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DAVIS & CO.,
Opposite Bay State House.
With the appearance of this number the resignation of the present Editor-in-Chief takes effect and next month, by vote of the Board of Editors, Mr. Paull will assume charge of the paper.

It is with regret that one lays aside the editorial pen, probably forever, for to express one's opinions in writing and feel that they are to be read and criticised by some five hundred students and alumni, is no small privilege and pleasure. Despite the work involved, the Editor of a paper like this holds one of the pleasantest offices in the Institute, for it brings him into contact with every phase of Institute life, with every class and kind of men, and gives him a knowledge of what is taking place and the condition of opinion not to be obtained in any other way. In relinquishing the work which we have attempted to do for the past few months, we wish to extend our hearty thanks to every one. To the students for the support, encouragement, and lively interest which they have constantly extended and upon which chiefly the success of the paper must depend; to the alumni for their ready response to appeals and for their kind letters of suggestion and advice, and to the Faculty for the uniform courtesy and kindness with which all our requests have been met. Not a single favor which we have asked in behalf of the paper, and which could reasonably be granted, has been refused, but instead everyone has seemed pleased to assist in our work. So to all, individually and collectively, again we extend our thanks.

Although the new public library offers greatly improved facilities for study and reading, there is one thing about the present arrangement that is something of a disadvantage. Older students, especially those coming from the city high schools, miss the opportunity of consulting with the librarian. Mr. Green is a man of almost unlimited knowledge of books and current literature, and in the old building that knowledge was freely at the disposal of every one for the asking. Now that the librarian is hid away behind two or three rows of desks, he is not easily accessible, and the visitor feels unwilling to disturb him. To the great public it is an education in itself to meet a man of his attainments, and the new order of things, although it may be necessary, is at least a misfortune to frequenters of the library.

The communication in another column, presumably from a Senior, is undoubtedly a sample of the opinion of nearly every member of that class in regard to the conduct of recitations in one of the departments at Boynton Hall. As a criticism it cer-
tainly is not far from reasonable. In the class-room referred to, there is no “exchange” of thought. The “balance of trade” is entirely with the professor, and as the year advances and the students again and again state their ideas in response to questions, and never know whether these ideas are based upon correct principles, or whether their method of reasoning is logical, they begin to inquire if, after all, the instructor does not gain more from the hour than those who, in theory, are instructed, but are not instructed in theory. We come here to learn what we do not know, not to tell it.

We look to our professors to point out to us the right road, and leave us to follow it, not to impress upon us more forcibly the fact that we are lost. There is no doubt that the questions asked are original and calculated to make us think for ourselves, but it seems foolish to start a train of thought in the wrong direction, and especially so if nothing is afterwards done to correct the blunder. We learn by our mistakes, but only when we realize that they are mistakes.

Already there are indications that those interested in base-ball are beginning to consider what shall be done next spring, hence a brief survey of the subject at this time will not, perhaps, be out of place. Students must decide before long whether a nine shall be supported during the coming season. We have before us a choice from three things in the way of athletics. We can direct our attention entirely to base-ball, entirely to general athletics, or to both.

Scarceley anyone would advocate the abolishment of the athletic team, so the question simplifies itself to base-ball, and becomes, Shall the Institute support a nine the coming season? Let the question be answered entirely in the light of past experience and on the basis of practicability. Two years ago this winter the base-ball men showed an unusual amount of activity and prepared for a brilliant season. Class nines were organized, uniforms bought and football relegated to the fogies. All opposition was denounced and the skeptical were told that there was more interest in base-ball than could be aroused for football in two years. The season passed. The Institute nine was the laughing-stock of the city, while the class series of games was never completed. Last winter again base-ball was vigorously agitated. The failure of the preceding year was ascribed to this and excused by that, and its repetition would be impossible. Another season passed and everyone knows with what result. The nine was fairly victorious, but scarcely any one attended the games and the Treasurer preserves as a souvenir an unpaid bill of something like a hundred dollars. Once more the base-ball enthusiasts are stirring; again we hear repeated the explanations and arguments of last year and the year preceding, and we are told that this time all will be different. It may be so, but before admitting it let us consider if the arguments advanced are based upon plausible theories or actual facts. Let us not deceive ourselves by mistaking the height of the ardor of a few for the level of the enthusiasm of all. If nearly all students demand base-ball well and good, but if not, there is no use in attempting to create that demand. If a nine is to receive only the half-hearted support which it has in the past two years, it better be done away with entirely, and the time and effort put into something that will give creditable results. If there is material here for a first-class nine, if students will contribute to its support and attend the games, if the Institute is large enough, or will be next spring, to handle two branches of athletics, then by all means have base-
AN INSTITUTE CALENDAR.

A Souvenir to be Published by the WPI.

The Board of Editors of the WPI will soon publish, and have for sale at the commencement of school after vacation, an extremely tasty and useful calendar for next year. It will be about 10 by 12 inches in size, of card-board, with a pad in one corner, containing a slip for each month. On these slips, all holidays and vacations will be printed in red ink while regular sessions will be in black. In this way it will be found very handy to students for reference. At the top of the card-board will be a 5 x 7 picture of the Institute. This will be printed from the best half-tone cut obtainable, made from a photograph taken expressly for this purpose, and since the last addition to the Shop was made.

