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We would call attention to the notice in another column concerning the Board of Editors of the WPI. There are vacancies in each of the three lower classes. Applicants are required to furnish some article, long or short—anything which would display their ability in that line. It is necessary, also, that the student stand high in scholarship in his class.

Class of Ninety-Seven, we greet you! We congratulate you on your appearance, and sincerely hope that we have not been deceived in our first impression of you. May your four years of toil be free from obstructions, and may you finish as you have begun—with the good will of all.

The work in the shop laid out for the Senior Mechanics is both interesting and pleasing to the students concerned. The work of the preceding years has not been especially agreeable—in fact it has sometimes been tiresome—due principally to the fact that the student did not know half the time what he was making. Now, knowing the objective point, the student has a chance to think for himself; he sees more than one way of doing a thing, and by these means he learns quicker and in a more agreeable manner. The novelty, too, serves to relieve the monotony of the day's labor.

Foot-ball, this year, has awakened more interest than in any previous year in the memory of men now in the Institute. That four distinct teams could be formed is in itself a positive proof of this. On the Varsity team many of the good players of last year are missing, but their places have been well filled by men who have had experience. The manager has made it a point to arrange games with first-class teams only, so that lovers of the sport in the Institute will be treated to some grand exhibitions. Hence there should be no ill-feeling if the team should fail to win even a single game; for, in the eyes of other colleges, it is far better to be defeated by the best teams than to win inglorious victories from third-rate aggregations.

From Saturday's game, however, we draw the conclusion that we are "in it" with any of them. The magnificent showing made by the team against their much heavier opponents, is worthy of great praise. There were weak points, of course, but the short time for practice is accountable for them. The attendance at the game was very encouraging to the management, and hereafter it is hoped that the quality of foot-ball played by the Techs will be sufficient in itself to attract the students and public,
without any extra exhortations from the
management.

The present year has opened with a change
which has long been in the minds of the
Trustees and adopted none too soon. The
four years course has been safely launched.
The changes that have been necessary are
very great, but we believe that they are
changes for the better. How the Freshman
of to-day differs from the Prep of the past!
The latter used to wonder how he could end­
Dure reporting
that he has only ten hours per week to
“work.” But the three summers in which
he must get on the right side of 168 hours
take away quite a little of this consolation.
The chemist and the civil, too, have their
work lengthened out a little, the principal
change being in the amount of practice—
the former doing 168 extra hours instead of
the customary 100.

The principal change to be noticed, how­
ever, is the diminution of the number of
students in the two new classes, compared
with those of the last few years. This,
however, was desired and almost necessary,
for of late the divisions in some depart­
ments have been too large to suit the ac­
commodation.

Advanced French which '95 and '96 were
not obliged to take has again been placed
on the list of Freshmen studies. They
must also submit during the first term to a
lecture of Ethics and Hygiene. For Fresh­
man Civils, Chemists and General Scientifics
studies in the shape of History, Rhetoric
and Composition have been added. In all
courses all mathematics are finished at the
end of the Sophomore year. Heretofore it
has taken until the end of the Middle year
to complete them. Perhaps the reason of
this is, that, as so many receive conditions
in the higher branches of mathematics, more
time before graduation will be at their dis­
posal to get rid of these conditions.
Mechanics, which by the old schedule was
studied only in the Senior year will now be
taken up all through the Junior and half
the Senior years. English Literature which,
heretofore, has not troubled students of the
chemistry department, will now be studied
by them in the Senior year. The Mechanics
in the Senior year have as options Higher
Differential Equations and Commercial Elec­
trical Machinery. Senior Civils, too, have
the former.

WHAT ONE TECH HAS DONE.

Almost every day we read of what has been
achieved by Tech graduates. Some have risen
high, others have risen higher, but from the
following article clipped from The Northwest
Magazine for September we draw the con­
clusion that the zenith of a Tech’s possibilities
will never be reached.

