of incandescent lights in working order Tuesday evening, and was visited by a large number who inspected its workings. The electricity is generated by three immense dynamo machines driven by two engines of one hundred and twenty-five aggregate horse-power. Two of the dynamo machines are rated at two hundred and fifty lights of sixteen candle-power each, and the other at one hundred and fifty lights of the same power. The total candle-power is 10,400, and there are about eight hundred and seventy-five lights. There is one large distributing main with sixteen lateral systems. Each light can also be used independently if desired. The power is controlled by an automatic regulator, one of Edison's latest inventions. The regulator formerly had to be worked by hand, and this is the first automatic one that has been constructed. The large chan-

deliers in the main saloon are of 600 candle-power. Each stateroom is furnished with a lamp of ten candle-power — *Commercial Bulletin*.

Mr. Edison is said to have replied to inquiries regarding his electric railway as follows: "I have it running a distance of two and a half miles. The locomotive runs at the rate of twenty-nine miles an hour, with one passenger car capable of holding forty passengers. It is a three foot six inch gauge, with a sixteen-pound rail. The weight of the locomotive is three tons, sufficient for light trains, and runs often. I put it up as an experiment. I have also a freight train, which carries thirty tons of freight and makes eight miles an hour. I have only eight horse-power on the locomotive. I am now, however, building a large one of forty-five horse-power, with which I expect to be able to pull about eighteen coal cars. The track of my road has been down some months, and still holds its insulation. I made a run the other day at the rate of twelve miles an hour in the snow, and there was only a leakage of two and a half horse-power on the whole line of the road." — *Electrical Review*.

The three great types of modern marine engines are as follows: (1) The two-cylinder intermediate receiver compound engine, having cranks at right angles. (2) The Woolf engine in the tandem form, the high-pressure and low-pressure cylinders being in line with each other, but sometimes side by side, and always communicating their power to one crank. Such an engine is sometimes used singly, but oftener two are used together, working side by side, with cranks at right angles; recently three together, the cranks being one hundred and twenty degrees apart. This system affords an opportunity of adding more engines to the same propeller. (3) The three-cylinder, intermediate-receiver, compound engine, with one high-pressure and two low-pressure cylinders. The cranks are placed at equal angles apart round the shaft.

William A. Harris, Providence, R. I., is running his works at a cost of one third of a cent per hour per horse-power. He makes his steam in steel tubular boilers, made by the Whittier Machine Company, Boston. They are set with the Jarvis furnace, using the Sheffield grate bars, burning screenings and soft coal for fuel. — *Cotton, Wool, and Iron*.

The number of Edison lamps in use in America at the end of last year was more than 29,000, and in Europe, at the end of February, there were nearly 20,000.

A mixture of three ounces sweet oil with one ounce carbolic acid is recommended for repelling mosquitoes.

There has been a piece of amber found in New Jersey, twenty inches long, six inches wide, and one inch thick. It is a little harder and tougher than the Baltic amber, and cuts more like horn.

The "Ratification Meeting."

ACCORDING to the call of the gymnasium committee, a meeting of the three upper classes was held in Huntington Hall, on Monday afternoon at 4.30; Mr. Leonard in the chair, Mr. Litchfield secretary.

The business of the meeting was stated by the chairman to be to approve or disapprove the recent action of the gymnasium committee, in refusing the use of the gymnasium for the dance on Saturday, for reasons stated in the bulletin; and the Chair hoped that after a thorough consideration and debate, the meeting would ratify the action and support the committee, who would then be in position to make an amicable settlement with a committee from the Freshmen, as had been suggested by members of the Faculty, before whom the gymnasium committee had appeared in the morning.