It is expected that the whole thing will make a souvenir of the Institute which students will like to send away to friends. It is not gotten up as a money-making device, and only a limited number will be published. Price, each, twenty-five cents. Alumni desiring copies may obtain them in the order of application, by addressing the Business Manager.

NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO.

Newport News, Va., Dec. 8, 1892.

The intending visitor to the Newport News Shipbuilding plant, if he reaches town by the Chesapeake and Ohio R. R., will alight at the finest passenger depot on the road, east of Cincinnati. On stepping from his train, if he is accustomed to take his bearings by common sense observation as he travels, he will at once notice the lofty sheer legs of the shipbuilding company, about a mile up the James river.

The shipbuilding plant is located on the north bank of the James, 30 miles from the open sea. The river at this point is five miles in width. The location and yard are admirably adapted to meet the requirements of an immense manufacturing concern, being near the centre of the Atlantic coast line; in close proximity to coal and iron; with ample depth of water and width of stream. That this great plant, supplied with the most improved machinery known to American manufacturers, has been established and is now in successful operation as a competitor in the American shipbuilding trade, is due to the master genius of Mr. C. P. Huntington who conceived the project, and his millions wisely expended under the skilful and far-sighted direction of the President, Mr. C. B. Oreutt of New York, and the energetic management of the General Superintendent, Mr. Sommers N. Smith.

The yard contains 75 acres, having a water frontage of 2,600 feet. If our visitor enters the works on the south, at the timekeeper's office, on his left towards the river, he passes, first the lumber sheds, frame buildings covering over 40 by 500 feet of ground space. Near are the joiner, machine, boiler and blacksmith shops, all separate buildings, arranged parallel, with ample room between for railroad tracks. The joiner and pattern shop is a three-story brick building, 60 by 306 feet, equipped with the finest wood-working machinery. The machine shop, of iron and brick, is 101 by 300 feet. One of the longest wall planers in the world is in this shop, having a capacity of 22 feet vertically, by 25 feet horizontally. The largest lathe in America, swinging 126", the cylinder boring mill capable of boring cylinders 108 inches in diameter; a new electric travelling crane of great capacity, from the Shaw Electric Crane Co., of which Mr. C. L. Griffin, '88, is chief draughtsman, give an idea of the magnitude of the work executed here. The boiler shop is a brick and iron building, 103 by 300 feet, supplied with heavy hydraulic machinery for riveting, etc. A large Shaw Electric Travelling Crane is soon to be placed in this shop. The blacksmith shop, 100 by 306 feet 6 inches, is of brick and equipped with heavy steam hammers, cranes, etc., for handling its share of the work.

The steam power for the plant is centralized at the power house which is 40 by 130 feet, of brick, with a large addition just completed. Here are located the boilers, engines for the dynamos, and steam pumps. A steel subway from 6 feet to 8 feet in diameter carries the steam pipe lines 400 to 500 feet in either direction. The dry dock is 600 feet in length, 180 feet wide at the top and has a depth of 25 feet over the sill. The pumps connected empty the dock in 11 hours.

The ship shed is an iron and brick building, 60 by 320 feet, supplied with the best machinery for the purposes intended. Above the ship shed is the mould loft, where the lines of the vessel are laid down full size. This floor is 60 by 306 feet in the clear. The bending shed where the forms and plates are shaped is fitted up with heavy hydraulic machinery. Beyond this build-
ing is the frame shop, 270 by 344 feet, covering over two acres of ground.

There are two ship-ways 400 feet in length, and two 450 feet long; above which for the entire length runs a travelling derrick which receives material from a similar traveller, running on a ground track, and conveys it to any desired part of the ship.

Two 500-foot ship-ways, with trestle work for an electric travelling crane, are being rapidly pushed to completion. The magnificent piers and outfitting basin, the 70-ton sheer legs of which mention was made, and several other buildings, mostly brick, of commodious size and arrangement might be mentioned, if time and space permitted.

The general-office building claims a word. It is of brick, over 40 by 200 feet on the ground. The lower floor is arranged for stores and supplies for the yard and shops. The second floor is arranged in general offices, while the third floor is divided equally between the hall and engine departments for draughting rooms. All the floors are provided with fire-proof vaults for the safe keeping of papers and drawings. The building is heated by steam and lighted by electricity.

So much for the facilities for doing work, and now a word as to the work itself. Two iron tugs, with quadruple expansion engines, have been built. Two iron freight steamers of 4500 tons each, have been completed and are now running from New York to New Orleans, having broken all previous records on the route for quick passages. Two other steel vessels are under way; each is 406 feet over all, 48-foot beam and 33 feet 9 inches depth.

Each is to be fitted with triple expansion engines of 3500 H. P., having cylinders, 32", 52", and 84" by 54" stroke. Steam at 165 lbs. pressure is supplied by three double-ended, cylindrical boilers, each 13 feet 10 inches diameter by 20½ feet long, containing 18 corrugated furnaces 3 feet 11 inches outside diameter.

Time and space are too limited to do justice to the subject of this article, hence, for those students who are interested, the writer has mailed a copy of The Iron Age, for March 10th, 1892, containing a very good article, with an accurate plan of the works, together with illustrations of the dry dock, travelling derricks over the shipways, and the machinist and blacksmith shops. He asks that this number of The Iron Age may find a place on your reading-room table for a few days at least.*

Such is a bare outline of the work only just begun at the Newport News Shipbuilding and Dry Dock Company's yards.