John William Kendrick, who was promoted
from chief engineer of the Northern Pacific to
general manager on the death of W. S. Mellen,
was born in Worcester, Massachusetts, in
October, 1853, and comes of old New England
stock on the side of both his father and his
mother. His father was a farmer, but he man­
aged to give his son a good education, first in
the Worcester public schools and later in the
Polytechnic Institute of that city, where he
studied civil engineering and from which he
graduated in the class of 1873. The young man
struck out for himself as soon as he was done
with school, and found work in Lowell, in the
office of the city engineer. He was next em­
ployed in Woonsocket, R. L., and afterwards in
the engineering force of the Worcester &
Nashua Railroad and the Boston, Barre & Gar­
der Railroad. Railroad surveys in and around
Boston then occupied him until August, 1879,
when Gen. Stark, then vice-president of the
Northern Pacific, sent him to the Yellowstone
Valley, in Montana, with a locating party. The
chief of this party was William C. Wetherell,
afterwards chief engineer of the Mexican Na­
tional Railroad. Mr. Kendrick helped locate
the line between the Little Missouri and Glendive.
The labor was so perilous, because of the proxi­
imity of Sitting Bull’s hostile Sioux, that the
engineers worked under the protection of an escort of troops.

From June, 1880, till October of that year, Mr. Kendrick had charge of sixty-five miles of construction east of Glendive and afterwards of 110 miles from Glendive west. In 1882, Gen. Adna Anderson, then the chief engineer of the road, wired him to come to St. Paul. Greatly to Mr. Kendrick’s surprise, he was placed in charge of the important terminal work in St. Paul and Minneapolis and the construction of the line from St. Paul to Sank Rapis. Until June, 1883, this work was prosecuted under the engineering department of the Northern Pacific, but at that time the St. Paul & Northern Pacific company was organized to carry it on and to own it, and Mr. Kendrick was made chief engineer of the new corporation. In 1885 this position was consolidated with that of engineer of maintenance of way on the main line and branches of the N. P., east of Helena, and Mr. Kendrick performed the duties of both offices. In 1887 he was appointed chief engineer of the Northern Pacific, to succeed Gen. Anderson. In 1892 his jurisdiction was extended to cover the Wisconsin Central lines, the Chicago & Northern Pacific and the Calumet Terminal & Transfer Railway Company and his office was removed to Chicago. His promotion to be general manager of the Northern Pacific brings him back to St. Paul.

Mr. Kendrick has built about 1000 miles of the present Northern Pacific system. The appointment of a civil engineer to the head of the operating department of a railroad is by no means exceptional. More than one-fourth of the managers of American railways came up from the engineering department. Mr. Kendrick had always been a close student of all questions connected with the operation of railways as well as their construction. He presented not long ago to the N. P. management a comprehensive plan for the reduction and rearrangement of grades on the road with a view of effecting great economies in train service.

This plan met with general favor and would have been carried out had not the financial stringency prevented its adoption. Mr. Kendrick enters upon the arduous duties of his new position with the great advantage of being thoroughly familiar with every mile of the Northern Pacific system, of knowing well all the officers who are to work under him and of comprehending the traffic resources and possibilities for development of the entire country traversed by his lines. He is a well-balanced, cool-headed man, of active intellect and sound judgment, and he has always been an industrious, tireless worker. No one who knows him well doubts that he will succeed in his present place as he has done in all others he has occupied. He has won all his promotions by merit ing them.

Speaking of the standing Mr. Kendrick has long had with the men controlling the Northern Pacific, and of the confidence with which the immense interests were intrusted to him in the past few years, and especially in the tremendous expenditures made by the company in getting into Minneapolis and making other improvements on the line, a well-known Northern Pacific man said to the Minneapolis Tribune:

"Mr. Kendrick had almost unlimited control of all that work, and his power was almost autocratic. The company virtually put $10,000,000 in his hands, and told him to go ahead and do with it as he pleased. The manner in which he used the money was never questioned, and the wisdom of the improvements made have not required even time to demonstrate."

An instance of how the work was done was given by the same speaker. "I was in the St. Paul general office one day," said he, "and Mr. Kendrick walked into the comptroller’s office and said to a clerk: ‘Make me a check for $10,500.’"

"‘To whose order payable?’ asked the clerk.

‘Make it to bearer,’ replied Mr. Kendrick. The check was made and used to pay for certain land needed in the work, and the title of the same taken in the name of a trusted employee of his office, so as not to create any suspicion of what was being done in the extension to unduly affect the price of property, and then when it was all right the property went to the company. ‘That,’ said the gentleman, ‘was only a small incident of how the business was managed.’"

A NOVEL “AD.”