A number of students expressed approval of the committee's action, and resolutions were read by the secretary sustaining the action of the committee on the ground that as the Freshmen had not favored the upper classes, had not

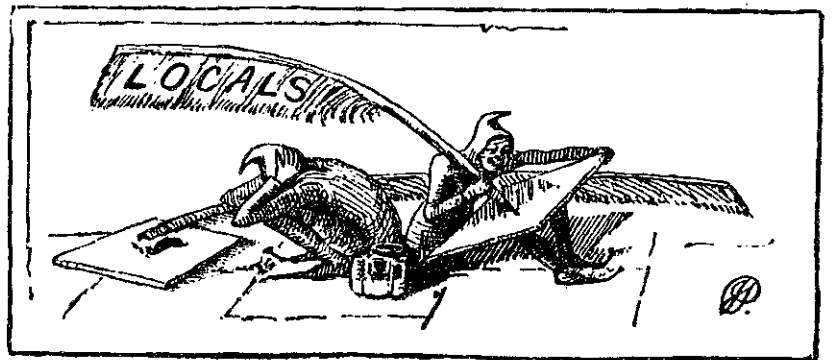
followed the custom of giving the complimentary Freshman ball, had shown but little interest in the Athletic Club, the TECH, and other institutions supported entirely by student aid, therefore it should not be expected that the upper classes would be willing to grant the Freshmen the favor of the use of the gymnasium for a dance for the class alone on Saturday afternoon.

Resolutions, as an amendment to those of Mr. Litchfield, were read by Mr. Tyler, '84, in which it was resolved that the committee's action should not be sustained, but that they should be advised to reconsider their decision and permit the use of the gymnasium for the dance. The resolutions were ably supported by Mr. Tyler in a speech, and by a number of men who expressed themselves by disapproving of the action of the committee, thinking it of a petty nature and not worthy the sanction of the school. After considerable debate the previous question was called, and the motion on the resolutions put. Mr. Tyler's resolutions were lost and Mr. Litchfield's passed by a considerable majority. The gymnasium committee, with Mr. Tompkins, '83, were constituted a committee from the upper classes to confer with the Freshmen and if possible come to an amicable settlement of the difficulties. The meeting then adjourned.

The Cadets will give their first exhibition drill in the gymnasium next Saturday at 1 o'clock P. M. Dancing will follow the drill, music being furnished by Edmands's Orchestra. The committee have completed the arrangements, and all bids fair for a pleasant party.

An effort is being made to establish a Columbia club similar to the Harvard clubs, so successful in New York and other cities.

Innocence Abroad. — Æsthetic Professor (to gay and frisky Senior). Mr. ———, can you tell me where all the young men get those pretty bands they wear in their hats? I could find none in the stores. Collapse of Senior. — *Brunonian.*



GIVE us a chance to try the new fire apparatus!

Can we not obtain a plot of ground to play tennis on this spring?

We are glad to see so much general interest taken in the minstrels.

All those who can sing should brace up and report to the Minstrel Committee.

The students of Chauncey Hall gave a very pleasant dance in the gymnasium on Friday last.

Mr. Luther, '84, who has returned from the South on business, paid the civils a visit last Wednesday.

The Freshmen have decided to give up the ball, and are going to treat themselves to a supper instead.

The day before Mr. Nathaniel Thayer died he gave to the Institute of Technology twenty-five thousand dollars.

During the last week quite a number of professors from other schools have taken advantage of their Easter vacation and have visited the Institute.

At a recent meeting of the class of '83 a committee of four was chosen to make arrangements for a class dinner, which will probably take place about the middle of next month.

Class '84 was favored with an exhibition of a most excellent life-like picture of somebody at a recent lecture in mechanics. A frame six inches square surrounded the features.

It is expected that the outside walls and roof of the new building will be up by July 1st. In order to do this, the workmen will have to work a little faster than they have done lately.

Mr. Sawyer, formerly of the class of '83, is now employed by the Edison Electric Light Company, and may be found in charge of their

supply department, at No. 50 Oliver Street, in this city.

We would call the attention of students to the "ad" of Collins & Fairbanks, 407 Washington Street, formerly with D. P. Ilsley & Co., who will keep the latest novelties in English and American hats.

An '84 miner, the other day, was heard arguing that the earth revolved upon its axis from east to west; after some time had elapsed, however, the miner acknowledged that he was laboring under a wrong impression.

An extravagant Freshman was heard to inquire the other day at the supply-room for "some heavy platinum wire for stirring rods." With so much money in the class, there ought to be no difficulty about the Freshman ball.

Messrs. F. D. Fairbanks and C. H. Collins, for the past ten years associated with D. P. Ilsley & Co., and well known by so many of the Institute men, have gone into business at 407 Washington Street. We can heartily recommend them to all students.