The plant, and the work executed, will stand as a grand monument to the name and genius of the founder, who is thus using an immense fortune to the advancement of our country's prosperity and the interest of its citizens and mechanics.

C. F. B. '88.

OTHER TECHS AND OURS.

Comparison of Hours Spent in Civil Engineering.

Considerable has been said in regard to the amount of time given here to studies in the Mechanical Course as compared with that at similar institutions, but no comparisons, in the Department of Civil Engineering, have been made. Engineering News is publishing a series of articles upon the Engineering Schools of the United States, and from them we cull a few interesting figures. These figures are taken from carefully arranged and corrected tables, which, of course, are made up without prejudice, and are statistics pure and simple. We give only figures showing hours here, at the Massachusetts Institute of Technology, and at Rensselaer Polytechnic Institute. They prove that in the Civil as well as in the Mechanical Departments the work required here is as much and even more than in other technical schools with four-year courses instead of three.

MASS. INSTITUTE OF TECHNOLOGY.

Algebra, 28; Geom., 32; Trig., 70; Anal., 45; Des., 75; total, 250.
Calc., 95; Mechan., 128; Physics, 106; Elec., 74; total, 433.
French or Spanish, 270; Eng. Lit. etc., 180; Geol., 105; Metallurgy, 15; total, 570.
Astron., 30; Surveying, 255; Chem., 210; total, 495.
Thermo-dynamics, 245; Draw., 225; Eng. Technicalities, 1,270; total, 1,540.
Grand total, 3,288.

WORCESTER POLYTECHNIC INSTITUTE.

Elementary Mathematics, 326; Algebra, 10; Geom., 35; Trig., 35; Anal., 85; Des., 51; Calc., 102; Mechan., 170; Phys., 100; Elec., 50; total, 494.
French and German, 312; Eng. Lit. and Rhet., 210; Geol., 20; Mineral. 45; Metallurgy, 15; total, 602.
Surveying, 836; Chemistry, 292; total, 1,128.
Thermo., 98; Draw., 636; Eng. Technicalities, 387; total, 1,121.
Grand total, 3,671.
RENSSELAER POLYTECHNIC INSTITUTE.

Algebra, 73; Geom., 39; Trig., 45; Anal., 45; Des., 76; total, 278.
Calc., 95; Meechan., 110; Phys., 105; Elec., 76; total, 386.
French, 149; Eng. Lit., etc., 67; Botany, 48; Geology, 59; Mineralogy, 37; Metallurgy, 58; total, 418.
Astronomy, 84; Surveying, 285; Chemistry, 141; total, 456.
Thermo., 145; Draw., 70; Eng. Technicalities, 478; total, 687.
Grand total, 2,231.

At Worcester, during the Junior and Middle years, Civils enjoy 326 hours of elementary mathematics, while at Mass. Inst. Tech. only 250 hours are given. In these branches at Rensselaer Poly. Inst., 278 hours are spent. But this does not prove anything, for the ground in some cases as at M. I. T., may have been covered before admission to the Institute. However, a further examination shows that upon what is called advanced mathematics, i.e., Calculus, Mechanics, Physics and Electricity, 494 hours are spent here, against 433 at M. I. T., and 386 at R. P. I. For University studies, viz., French, Eng. Lit., Geology, etc., W. P. I. allows 32 hours more than M. I. T. and 184 more than R. P. I. In surveying alone at W. P. I. 836 hours are given, while at M. I. T. and R. P. I. only about 250 hours are allowed; 636 hours of drawing at Worcester contrast with 70 hours at R. P. I. and 225 at M. I. T.

Not a very poor comparison for Worcester Polytechnic Institute. And these figures furnish the basis for an argument in favor of the proposed four years’ course. Here are over 1,000 hours’ more work done in three years by Civils than is accomplished in four at Rensselaer and nearly 400 more than at M. I. T. It is reasonable to suppose that a much more systematic and complete course, one in which the students would have more time, and not find themselves mere grinds, could be arranged for four years.

FROM THE SHORE.

Something About Lighthouses—A Fish Story.

EDITOR W P I:—

In reply to yours asking for some notes concerning the lighthouse service, I will attempt to tell a little of the control and maintenance of this important branch of government work.

There are in the United States about 900 lighthouses and lightships, beside a large number of fog-signal stations, and countless buoys and other aids to navigation. The government of these is entirely in the hands of the Lighthouse board which is a bureau of the Treasury Dept. and of which the Secy. of the Treasury is president.

This Board is made up of seven members, two army engineers, two commodores or commanders of the navy, and two men of authority on scientific subjects, beside the Secy. of the Treasury himself.

This board has charge of all business connected with the lighthouse service, including the assignment of army engineers and naval commanders to the different districts and the appointment of all officials.

There are sixteen districts, the first beginning at the boundary line between Canada and Maine, the 13th extending from California to British Columbia and the 16th on the Mississippi river. They include the great lakes, the gulf and principal rivers, beside the entire coast line of the country.