Since my return to school this term I have noticed a remarkable change in the atmosphere regarding athletics.

Something seems to be wrong and just what that something is “is a good question.” No article was ever, nor likely to be printed in these columns criticizing the actions of the Faculty, but, as in this case the “something” affects the school, I feel licensed to speak.

During this summer and while out West, I made it a point to find out the principal causes which determined the comparative outside knowledge of our leading colleges. Among the college men met with, were undergraduates from Amherst, Cornell, Leland Stanford, and Columbia (Washington, D. C.) colleges. To the question, What did they really know about
the larger colleges, such as Harvard, Yale and Princeton, almost identical answers were received. I was surprised to find out the apparent ignorance of college men in regard to the educational line as pursued at other colleges than their own. Without exception they were obliged to confess that about all that they did know was due to the reports of athletic contests as chronicled in our "American Encyclopedias," the newspapers. Now of course this would not apply to the real business men of the age, but are they the ones to whom the advantages of an educational institution are to appeal? Is it not really the boys themselves who choose at what particular college they wish to pursue a higher course of learning? Would there be any hesitation in choosing between two colleges of equal note, if one was equipped with a gymnasium and every facility to improve upon physical development, while the other offered none? Why might not this in the absence of the "all needful" apply to general athletics, such as foot-ball and base-ball as well? If the "powers that be" frowned upon these demonstrations of natural appeal, is it likely that young men would be attracted by the benefits to be obtained at such a school, or would they to the contrary be more apt to choose a rival institution as their Alma Mater, where attempts at jumping and running were not only permitted but encouraged? On the other hand, one might argue that men go to college to learn and investigate the laws of a science or profession, and not the science of foot-ball and general athletics. That may be so theoretically, but if one will only notice, he will find out that the very men who appreciate and endeavor to develop their opportunities in college, are the identical men who realize that a sound body is as essential, as well, if not more so, than a sound mind, and captains, and managers of teams hunt out these men knowing their perseverance in their undertakings.

Now, there are some men who would make athletics the scape-goat of all absences and sicknesses and use it for a general excuse. Those men do more harm than good and I am safe in saying, that were athletics not an available excuse they would soon find out something that would serve their purpose.

The men who indulge in athletic games have generally a superabundance of vital energy and animal spirits, which must have an outlet somewhere. And if debarred from athletics, they would plunge into excises of a far more detrimental character.

Now the point of all this talk, is not that I would have school studies lessened or set aside to make way for athletics, but give it a show; encourage the men who advance and spread the name of the Institute, and let those who cannot help with their hands, help with their approbation and their—pocket-books.

TECH vs. TRINITY.

The first game of the W. P. I. foot-ball season has been played and not lost, either. It may have been a surprise to some, but to those who have watched the faithful practicing, efficient "captaining" and coaching the result is not far from what was expected. We would add, "let the good work go on."

<table>
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<tr>
<th>TECHS</th>
<th>Positions</th>
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<tr>
<td>Ware, left-end-right</td>
<td>Coggeshaw</td>
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<td>Lathrop, left-tackle-right</td>
<td>Reese</td>
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<tr>
<td>Brigham, left-guard-right</td>
<td>Penrose</td>
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<tr>
<td>Boyden, centre</td>
<td>McGann</td>
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<tr>
<td>Brooks, right-guard-left</td>
<td>Raedlends</td>
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<tr>
<td>Durand, right-tackle-left</td>
<td>Buell</td>
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<tr>
<td>Harris, Cunningham, right-end-left</td>
<td>Strawbridge</td>
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<tr>
<td>Chase, quarter-back</td>
<td>Greenley</td>
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<tr>
<td>Allen</td>
<td>Capt. Edgerton, F.</td>
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<tr>
<td>Zaeder, Arnold, half-backs</td>
<td>Langford</td>
<td></td>
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<tr>
<td>Nelson, full-back</td>
<td>Edgerton, J.</td>
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The game was called at 3.05. Trinity had the ball. At first V Trinity's centre accidentally kicked it and Lathrop seized it, and, dodging the Trinity men, made the first touchdown within one and one-half minutes of play. Allen kicked the goal. The ball was again put in play, but there was no gain for the first two downs. Nelson tackled his man and downed him.