The 2 G. dance took place last Friday evening in Berkeley Hall. Socially the affair was a decided success and it was not till the small hours of morning that the tired devotees of Terpsichore turned their way homeward. The party was graced by the presence of Gen and Mrs. Francis A. Walker.

For sale, or will exchange for a flannel shirt, box of paper collars, and a pair of rubber boots, a copper-headed cane in first-rate condition, having been little used. The following is the reason for selling: The present owner has reformed and desires to become a civil engineer. The article can be seen daily in third-year drawing-room.

A fact to disprove the assertion that members of the class of '86 do not take any interest in athletic sports; while visiting one of the members of the class we were informed by his fond parent that she had been obliged to purchase a high-kicking apparatus in order to save her interior decorations of lanterns, etc., on which her son had been practising.



CO-EDUCATION is at present, and is probably destined to be for some time to come, one of the most important subjects before the college world in general, and college presidents in particular. Columbia has recently turned aside the assault of the Society for the Higher Education of Women in a very diplomatic way. The trustees, although declaring themselves opposed to co-education, signified their willingness to endeavor to raise the standard of female education by proposing courses of study outside of the college, but under the supervision of its authorities. This, as the *Spectator* says, evidently means that if the Society cares to erect buildings outside of the college, in which to accommodate women, the college will tender the services of its faculty. Thus the Society is forced either to retire or to offer material evidence of its sincerity. The students of Columbia were almost unanimously opposed to the admission of women, and, so far as we can judge from our exchanges, co-education is almost universally unpopular among college men. These same men would probably, however, gladly see women educated to any height desired by the Society, their objection to co-education probably being partially due to the consciousness that, even if it were possible, it would be prejudicial to woman's best interests to place her on the same footing with men.

The students of Amherst College, who have for a long time enjoyed an immunity from restraint and the advantages of a system of self-government, which have been the envy of their less favored brothers, are at present exercised over the somewhat recent action of the college faculty forbidding them to participate in any intercollegiate athletic contests after the end of

this collegiate year. The reason assigned by the faculty for objecting to such contests was that they are demoralizing to the college, offering no compensating advantages for the large expenditure of time, money, and energy. The students have almost unanimously signed a petition containing strong arguments against the position of the faculty.

The *Vassar Miscellany* waxes eloquent over the Intercollegiate Press Association, and declares that the elevation of tone among the college papers is already appreciable. Unfortunately for our faith in feminine perception, the *Acta Columbiana*, whose editor-in-chief is president of the Association, arrived in the same mail with the always-welcome exponent of Vassar ideas. This is the way in which the editor of that presumably model sheet addresses his contemporaries:—

“Seen the *Era*, Jake?” said Tenafly.

“Yes, sir, I have; and for dirt, pure and simple, look on page 216, second column. If any one will show me a nastier bit of printing in any college paper in the country, I’ll present him with a pug-nose terrier.”

“You’re about right. If that’s the effect of co-education at Cornell, Lord deliver us from it,” said Chubbins. “They’re getting so horribly vulgar that it might be well to have expurgated editions. I thought those fellows were gentlemen, anyhow.”

“So did I—once. But no man with gentlemanly instincts or conception of decency would have written such a mass of dirtiness, or based an editorial on what, in plain language, I call a lie.”

And again:

“Of all the weathercocks ever seen, the *Dartmouth* is the cockiest. A little breeze from the *Acta* turns its hollow head in the direction of abuse, in which the *Dartmouth* has shown that after all it is proficient in something.”

So much for elevation of tone. We have perhaps given our quotations an undue length, but only in that way could we give a fair idea of the style and atmosphere of what is undoubtedly one of the most prominent of all the college papers. Page after page of just such personalities occur in each number, and the prominence of the paper only makes the scurrility more apparent.

With such a champion, the Intercollegiate Press Association can hardly fail to realize the expectations of its founders!



PSYCHOLOGY RECITATION. — *Dr. McCosh.*
— “And who are some of the great men who opposed this theory?” *Student* (hesitatingly).
— “I believe, Doctor, that you are one of them.”
Doctor (rubbing his hands in disgust). — “But of former times, sir?” — *Nassau Lit.*

It is probable that the Sophomore crew will win the class races at Columbia.