There are six different classes of lights ranging from the magnificent first-order lamps, which can be easily seen a distance of 25 miles, to the sixth order used principally on rivers, and which can be seen about 7 miles. The first- and second-order lights are used for outside or primary sea coast lights and are scattered widely, for instance in Maine, Petit Manan, Monhegan Island, Cape Elizabeth, and Seguin are the principal lights, while the total number of lights is over sixty.

The third-order lights are secondary sea coast and form a line along shore, while the fourth- and fifth-order, much more numerous, are used to guide the mariner into sounds, bays, or harbors.

A custom which deserves especial commendation is the appointment of old soldiers and sailors, generally war veterans, to be lightkeepers. It requires simply bravery and a strict sense of duty, traits which can nowhere be surer found than in these old heroes. They are great story tellers and will stand all sorts of jokes except doubts of the truth of their yarns.

While at Prospect Harbor a remarkable factory was pointed out to us by the keeper of the light, where a curious and interesting development is said to take place. Fishes are carried there, and cut and packed in tin boxes to be sent around the country. The queer part of the story is, that only herring are bought while the fish sold and shipped from the factory comprise quite a variety, including sardines, sea trout, brook trout, herring, and mackerel.

The natives see nothing curious about this application of the Darwinian theory, and the lightkeeper mildly asserted that not only are new species bred there but often an individual
fish (herring) goes into three separate boxes, his body a mackerel, his tail a sardine, his breast a sea trout, only his head remaining a herring, and this is back into the sea probably to grow a new sardine, tail and the other appendages, and again be assorted. I tried to obtain specimens of this wonderful fish (the Maine herring), but the natives jealously watch a stranger, and so prevented the W. P. I. museum from obtaining a "proof of Darwinism."

I will assure the W. P. I. readers that this is no fish story, but an actual fact. '92.

NOTES BY ENTROPY.

A little while ago I did something that I ought to have done before I left the W. P. I. It was simply that I went to Providence and visited some of the well-known shops of that city, calling at Brown & Sharpe's first. I believe B. & S. have the most extended reputation of any shop in the country; certainly if they have not it is not their fault. They extend welcome to everybody who is sufficiently interested in machinery to see their shops. It was a new experience to me to see a shop so clean, light, and comfortable.

It is not so very different from the W. M. S., but that is so different from other Worcester shops that I had always thought of it more as a model shop than as one intended for real business. I was used to Worcester shops, particularly those building machine tools; and do not believe there is another city in the country with so many little machine tool shops as Worcester. In Providence they manufacture machinery. In Worcester (except about three concerns) they cobble up machinery. If B. & S. or, I believe, any other live concern decide to build a machine, they spend months getting out drawings. Every detail is carefully worked out with reference to the mode of manufacture, and to attain the least expense with the greatest fitness for the place it is to occupy in the complete machine. When the drawings go out to the shop, the experimenting is all done. The machine is then an established fact. A few changes may be made after the machine is erected, but very few.

Worcester people go about it differently. From all appearances I should judge they usually made up their minds to get out a new machine one day and wanted to have it done and paid for the next. Sunday they get the inspiration of the thing, and Monday morning they are off to the patternmaker. We will suppose, for instance that our friend wants to get out a new planer. He tells the patternmaker, "I want the patterns for a new 26 in. planer; I want to use all that I can of the patterns that I already have." He might just as well add, "I want it just like what so and so built before the war."

The before mentioned patternmaker is probably an old man who has worked in all sorts of shops, so he remembers about how he made a similar set of patterns for somebody else twenty or thirty years ago. So he begins and puts his patterns together. The machine man spends about half his time in the pattern shop telling how long he wants this gear and that shaft or finding fault generally.

Finally the patterns are packed off to the foundry, and if our friend is lucky he will get all his castings in the course of time. Usually, however, the foundry man manages to lose a few patterns and a few were purposely left, so that after the machine is set up a wooden piece may be fitted in and a piece or two nailed on to allow for finish, or perhaps the foundry man is asked to rap it pretty well in the sand to make the casting as big as wanted. If the moulder remembers to rap one piece "vigorously" he raps all he has that day the same way so as to be sure.

By dint of fussing, shimming up here, cutting down there, and getting new castings to fit where others would not, the machine is finally put together so it will run, and shipped off, only two or three months later than it was promised. The next machine is cheaper to build, of course, provided the boss has not forgotten too many dimensions, or if the proprietor has not found too many things he wants to change. You may think that this is overdrawn, but it is not. I have "been there" myself.

But this is not telling about B. & S.'s shop. B. & S. run their own foundry. If you have visited any Worcester foundries, it will do you good to visit that shop. It is light, it is clean, it is swept oftener than many machine shops.

I do not want to decry Worcester shops, even though B. & S. are in my opinion far ahead of most of them. Worcester people can make just as good castings (if they would), just as nice and accurate machine work as any one else. The lack of cleanliness of some of these shops may, perhaps, be explained by what one of these small shop owners told me once: "If folks see you having your shop cleaned up they will think you have no work to do, and they will not bring you any." On the principle I suppose that, "From him that hath not shall be taken away."

Yours, Entropy.

NINETY-SIX'S ATHLETIC PROSPECTS.