The ball was next downed but with no gain. Trinity gained five yards at the next critical point, the game was second down and one yard to gain. At this point Trinity made another fumble and Tech got the ball which was put in play at once. Allen proved too much for Trinity sprinters. He dodged all in front of him and ran half the length of the field and ten yards over. The goal was not kicked, being a very hard one.

Trinity took the ball and gained three yards. Then Chase downed the runner. On the next play Trinity gained six yards but was well stopped by Harris, '94. Downed by Worcester at two yards gain for Trinity. Second down, three yards to gain. Trinity makes ten yards in two downs. First down, Trinity gains ten yards and is well tackled by Zaeder. The ball was downed with no gain. Second down, five to gain. No gain. Trinity woke up to a slight extent, here, and made ten yards, and directly afterwards a touchdown. The goal was kicked. Score 10 to 6 in favor of Worcester.

Tech took the ball and gained ten yards but lost by a fumble. Langford gained four yards. Chase tackled well, but Trinity made two and afterwards six yards. Ware made a fine tackle.
and brought his man down. Second down, three to gain. Ten yards, and, at next lining up seventeen more were gained by Trinity, followed by a touchdown and goal. Score 10 to 12 in favor of Trinity.

Worcester took the ball and made fifteen yards, then five yards and lost the ball. Trinity made four yards. At the second down there were three yards to gain. Sixteen yards gained by Trinity in two downs. Time of first half was called at this point for a ten minutes rest. Score 10 to 12 for Trinity.

At the next half Worcester took the ball and gained first five, then ten, then five more, four by Durand. First down by Allen who gained five yards at the next instant. Third down and one-half a yard to gain. Allen gained four yards, then Arnold three more and Brooks, with two yards to gain, carried the ball to within two yards of the line. Worcester forced the ball over by main strength, and Allen kicked the goal. Score 16 to 12 in favor of Tech.

Trinity took the ball and gained one, two and eight yards in rapid succession. Then Ware tackled and downed the runner. Trinity gained ten yards. One of the half-backs took the ball but was stopped short. Second down, Trinity gained eleven yards, then two more. The full-back took the ball, but, before he went far, ran against a stone wall in the shape of Brigham, and stopped, naturally. Trinity gained two yards. At the third down there was one-half a yard to gain. Soon after a touchdown was made, but the goal-kicker failed to place the ball between the posts. Score 16, all.

Worcester took the ball but didn’t get to the centre line. Chase gained five yards, then Allen six, Arnold two. Worcester stumbled and Trinity got the ball but lost a yard and a half on two downs. On the third there was no gain. Worcester gets the ball and gains ten yards, then one more, then two by Durand. Allen made two yards. One minute to play. Allen tried for goal from the field but the ball dropped within two yards of goal line. Time was called before anything could be done, however.

Score 16 to 16.

The only fault-finding we have to make is at the lack of systematic blocking and lack of snap to some of the plays. Also, it seems that with only one or two minutes to play and the ball 40 or 50 yards from goal it would be better judgment to hazard a run around the end instead of trying to go through the line until time is up. The captain is to be congratulated, however, on getting his team together and putting up such a game so soon after college opens.

Dr. Fuller, Prof. Couant, Mr. Coombs, Mr. Rice and Mr. Viles, were present.

JUNIOR VERSUS FRESHMAN.

On Friday, Sept. 15th, the second of the class foot-ball games was played on Dewey’s field. The game was notable as being the first game played by a “Freshman” eleven in the history of the Institute.

As ’97 were unable to get eleven men together the other classes helped them out. The teams lined up as follows:—

’97.

Martin r. end 1. Edwards
Clement r. tackle 1. Throop
G. Davis r. guard 1. Kelley
Ford centre 1. Riley, ’96
Brigham l. guard r. Boyden, ’94
Killiam l. tackle r. Dana
King 1. end r. Morse
A. H. Warren quarter Nelson
Stone r. half 1. Durand
Field l. half r. Lathrop
Harrington (Capt.) full-back
Referee—Harrington, ’94.
Umpire—1st half, Tucker, ’92; 2d half, C. P. Ware.

Ninety-seven opened with a V which was easily stopped by ’95. They lost the ball on four downs and ’95 after a few short runs around the end, sent Brigham through the centre for a touchdown. Time, five minutes. Harrington kicked goal. Score, ’95—6; ’97—0.