A scientific expedition will be undertaken by Williams College next summer in which students will join to procure specimens for use in biology and geology. A steamer has already been procured, which will be fitted up for deep-sea dredging, and with electric lights for gathering specimens by night. — *Rutger's Targum via Berkeleyan.*

It was a Chaddock boy who, believing in translations as free as the genius of our country, rendered *dux femina facti* “the fact is, woman is a duck.” — *Ex.*

The trustees of Columbia have voted against co-education.

Lampy says the present collars come high, but he must have them. He also suggests that Wiggin has gone in for the heavy wait. Another exchange thinks the storm was delayed on account of the weather.

There was a man in our town,
And he was wondrous wise;
He wrote a crib upon his cuff
Of much diminished size.
But when he felt a little bored,
And yawned, with arms extended,
This wise man gave himself away,
And straightway was suspended.

Lampoon.

COLLINS & FAIRBANKS,

(Formerly with D. P. ILSLEY & CO.)

— All the Latest Novelties in —

GENTLEMEN'S HATTERS! HATS, UMBRELLAS & CANES,

Especially Adapted to

407 Washington Street, **YOUNG MEN,** Opposite Maculler, Parker & Co.

NOYES BROTHERS,

NO. 4 SUMMER STREET, BOSTON, U. S. A.

FULL DRESS SHIRTS.

ENGLISH STYLES OF COLLARS.

ENGLISH NECKWEAR.

GOLD, SILVER AND BUCKHORN

MOUNTED CANES & UMBRELLAS.

ENGLISH SMOKING JACKETS.

LONG DRESSING GOWNS.

HOUSE AND STUDY COATS.

ENGLISH BATH WRAPS.

BATH TOWELS AND MITTENS.

LONDON TAN STREET GLOVES, \$1.35.

WARM LINED STREET GLOVES.

SCOTCH WOOL ULSTER GLOVES.

DRIVING AND SLEIGHING GLOVES.

SILK WRISTERS & MUFFLERS.

WINTER UNDERWEAR, ALL GRADES.

FINE MERINO HOSE 50 CTS. A PAIR.

ODD DESIGNS IN SCARF PINS.

FULL DRESS Collars, Ties and Studs.

LONDON & PARIS NOVELTIES.

THE CRUSH HAT

PATENTED AUG. 27, 1878.



SILVER MEDAL

Awarded at the 14th Exhibition M. C. M. Association, Boston.

The Crush Hat

Is correct in style, very much lighter, and by far the most durable hat of its kind; it is as shapely as a silk hat, and to insure SUPERIOR EXCELLENCE is manufactured on the premises.

Mounted free to any part on receipt of price — \$7.00.

JUST RIGHT.

For RECEPTIONS, the THEATRE, PARTIES, WEDDINGS, Etc.

HARRINGTON the Hatter,

14 School Street, Boston.

Boston Foreign Book Store.

CARL SCHOENHOF,

146 Tremont Street,

SECOND DOOR NORTH OF WEST STREET,

BOSTON.

To Students a Liberal Discount.

AT THE RINK.

A little art to get a start,

A little joy, and then

It seems as though the universe

Were chaos come again.

— Trinity Tablet.

GLOVES!

All Technology Students will find it greatly to their advantage to wear the

"Centemeri,"

The *FINEST FITTING GLOVE* Imported.

CHAS. H. REED, Sole Boston Agt

26 Temple Place.

PREPARATION

FOR THE

Massachusetts 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 that 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 the teachers who are preparing the candidates with 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.

CHARLES A. SMITH & CO.

IMPORTERS OF FINE WOOLENS,

DRAPERS AND TAILORS

18 and 20 School Street - - - BOSTON.

W. E. HODGKINS.

C. G. BEAL.

THE TECH.

JOHN EARLE & CO. TAILLORS,

Have always in Stock a CHOICE ASSORTMENT OF FINE GOODS for your Selection,

FROM THE BEST FOREIGN AND AMERICAN FABRICS.

DRESS SUITS LOANED FOR OCCASIONS.

No. 330 Washington Street, up stairs, BOSTON.

JACOB GERLACH,

(Successor to F. Herchenroder)

Ladies' & Gents' Hair Cutting

No. 54 TEMPLE PLACE, BOSTON.

MANUFACTURER OF

Ventilating or Gossamer WIGS and TOUPEES.