From present indications, the class of '96 will make an unusual record in athletics. If the out
of-town members can present a few stars to help out those coming from the city, the class will at once push to the front. In the English High School in this city now preparing are the best three players of last year’s baseball team,—Zaeder, Philpott and Knowles. Zaeder, acknowledged by all as the best all-round athlete in the vicinity, has a record of 20 ft. 4 in. in the running broad jump; 5 ft. 5½ in. in the running high; 34 ft. in the 16 lb. shot; and is a sprinter of no mean ability. But it is in baseball that Fritz has gained the greatest renown.

For the last six years he has played base-ball and has made himself known all over the county as the best amateur first-baseman to be had, and preferred to many professionals. In 1890 he was a member of the Worcester collegians team, which made a tour of Maine, N. B. and N. S., and everywhere the papers praised his wonderful playing and his tremendous batting. This last season he played on the W. A. C. team, which made quite a record for itself. He will be a tower of strength to our team, if we have one; it will inspire the players to think there is at least one man who can be depended upon. Philpott, the second of the trio, played second-base and catcher and was also captain of the High School team. He will try for the former, his favorite position. He is a good all-round player and a sure hitter. Knowles, though a little light, is a second-base man and short-stop of the first-class, having won the admiration of all by his stops and accurate throwing, the past season.

It pleased the hearts of all Tech men a week ago to learn that F. H. Bigelow had decided to enter the W. P. I. He is a W. A. C. man and is capable of 104½ sec. for the 100 yds. In the last game of the W. A. C., he won the 220 yds. without a particle of training, except that training which the game of foot-ball affords; in fact he had played in a game the day before.

He is also the best 220-yd. hurdler in the city, and if properly trained would be able to take second in that event, at the Intercollegiate games. In foot-ball he played half-back, and his speed had a great deal to do with winning a number of games for the High School.

Next in the athletic line comes Walter Davis, a man with a record of 2.06 for the half and 55 sec. for the quarter. He was a member of the W. A. C.’s victorious team in its race with the B. A. A. team last winter. He has improved in the 440 yds. since he made his record, and will probably stand a chance for a place in that event at the Intercollegiate sports. Another good sprinter is Geo. Eddy, a graduate of the High School and well known as the man who used to push Dadmun.

Foot-ball material, and well-trained material at that, will not be lacking in the new class. The four backs and the left-end of the High School team will soon be with us. The above mentioned Bigelow and Knowles, together with Nelson and Capt. Cunningham, make up the four backs, and Everett Eddy played a good game at end.

Thus it will be clearly seen that ’96 will assist immensely in making up the base-ball and football teams, and, in addition to this, will be found fighting for first place at the Springfield sports.

SHOP NOTES.

The Vacation Lists. A Big Chip.

In response to the challenge long posted on Boynton Hall bulletin boards, the enterprising and labor-inclined representatives of the Middle and Junior Classes went early to bed on Sunday night, Dec. 11th. The faithful little tin alarm clock, which by a mutual understanding with its owner accidentally fails at stated intervals to “go off,” had been duly coerced to attend to business the next morning and the industrious student forgetting whom he had seen that evening at the Y. P. S. C. E. meeting, prepared to dream of greasy overalls and fat time-checks. As soon after 12 o’clock as might safely be called Monday morning, there was a rustle of clothes and a glare of light on Dix St., and at 1:15 A. M., Eaton, ’94, was pronouncing the mystic words, “Open Sesame,” at the portals and oil-be格rimed windows of the Washburn Shops, connected with the Worcester Polytechnic Institute, M. P. Higgins, Superintendent. Gallagher was second (and a W P I man too) followed by Keith and Magaw. The next comers, who were admitted through the slide door, found these four in the boiler-room. Still the number increased and soon two games of poker were in progress, chips having been obtained from John Hurley’s last sweeping. So the hours passed gaily away until seventeen men welcomed “Varney” at 8:40 with “Tidings of Comfort and Joy.” The list was produced, bets were declared off, the crowd fell into line as orderly as at a well-arranged funeral, and the autographs of future presidents of the United States and assistant instructors at the Institute were rapidly arranged for the edification of Mr. Mitchell and his heroic band.

The reception was a complete success in every way and the Shops are to be congratulated upon such an auspicious commencement of the Christmas holidays. There was but one draw-back, the absence of Newton. Last year by his vigorous assault the police were driven
from the grounds in confusion. Fortunately, his services were not needed this year in that line, and there was missing only the absence of his rhythmic "chaw" and the song of the Barber's Crossing zephyrs through the decorations of his façade.

At 7 A. M. there were thirty-seven "candidates for admission" and at latest reports, fifty-two. About twenty-six can be accommodated, besides, perhaps, four Seniors in the draughting-room and six in pattern-making.

On Saturday, the 10th, the shaft in the new shop was started for the first time, and at present a little work is being done in that room. The working of the quarter-turn equals all expectations.

Freight elevators are in process of construction for G. Henry Whitecomb and for A. G. Estabrook's building, known as Bangs' Block, on the corner of Bangs' Court and Main Street. Also an elevator plunger in the Whitecomb Envelope Factory put in by the Hydraulic Manufacturing Co. is being replaced.

An unusually long chip was cut on Thursday, Dec. 8th, by the Reed lathe working under the oversight of W. B. Fuller, '94. It measured no less than eighty-five feet, eight inches without stretching. This lathe seems to run to chips, as five over thirty feet long were cut.

---

THE FOOT-BALL TREASURY.