The game was a repetition of the first five minutes. Ninety-seven would start with the ball in the middle of the field but lose it to ’95 on four downs, then ’95 would score a touchdown.

The final score was ’95—18; ’97—0.

Harrington, Stone and Brigham played the best game for ’95, and Arnold for ’97. The latter’s tackling was the feature of the game.
THE CLASS OF '97.

We see many unfamiliar faces at the Institute this term. In the brief time in which they have been with us we have been unable to study their characteristics, but we feel certain that the class of '97 will make an honorable mark for itself in the class-room and on the field. This is the first class to test the advantages of a four years' course. We welcome the following men into our midst:

**Name** | **Age** | **Home** | **Course**
--- | --- | --- | ---
Bertram H. Arnold | 19 | Norwich, Ct. | Elect.
Roy A. Barnard | 17 | Worcester | Elect.
Arthur W. Beamard | 17 | | CIV. ENG.
William B. Bicknell | 20 | Honolulu, H. I. | Mech.
Joseph E. Brown | 18 | Worcester | Elect.
Chas. B. Dana | 20 | | Elect.
Wm. S. B. Dana | 20 | | CIV. ENG.
Herbert L. Daniels | 19 | | 
Lloyd J. Davis | 17 | | 
Chas. F. Day | 18 | | Chem.
Burton E. Eames | 18 | West Upton, Mass. | Elect.
Isaac F. Elliott | 19 | Brunswick, Me. | Mech.
Ralph E. Fish | 19 | | 
Harry E. Gough | 17 | Fitchburg, Mass. | Elect.
Chas. H. Greenwood | 18 | Gilbertville | Mech.
Chas. P. Hemenway | 19 | Barre | Elect.
Geo. N. Jeppson | 20 | Worcester | Mech.
Herbert E. Kelley | 20 | | 
Henry S. Lancaster | 18 | Worcester | 
Chas. B. Lathrop | 20 | Norwich, Ct. | Elect.
Frank A. Loud | 19 | W. Hampton | 
Oscar W. Lundgren | 18 | Worcester | 
Archie W. Merchant | 20 | Monson, Mass. | 
Thomas M. Molloy | 20 | Worcester | CIV. ENG.
Herbert H. Morse | 19 | Southbridge, Mass. | 
Arthur E. Orrell | 18 | Ware, Mass. | 
Ellery B. Paine | 18 | No. Woodstock, Ct. | 
Arthur B. Pond | 20 | Auburn | CIV. ENG.
Chas. F. Powers | 18 | Orange | 
Edwin F. Storer | 17 | Brunswick, Me. | 
Seth H. Tarbox | 21 | Westminster | Chem.
Lawrence P. Tolman | 17 | | 
Edward L. Walker | 19 | Hopedale, Mass. | CIV. ENG.
James T. Walsh | 18 | Whitinsville | Elect.
Harry E. Wheeler | 17 | Leominster | Mech.
Christopher Whitman | 19 | Westminster | 
Isaac F. Williams | 20 | Uxbridge | 
Elmer H. Willmarth | 19 | Vergennes, Vt. | 

EDITORS TO BE ELECTED.

There are at present four vacancies on the Board of Editors—two from the Junior, and one each from the Sophomore and Freshman classes. Applications should be made to the Secretary in person or dropped in the W P I mail-box. An article of interest to students is requested with each application and all should be in before Saturday, October 7. Further information can be readily obtained from the present members of the Board.

Y. M. C. A. RECEPTION.

The annual reception of the Y. M. C. A. to the Freshman class will be given Oct. 6, in Salisbury Laboratory, from eight to ten. As usual all the students are invited to attend with ladies. The Y. M. C. A. realize that social life here at the Tech is neglected, and have put forth special pains to make the evening a pleasant one. We do not have many opportunities for meeting together for an evening; so let every man turn out and do not forget to bring the ladies.

RECEPTION TO FRESHMEN.

On Friday evening, Sept. 22, the ladies of Central church gave a reception to the entering class. There was a fair representation of the Freshmen as well as a sprinkling of upper classmen and alumni. Profs. Cutler, Haynes, and Kendrick were present and endeavored to put the new comers at ease. They were so far successful that the Freshmen came forth from their corners and endeavored to outshine the Highland Military men. Light refreshments were served after which games and general conversation were in order, and the Freshmen departed homeward well pleased with their first appearance at the church social of Worcester.