Ladies' Hair Work of every variety. Children's Hair cut in the neatest style.

Get your Notes Bound at

J. H. GUARDENIER,

BOOK BINDER,

NO. 50 BROMFIELD STREET.

Near Tremont Street - - - BOSTON.

Old Books, Magazines, Music, Etc.

Neatly Bound in every Style, at Lowest Prices.

Portfolios of every descriptions for Photographs and Engravings, made to order.

The College of the City of New York has been agitated over the near approach to a duel. The would-be participants were arrested.

The *Dartmouth* of March 16 was evidently the only green thing to be seen about Hanover, as it states that there were four feet of snow on the ground.

RICHMOND

Straight Cut No. 1

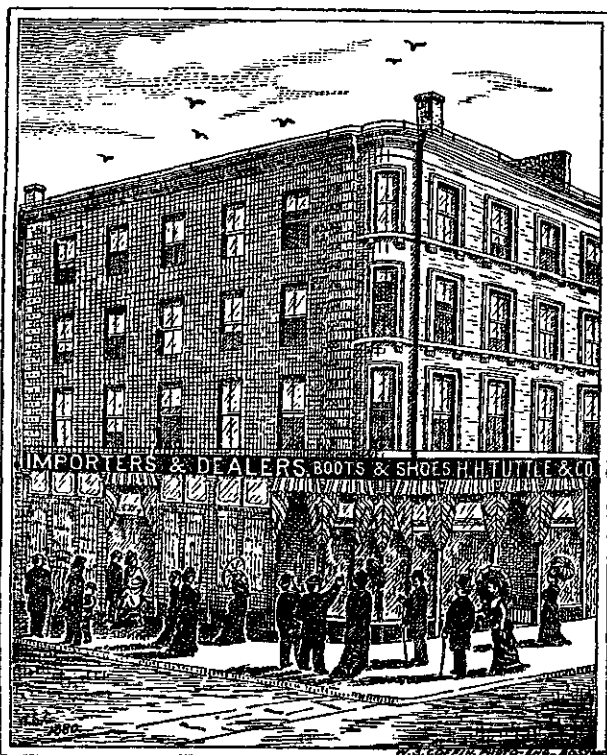
CIGARETTES.

CIGARETTE Smokers who are willing to pay a little more for Cigarettes than the price charged for the ordinary trade Cigarettes will find the **Richmond Straight Cut No. 1** superior to all others. They are made from the Brightest, Most Delicately Flavored and Highest Cost Gold Leaf grown in Virginia, and are absolutely without adulteration or drugs.

We use the Genuine French Rice Paper of our own direct importation, which is made especially for us, water marked with the name of the brand, "Richmond Straight Cut No. 1," on each Cigarette, without which none are genuine. Base imitations of this brand have been put on sale, and Cigarette smokers are cautioned that this is the Old and Original brand, and to observe that each package or box of Richmond Straight Cut Cigarettes bears the signature of **ALLEN & GINTER, Manufacturers, Richmond, Va.**

Also manufacturers of the **Richmond Gem, Opera Puffs and Little Beauties Cigarettes, and Richmond Gem Curly Cut, Old Rip Long Cut and Richmond Straight Cut Brands of Smoking Tobacco.**

ALLEN & GINTER.



GENTLEMEN'S SHOES A SPECIALTY.

We ask the attention of Students to our unrivalled assortment of

BOOTS & SHOES,

French, English, and American,

Including many that are very stylish, durable and low priced.

HENRY H. TUTTLE & Co.

435 WASHINGTON, COR. WINTER STREET.

THE CHINA PARLOR.

RICH CHINA AND GLASS

From all the Principal POTTERIES in EUROPE.

CLARK, ADAMS & CLARK, 65 & 67 Franklin St., Boston.

The only Reliable and Standard Brands of Pure Cigarettes and Tobaccos.

PIONEER CIGARETTE MANUFACTURERS OF AMERICA.

Kinney Bros.