Report from Manager Phillips with a few Suggestions

At a meeting of the Foot-Ball Association held last Monday noon, Manager Phillips submitted the following report for the past season:

1892.

---

Receipts.

From

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Treasurer</td>
<td>$26.90</td>
</tr>
<tr>
<td>Subscriptions</td>
<td>234.50</td>
</tr>
<tr>
<td>Oct. 1. Guarantee from Aggies</td>
<td>35.00</td>
</tr>
<tr>
<td>Oct. 8. &quot; Brown</td>
<td>45.00</td>
</tr>
<tr>
<td>Oct. 15. Gate Receipts</td>
<td>28.25</td>
</tr>
<tr>
<td>Oct. 21. &quot; &quot;</td>
<td>10.00</td>
</tr>
<tr>
<td>Oct. 29. &quot; &quot;</td>
<td>11.50</td>
</tr>
<tr>
<td>Nov. 12. &quot; &quot;</td>
<td>20.50</td>
</tr>
<tr>
<td>Nov. 16. Guarantee from Harvard Freshmen</td>
<td>35.00</td>
</tr>
</tbody>
</table>

Total: $446.65

---

Expenses.

1891.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hacks at Middletown</td>
<td>$8.00</td>
</tr>
</tbody>
</table>

1892.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 1. Expenses to Amherst</td>
<td>56.10</td>
</tr>
<tr>
<td>Oct. 8. Expenses to Providence</td>
<td>40.01</td>
</tr>
<tr>
<td>Oct. 15. Guarantee to Aggies</td>
<td>35.00</td>
</tr>
<tr>
<td>Oct. 21. Guarantee to Harvards, '94</td>
<td>35.00</td>
</tr>
<tr>
<td>Oct. 29. Guarantee to C. M. T. S.</td>
<td>31.00</td>
</tr>
<tr>
<td>Nov. 12. Guarantee to Brown</td>
<td>45.00</td>
</tr>
<tr>
<td>Nov. 16. Expenses to Cambridge, Telegrams</td>
<td>30.06</td>
</tr>
<tr>
<td></td>
<td>4.48</td>
</tr>
<tr>
<td></td>
<td>55.00</td>
</tr>
</tbody>
</table>

Foot-Ball Supplies, $66.75
Adverting, 13.00
Use of Oval, 40.00
Coach, 26.00
Expenses of H. M. Southgate to Boston and Cambridge, Oct. 8th and 9th, 4.55
Expenses of H. L. Phillips to Boston and Cambridge, Oct. 28th. and Nov. 3rd, 4.30

Total Receipts, $439.80
Total Expenses, 439.80

Bal. in Treasury, Dec. 19, 1892, $6.85

H. L. PHILLIPS, TREAS.

In reply to a request from the Editor for some suggestions upon managing elevens in the future, based upon the experience of this year, Manager Phillips offered the following:

"Think it would be advisable for managers to sign a written agreement for a game, and to have dates for all the games except one or two arranged before the summer vacation. In this way a game with the M. I. T. might be arranged, which certainly would be of great interest. Advertising by means of placards and flyers is preferable to advertising in Worcester's only newspaper.' This is proved by the receipts of Oct. 15th and Nov. 3d, as against those of Oct. 21st and 22d. Should not advise getting one of the famous coaches of the country, but engage a good man like Mr. Ellis for the first three weeks of the season when the team can practise an hour every night and get hard training. Failure to do this was what, in my opinion, lost the first game.

"Players should be made to put on their suits at noon and be out promptly at 4.30 P. M. Make it more of an object for the men to play on the second eleven, by arranging a game for them at the Oval toward the last part of the season. Also take all the members of the first eleven who have played in a certain number of games, to Springfield for the Harvard-Yale Game. This would have been done this year, but the treasury would not admit. Try and have a training table.

"Now that foot-ball is on a firm basis at the W. P. I. and is improving every year, and the Alumni can see that we are 'in it for keeps,' think that if at the Alumni meeting in June the Foot-Ball Association should ask for money, a large amount would be pledged.

"And now a final word to those interested in foot-ball, base-ball or general athletics. Would it not be well to have an association, or union, as it is called in the larger colleges, which should have full control of all athletics at the Institute? A president, vice-president, secretary, treasurer,
and one or two directors from each class, together with the Athletic, Foot-Ball and Base-Ball Managers, would be all the officers necessary."

ATHLETIC DIRECTORS.

A Tournament for this Winter.

At a meeting of the Athletic Directors held last week, a proposition for holding a tournament this winter was considered. Objections were raised to the plan on the ground that valuable prizes would have to be offered in order to induce athletes of prominence to enter, and that it would involve a great amount of work, care, and responsibility upon students having it in charge. It was finally decided to invite the High Schools, Academy and Holy Cross College to each appoint two representatives to confer with the same number from the W. P. I. in regard to holding a joint tournament. If this could be held a large number of contestants would be induced to enter without the offer of valuable prizes, and the influence of the four schools would assure a very large attendance. In this way each would derive practice for its men and besides a snug sum for its treasury. All of the schools have not responded as yet, but as soon as answers are received the preliminary meeting will be held. There was much discussion over provision for the team this spring and several plans were adopted.

HISTORICAL SOCIETY.

The second meeting of the society for the season was held Friday evening, Dec. 16th, in the Boynton Hall Library.