THE BANJO CLUB.

Tuesday, Sept. 19, the Tech banjo and guitar club reorganized for the coming season of '93-'94. Mr. Boyden was re-elected leader, Mr. Magaw, business manager, and Mr. Gifford was re-elected secretary.

The outlook for the coming season is bright as the members start in with the experience of last year and with the advantage of having practiced their new selections during the summer, which scheme was originated by Mr. Boyden. The club has lost only one member, Mr. Gage, '93, so no time will be lost breaking in new members. All new men who wish to join our club will please give their names to Mr. Boyden or Magaw.
FOOT-BALL ASSOCIATION.

A meeting of the Foot-Ball Association was held in the chapel Monday, Sept. 18th. In the absence of President Rogers, '93, the meeting was called to order by Vice-President Dwinell, '94. The following officers were elected: President, C. H. Dwinell, '94; Vice-President, H. S. Davis, '95; Secretary, J. B. Mayo, '96. After a lively discussion in regard to the class games, it was voted that the final game be postponed indefinitely. Manager Davenport then addressed the meeting, stating that the prospects for a team were good and calling for the hearty co-operation of the students to give the team a strong financial backing. The manager stated that he had already received subscriptions from alumni and that the prospects were very encouraging.

ATHLETIC ASSOCIATION.

The meeting of the Athletic Association resulted in the selection of the following officers: President, E. B. Whipple, '94; Vice-President, F. W. Parks, '95; Secretary, G. W. Eddy, '96; Treasurer, H. P. Linnell, '94; Keeper, F. H. Somerville, '95.

CLASS ELECTIONS.

At a meeting of the class of '94 the following officers were elected: President, E. W. Davenport; vice-president, M. B. Chase; secretary, H. S. Whitney; treasurer, C. G. Harris; athletic director, J. M. Gallagher.

The Freshmen held a class meeting in Chapel at noon Sept. 22d, and elected the following officers: President, W. H. Morse, Jr.; vice-president, Geo. W. Throop; secretary, E. L. Walker; treasurer, H. E. Kelley; athletic director and captain of foot-ball eleven, T. L. Nelson, Jr. A committee on class yells and colors was appointed.

The class of '95 elected the following officers at its last meeting: President, A. H. Warren; vice-president, A. W. Clement; secretary, H. D. Temple; treasurer, H. S. Davis; athletic director, Fred L. Stone. A committee having in charge the arrangements for the half-way-thro' supper consists of G. P. Davis, A. W. Doe, H. J. Fuller, C. A. Harrington and F. W. Parks.

LABORATORY NOTES.

During the summer vacation, some changes have been made in regard to the interior of the chemical laboratories and lecture room. In the lecture-room, the observer is struck by the increase in the seating capacity. The platforms upon which the chairs are placed have been raised and rise from the floor more abruptly than formerly, so as to admit of placing additional rows of chairs in front without obstructing the vision of those behind. This has necessitated the moving back of Dr. Kinnicutt's desk a few feet nearer the blackboard.

The present seating capacity of the lecture-room is about one hundred and forty, and as the change in the course causes two classes to have general chemistry together, it is quite well filled during lecture hours.

In the general laboratory, the cupboards have been re-arranged so that now there are accommodations for one hundred and sixty students. The space for each student is less than under the old arrangement, but by using a little method in packing away their apparatus, the students will suffer no inconvenience from lack of room. The staples used in locking up have been clinched over on the inside, an improvement which will be appreciated by all who have ever had any experience in the general laboratory.

Another large bench has been put in the analytical laboratory. This is used by Dr. Kinnicutt in illustrating methods of analysis for the benefit of the Senior and Junior chemists. This will be more suitable for such work than the general lecture-room and will also save the students much time which was formerly consumed in travelling to and fro between the laboratory and the lecture-room.

The cracks caused by the cement floor drawing away from the walls have been closed up recently so that the apparatus in Prof. Kimball's department will not receive injury in case of breakage, leakage, and wash-bottle fights.

The Seniors have begun practice in the organic laboratory, and some of them think that they have already found their true calling in running a still.

The Juniors have nearly finished their qualitative work, and will probably begin on quantitative in the course of two or three weeks.