CAPORAL, CAPORAL $\frac{1}{2}$, SWEET CAPORAL, AMBASSADOR, ST. JAMES, ST. JAMES $\frac{1}{2}$, etc. Pure Tobacco and pure Rice Paper. SWEET CAPORAL. — *Cork Mouthpiece.* — Unsurpassed for cleanliness, economy, and convenience. The soft feeling of the cork between the teeth makes this the most desirable and pleasant mouthpiece, besides absorbing the nicotine and rendering a cooling sensation to the smoke. Same tobacco as the renowned Sweet Caporal Cigarettes, *absolutely pure.* The Caporal, Caporal $\frac{1}{2}$, and Veteran Cork Mouthpiece Cigarettes are also highly recommended. STRAIGHT-CUT CIGARETTES. — This Reliable Brand is made from extra fine, selected, prime, mild Golden Virginia Leaf, and is the Finest Cigarette as to quality, flavor, and workmanship ever offered for sale. Ask for Kinney Bros. Straight Cuts. Sold by dealers throughout the world.

PIANOS

OF ALL MAKERS

For Sale and To Let.

All Musical Instructions,
All the New Sheet Music,
All kinds of Instruments,
Everything Musical,

At the store of

OLIVER DITSON & CO.

449 and 451 Washington St., Boston.

My love is an astronomer,
And when she views the skies,
I wish that I were heaven,
To use its thousand eyes.
—*Tablet.*

Foreign Novelties.

AMES & MAKECHNIE,

Gentlemen's Outfitters

FINE CUSTOM SHIRT MAKERS.

Manufacturers of the

A. & M. SHIRT.

29 School Street.

I. W. MOODY,
STATIONER.

Class Day and Visiting Cards

A SPECIALTY.

No. 37 WEST STREET, BOSTON.

Stationery of all Kinds.

Gents' Clothing Dyed AND Cleansed.	LEWANDO'S FRENCH DYE HOUSE, No. 17 Temple Place, BOSTON, U. S. A. PRICE LIST FREE.
--	--

ALFRED MUDGE & SON,

Book and Job Printers

34 SCHOOL ST., BOSTON.

DOE, HUNNEWELL & CO.

Furniture and Interior Decorations,

UPHOLSTERY GOODS,

Nos. 577 and 579 Washington Street,

E. R. HUNNEWELL.
H. F. BURCHSTEAD.

BOSTON.

C. F. HOVEY & CO.

Have a Full Line of

Gentlemen's Furnishing Goods

33 Summer Street,

BOSTON.

BOSTON ROLLER SKATING RINK,

St. James Avenue and Clarendon Street.

UNTIL FURTHER NOTICE, SESSIONS AND PRICES WILL BE AS FOLLOWS:

SESSIONS.

MORNING, 10 to 12. AFTERNOON, 2.15 to 4.45. EVENING, 7.45 to 10.15.

PRICES.

Single Daily Admission.....	\$0.25
Package Daily (Five Admissions).....	1.00
Use of Skates.....	.10
Single Evening Admission.....	.35
Package Evening (Four Admissions).....	1.00
Use of Skates.....	.15

JUVENILE ASSEMBLIES Wednesday and Saturday Morning and Afternoon. Admission, 10 cents for Children under Fourteen Years of Age to Juvenile Assemblies only.

MUSIC every Evening, Wednesday and Saturday Afternoons, and Holidays.

None but the Winslow "Vineyard" Roller Skate used in this Rink.

Regular tickets are good for all assemblies. No extra charge for coat room. Gentlemanly and courteous instructors always in attendance to assist beginners. The management, on behalf of patrons, reserves the right to refuse admission or use of skates to any objectionable person.

FRANK E. WINSLOW, Proprietor and Manager.

BOSTON & PROVIDENCE RAILROAD

Passenger Station

CAFÉ

ON THE EUROPEAN PLAN.

Open from 6 A. M. to 10.30 P. M.

Please give us a Trial.

J. G. COOPER, Proprietor.

Dartmouth has been forced to resign from the Intercollegiate Base Ball League. The action of the League was apparently unjustifiable, and has called forth much discussion.

Princeton is to found a school of philosophy, and the *Princetonian* is our authority for the statement that Dr. McCosh is to resign the presidency of the college in order to devote himself to the new school.

Amherst is hereafter to grant the degree of Ph. D. to those college graduates of at least three years' standing who have taken the course of study at Amherst prescribed for the degree.

Columbia Bicycle.