Under the general topic for the meeting, "The Outbreak of the French Revolution," the following programme was taken up:


Discussions on the various papers was indulged in by those present.

Prof. William MacDeonald, Instructor Rice, H. W. Bowen, '93, were admitted to membership in the society. Messrs. Coombs, Butterfield, '93, and Andrews, '93, were appointed a committee to nominate officers at the next meeting for the ensuing year, which will be held on Friday, Jan. 13th.

CAMERA CLUB EXHIBIT.

On Saturday afternoon and evening December 10th, the Tech Camera Club held its fourth annual exhibit at the Salisbury Laboratories. There were about seven hundred prints on exhibition in the Mechanical Model Room during the afternoon and evening. In previous years the pictures have been divided into classes, and for the best pictures in each class prizes were awarded. This year each exhibitor arranged all of his pictures together and the one having the best collection received the first prize.

The judges were Dr. George E. Francis, Frank Kendall and J. O. Phelon. Edward H. Keith, '94, received first prize, an etching "On Lake Champlain," and Edward W. Vail, Jr., took second, an etching "A Bit of Sunlight." A very tasty card souvenir bearing a small engraving of Tech Hill was presented to each visitor.

In the evening about two hundred persons assembled in the Physics lecture room to see the lantern-slide exhibit. Six members of the Club showed views taken by themselves, and explained each as it was shown. The display both of pictures and lantern-slides was excellent, and the Club can be congratulated on the success of the whole affair.

Plans are being made for another lantern-slide exhibit just before the spring vacation. We hope they will be carried out, and that it will be as much of a success as the one just held.

COMMUNICATION.

Pointed Remarks on Teaching.

To the Editors of the WPI:

It is evidently the object of every student in coming to this or any other similar institution, to increase his stock of knowledge, not to be asked for his opinion on a subject and at the end of the hour leave the recitation room, not knowing whether he was in the right. When such is the case, has he gained any knowledge?

As a result the student goes out of the recitation room in a confused state of mind, wondering if he will ever know which is right and which is wrong. Is it for this that we pay our tuition, to be answered with sarcasm and left in the dark, to feel our way about in the mysterious problems of "science?" When a student asks to have a question, which appeared in the query, explained after the hour is over, and meets with a flat refusal; and when, in response to questions, the whole class are told that they
Analyzes are being made in the laboratory of certain specimens of rock brought from Egypt by Mr. Chas. G. Washburn. It may be of interest to state that the Syenite of which the pyramids are built closely resembles the so-called Milford granite owned by the Norcross Brothers. This resemblance is not only in appearance but in specific gravity and chemical composition.

In connection with the notes on meteoric iron in our last number, it might be stated that the nickel iron used for armor plates on the new U. S. war-ships resembles meteoric iron as regards toughness, which is caused in both cases by a small amount of nickel in the iron. It seems probable that the idea of making nickel iron for plates was derived from the study of meteoric iron.

An analysis of the nickel iron obtained from Annapolis through the kindness of Senator Hoar was made in the laboratory last year with the following result:

<table>
<thead>
<tr>
<th>Element</th>
<th>Amount in Grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>94.98 per cent.</td>
</tr>
<tr>
<td>Nickel</td>
<td>3.53</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.53</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.29</td>
</tr>
<tr>
<td>Carbon</td>
<td>0.48</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.02</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.01</td>
</tr>
<tr>
<td>Undetermined</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Physics.**

The men of the post-graduate electric course are making standard resistance coils to carry 2 amperes, varying by one ohm, from one ohm up to 1200 ohms. They are also setting up apparatus for the determination of the B. H. curves of iron. During the course of the work a few days ago, Nelson '92, suggested a modification of Thompson's formula for the compounding of dynamos, which has so far proved quite advantageous.

The Seniors of the Physical and Political Science course are making standard resistance coils and Latimer-Clark standard cells. The same class is also at work upon the determination of the temperature co-efficient of German silver wire.

**Mechanics.**

The work in the Mechanical Laboratory has been rearranged this year, and more completely systematized than ever before. As a consequence the present Senior class find it much more interesting and profitable.

The Morse Rotary Engine Co. of E. Boston, Mass., are to send one of their engines to the laboratories soon, to be tested.

A new hook gauge of approved style would be a valuable addition to the equipment of the Department of Hydraulics.
CLEVELAND ALUMNI.

The Worcester Polytechnic Alumni Association of Cleveland, O., will hold its regular semi-annual meeting and banquet at "The Hollenden," Superior St., Cleveland, O., on New Year's Eve. All Alumni and members of the Institute are cordially invited.

ALUMNI NOTES.

'91. E. A. Taylor and A. H. Warren were elected members of the New England Water Works Association on Dec. 14, 1892. Taylor is constructing engineer with Lucian A. Taylor, Worcester, and Warren is superintendent of Sewer, Street and Water Departments of St. Albans, Vt.

The engagement of Mr. Taylor to Miss Helen Maud Flint of Allston, Mass., has just been announced.

'86. Walter G. Wesson has been engaged as one of the instructors for the next Apprentice Class.

'87. W. A. McClurg has followed the example of W. W. Bird and sent a $5.00 note to the W. P. I., the balance over subscription to be paid to the Foot-Ball Association. Many thanks.

'90. The W. P. I. wishes to acknowledge the receipt of six of the back numbers wanted, from F. W. Treadway.

FOOT-BALL MEETING.

A meeting of the Foot-Ball Association was held in the Chapel, Monday noon. There was a very large attendance. President Rogers called the meeting to order, and Manager Phillips read his report for the last half-year, which was accepted without question. It will be found in full in another column. E. W. Davenport, '94, was nominated for Treasurer and Business Manager, and elected by acclamation. An extremely ludicrous incident occurred when the vote was taken. It so happened that the fire-bells were ringing, but were not noticed above the noise of the meeting. Pres. Rogers called for the affirmative vote and there was a single heavy volume of "Yes." "Those opposed" were called for and then the big Washburn and Moen whistle gave one sonorous and decisive "No," in response.

It was some minutes before the laugh stopped and order was restored. Voted, on motion of Captain Allen, that a committee of three be appointed, of which the chair should be one, to purchase a tackling-bag. Messrs. Allen and Davenport were appointed. It was then learned that a suitable bag would cost about one hundred dollars, which took the breath away from those present, and when it was asked how the money should be raised, the meeting dodged the point by adjourning.

Our attention has been called to the number of Nov. 24th, in which the Poems of Spencer were mentioned as an addition to the library. Of course it should have been Spenser.

TECHNICALITIES.

News Item: Prof. G. has had a hair-cut.

It is said that the last boil at 4 John St. is Heald.

The Physics Lab. clock has been off for a time, hence its run-down appearance.

Prof. Geo. I. Alden was elected a member of the Worcester School Committee last week Tuesday.

The Junior that overslept himself has been equalled by the Senior who inquired about the example "that you gave us out."

Business at the Shop is rushing. A Middler claims that a short time ago he found Supt. Higgins, setting up Knight.

Scene in the library annex:

"What are you gentlemen doing here making all this noise?" This room is reserved especially for Seniors. This is a reading-room. You men have no business in here and you had better get out of here or I will put you out."

F—ll, '93, is rapidly raising a growth of curled hair on his chin. We are authorized to state that it is not for appearance's sake but to furnish a subject for thesis work. Samples of these and others from Newton will be tested for limit of elasticity.

The M. I. T. Banjo and Guitar Club recently made the following offer to the W. P. I. Club:

—To come to Worcester and give a joint concert, provided Worcester hire a hall and pay for all advertising and printing and give Boston $55. The offer was declined.

Students in the Shop are filled with righteous indignation at the quarter-turn lately given to the desk of the new type-writer. Many consider it Poore policy. She probably wished to turn her Cole shoulder to the Draughting Room and her back to the mash-eens!!! CopyWright.

Jo, dear! Jo, dear! can't you guess the truth?
Jo, dear! Jo, dear! can't you guess the truth?
Get up and build a fire,
Turn the gas a little higher,
Then run and tell Maria
That, Baby's got a tooth.

Prof.—"How far out of the way did your diagram come?"

Senior.—[Slow but provokingly sure]. "Oh, I don't know."

Prof.—"Well, have n't you any idea? Was it an inch or an eighth of an inch?"

Senior.—"Both, an inch and an eighth."

All dealers in old tin cans, umbrellas, bottles, or fancy bric-a-brac of any kind are requested to deposit them on the new path to the Laboratories. The public may rest assured that any
Dr. Fuller is almost constantly receiving letters inquiring for graduates to fill responsible positions in different parts of the country. For example: A few days ago, a letter was received inquiring for a man to take a position as director of a school of mechanic arts. This school has just been founded with an extensive plant by a live western university, and some one is wanted who will take an interest in building it up.

Calorie inquired of his landlady the other morning, as he absent-mindedly cracked off a piece of doughnut with the handle of his knife, and put it in his pocket for analysis during the Mineralogy hour, if, when she poured the coffee into his Royal China cup, it became $t$. Then drops of sweat oozed out of the milk toast until it really looked as if it were made with gravy and the butter asked if it was the McKinley Bill that raised the bread.

The Freehand Drawing Department is soon to vacate its present quarters in Boynton Hall, and probably at the beginning of the next term will be fully established on the top floor of the new shop. Here there will be much better accommodations in regard to space and light. It has always been a rather difficult matter to properly ventilate the present room when a large class was having an exercise, and this change will be a welcome one to all.

Under the auspices of the Institute Y. M. C. A. a Bible Class has been started, which meets Sunday mornings at 9.15 in one of the parlors of the Local Y. M. C. A. The class is carried on entirely by the students, and it is hoped that it may become very efficient in promoting real and practical study of the Bible. Any one who is interested and who feels that he can spare a little time is heartily invited to join and may do so by speaking to Mr. Butterfield, the President of the Association.

Now that the paper covers have been removed from the books in the library, it is time for one more much needed improvement necessitated indirectly by the advent of cold weather. Much as warmth is desirable, we should have some way of getting a supply of fresh air into the library. After this small room has been occupied by twenty-five or thirty students during three or four hours each day the sensation to one, who has just come in from out of doors, is nauseating. Some means should be tried, either by "displacement" or chimney connections, whereby the room could be ventilated every day.
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Retail Yard,

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ESTEY ORGANS, Agents.
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Stylish Patent Leather Shoes for $5.00.
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