Thousands in use by doctors, lawyers, merchants, travellers, salesmen, editors, reporters, etc. Come and see them at our warerooms, and learn to ride, or send three-cent stamp for our elegant illustrated catalogue.



THE POPE MANUFACTURING CO.,
597 Washington Street - - BOSTON.

ALFRED MUDGE & SON,

Book & Job Printers,

34 SCHOOL STREET,

Opp. City Hall - - BOSTON, MASS.

THOMAS POWER & CO.

Manufacturers and Retailers of



All the Leading Styles of

GENTLEMEN'S FINE BOOTS, SHOES & GAITERS,

10 SCHOOL STREET, BOSTON.

THE TECH.

—1883.—

Spring Styles of Finest Shoes,

UNEXCELLED IN STYLE, QUALITY AND FIT.

SMALL BROTHERS,

371 Washington Street, corner Bromfield,

BOSTON.



TRADE-MARK.

KEEP'S SHIRTS.

The very best to measure.

SIX FOR \$9.00.

Best four-ply Linen Collars, 90c. per half dozen.

Best four-ply Linen Cuffs, 25c. per pair. Underwear, Neckwear, Umbrellas, Gloves and all Furnishings the best, and at the lowest prices in the city.

KEEP MANUFACTURING CO.

112 Tremont Street.

FACING THE COMMON.

At Engelhardt's Restaurant,

For Ladies and Gentlemen,

MAY BE FOUND

Private Dining Rooms,

For Large and Small Parties,

WITH A DAILY BILL OF FARE, AND CAREFUL SERVICE.

173 & 174 Tremont Street,

BOSTON.

The yearly income of Columbia College is about \$300,000 at present, but new leases about to be executed will, it is hoped, raise it to \$500,000.—*Spectator*.

The races of the Harvard Bicycle Club occur at Beacon Park, Wednesday, May 16. Several of the races are open to college men, and two to all amateurs. The prizes are to be gold and silver medals for college events; cups and medals for open events.

ABRAM FRENCH & CO.

Fine Chinas, POTTERY

—AND—

GLASS. DUPLEX LAMPS.

ABRAM FRENCH & CO.,

89, 91 & 93 Franklin Street,

COR. DEVONSHIRE.

CARPETS.

Special Bargains in Carpets.

To make room for the alterations in our Store we shall close out a large line of CARPETS in our Retail Department at the following low prices:—

WILTONS, damaged by water.....	\$1.75
AXMINSTERS " " "	1.50
ROYAL VELVETS.....	1.50
5-FRAME BODY BRUSSELS.....	1.25
TAPESTRIES.....	.65 & 75 cts.
EXTRA SUPERFINES.....	.75 "
ENGLISH SHEET OILS.....	\$1.00

These goods are sold much under the retail prices, and should be inspected by those thinking of purchasing this season.

JOHN & JAMES DOBSON,

525 & 527 Washington Street, Boston.

THE TECH.

Special Rates to Students.
Cabinets, \$5.00 per doz.
Cards \$3.50 per doz.

Ruby Hastings



Must be Certified by the Secretary as a member of the "M. I. T." **POPPIERHUIS**

147 Tremont Street,
(Corner West Street)

E. F. RITZ.

BOSTON.

G. H. HASTINGS.

Elevator to the Atelier.

Photographers to Class of '83.

THE

BRUNSWICK

BOSTON'S
GRANDEST
HOTEL,

Near the Public Garden, Common, and Public Library, Museum of Fine Arts, New Old South, Trinity (Phillips Brooks's)



Church, and opposite Institute of Technology.

Beacon and Dartmouth Street and all Back Bay Cars pass the Hotel, for either up or down town, every three minutes.

BARNES & DUNKLEE,
Proprietors.



**CURTIS & WELD,
COSTUMERS,**

AND DEALERS IN

Theatrical Goods,

2 HAYWARD PLACE BOSTON.

THE BERLITZ SCHOOL

— OF —

LANGUAGES,

154 Tremont Street - - - - BOSTON,

283 Westminster St., PROVIDENCE, R. I.

Send for Circular.

October 10th the Price was advanced to \$2.00.



Livermore's Stylographic Pen - - - - - \$2.00 each.

A. T. Cross Stylographic Pen - - - \$1.25 each at retail.

BY MAIL ON RECEIPT OF PRICE.

THE STYLOGRAPHIC PEN CO. 290 Washington Street, BOSTON, MASS.

HOW TO DRESS WELL.

MANY engaged in business or study have little thought for matters of Dress. We have men inquire nearly every day the proper dress for a Day or Morning Wedding, an Evening Wedding, a Dinner, or for the Opera. To meet these inquiries, and also for the convenience of our customers, we have issued a little publication of "FASHION NOTES," giving all the latest points in regard to dress, also the new styles for Spring. We will be happy to present one to any one who may request it.

FRANK D. SOMERS, TAILOR, BOSTON, 414 WASHINGTON STREET.

HELIOTYPE ENGRAVINGS.

Beautiful Engravings, finely finished and carefully chosen, and very suitable for the decoration of rooms, when neatly framed; also for portfolios, and to be studied as types of Art. They contain the finest works of the ancient ITALIAN AND GERMAN masters; and also the very choicest of modern FRENCH AND BRITISH pictures.

They are printed with black ink, on heavy bevelled plate paper, 19 x 24 inches in size; and are sold for the remarkably low price of

Fifty Cents Each.

A few of extra large sizes are ONE DOLLAR each.

Call and examine our collection of hundreds of subjects, at the

**Helio type Art Gallery,
213 AND 215 TREMONT STREET.**

Jm
Chanut
Paris

GLOVES

For LADIES, GENTS and MISSES.

Every pair fitted the same as in Paris.

J. M. CHANUT & C^{IE},

3 Temple Place, First Door from Tremont St.

ASK FOR
DIXON'S
AMERICAN
Graphite Pencils

S—Soft.

S M—Soft Medium.

M—Medium.

H—Hard.

V H—Very Hard.

JOS. DIXON CRUCIBLE CO.
Jersey City, N. J.

WARD & GAY,

No. 184 DEVONSHIRE STREET.

PHOTOGRAPH ALBUMS,

PAPETERIES,

FANCY GOODS,

FINE PAPERS AND ENVELOPES.

Our new sample books sent FREE to any address.

Headquarters for Amateur Photography!

CAMERAS, OUTFITS, APPARATUS, CHEMICALS, PLATES,
AND EVERY OTHER REQUISITE.

INSTRUCTION FURNISHED IF DESIRED.

C. H. CODMAN & CO. - - (Photographers' Supplies),

34 BROMFIELD STREET, BOSTON.

**JOSEPH GILLOTT'S
STEEL PENS.**

For Fine Writing, No. 1, 303, 170. For Broad Writing, 294, 389,
849. For General Writing, 332, 404, 390 & Falcon—878, 908.

Other Styles to suit all hands.

Sold by all Dealers throughout the World.
For Draughtsmen's Use, Nos. 290, 291, 659 and 850.



FROST & ADAMS, BOSTON,

Importers and Manufacturers of

DRAWING MATERIALS.

A Large Stock of the Best Supplies for
STUDENTS, ENGINEERS AND SURVEYORS.

No. 37 CORNHILL.

SEND FOR ILLUSTRATED CATALOGUE.

The "Dundee" Winter Overcoat, FOR GENTLEMEN.

\$15.

In three shades, Oxford, Black, and Terra Cotta Mixtures. All Corded Diagonal patterns; four correct styles, two with Mohair binding, and two with stitched edges. Substantial city make, and well trimmed. Strictly All Wool. Weather and wool tested, and therefore warranted not to fade. For fit, finish, and durability the "DUNDEE" cannot be surpassed at

\$15.

We have never before this season been able to manufacture Overcoats from the celebrated "DUNDEE" fabrics so as to be able to place them upon our counters at a less price than \$20.

A. SHUMAN & CO., Manufacturers, Jobbers and Retailers,

Gentlemen's
Retail Department.

440 Washington Street.

To Corner
Summer Street.

WADSWORTH BROS. & HOWLAND,

Importers and Dealers in

MATHEMATICAL INSTRUMENTS,

Architects' and Engineers' Stationery and Artists' Materials.

MANUFACTURERS OF

DESIGNERS' COLORS,

Moist and Dry.

84 WASHINGTON STREET, BOSTON.

CATALOGUES FREE UPON APPLICATION.