SENIOR ELECTRICS.

The division of Senior electricians, which course stirred up so much talk during the last spring term, at present comprises twenty-two members, some of whom expect to keep on with the post-graduate course. The work,
which has so far been lectures, is carried on in a very interesting and instructive manner. Theory is, for the time being, put in the background, while the practical part of the work is brought forward and emphasized in every possible way. By the practical part is meant the contact with, and handling of the machines, engines, dynamos, etc., with which an engineer must be acquainted. These machines come under the head of laboratory lectures and experiments. The other lectures have begun with the theory and management of the most common electrical machines, as the dynamo which is now being taken up. They also have lectures in general physics which, this term, bring them into the electrical laboratory. The voltmeter, ammeter, galvanometers, etc., are now being taken up. Each experiment comprises four or five sub-experiments and taking them all together the student will become well acquainted with the "ins" and "outs" of the instruments. At the lectures some of the instruments which are being spoken about are brought in, that the student may not only see the representations on the board and from imagination, but may see and handle the real objects. This makes the lectures much more interesting and capable of retention. The division have supplied themselves with Thompson's "Dynamo-Electric Machinery" which will probably come into use in the near future.

SHOP NOTES.

During the vacation the plunger turning lathe and the long Morse lathe formerly centrally located in the machine shop, have been removed to the new addition and in their place a spacious set of shelves has been built, on which the work of each division is assigned a separate place. Mr. Mitchell's desk has been removed to a raised platform in the centre of these shelves in order that the tool-room may be enlarged.

The shops have been awarded the contracts for placing two elevators in the Conant Building, and two in the factory of the Costs Thread Co., at Pawtucket.

An order for a freight elevator has been received from the American Electric Co., at Providence.

The Drawing Stand business has been especially good this summer, an order for twenty was received from Pasadena, Cal., through Clarence E. Alderman, '92, Professor of Mathematics, Throop Polytechnic Institute.

Twenty face lathes, similar to those used in the wood-room, have been shipped to the Ohio State University at Columbus.

Mr. Watson has gone to Lawrence where he is putting in an elevator for the Arlington Mills.

Mr. Walls, with four men from the shop, is at present working in Springfield, putting in two long run elevators for Meekins, Packard & Co. These elevators have a run of about eighty feet, the longest ever put in by the Washburn shops.

An elevator has been ordered by E. H. Dunbar, for the Canton Gas Light and Coal Co., of Canton, O.

A freight elevator is about to be shipped to Greeley, Cal.

A crew of men are preparing to drill for a long run elevator at C. C. Houghton's Block, Salem, Sq.

W. M. E. SOCIETY.

The second annual meeting of the Washburn Mechanical Engineering Society for the election of officers, and the reading and discussion of papers, will be held in the Salisbury Laboratories, Oct. 9th, at 8 o'clock P. M.

A paper will be read by Mr. W. Frank Cole, '83, on "Modern Methods of Controlling High Speed Elevators."

Mr. A. B. Upham, of '78, will present a paper on "Machinery in a Printing Office."

All are cordially invited to attend the meeting.

FOOT-BALL SCHEDULE.

The following is a schedule of the football games arranged for this fall:

September 30th, Amherst Aggies, at Worcester.
October 7th, Brown, at Worcester.
October 11th, Williams, at Williamstown.
October 14th, Brown, at Providence.
October 21st, M. I. T., at Worcester.
October 28th, Tufts, at Worcester.
October 30th, Amherst, at Amherst.

ALUMNI NOTES.

'88, J. B. Chittenden has received the degree of Ph.D. at Königsberg where he has been studying two years. He has been appointed an instructor at Princeton.

'89, E. W. Desper will be found at the
English High School, where he is pursuing the duties of instructor in chemistry.


'92. E. L. Smith is instructor in chemistry at the Salisbury Laboratories.

'93. Pelham Lincoln is to continue his studies in chemistry and will enter the M. I. T. this fall.

C. H. Andrews is engaged as instructor in physic and mathematics at the English High School, Worcester.

R. M. Starbuck, Jr., E. W. Vaill, and J. A. Derby have returned to the Institute to take the post-graduate course in electricity.

A. D. Butterfield, Nathan Heard, W. H. Larkin, Jr. and Chas. O. Rogers have been in the employ of the United States Government Light-house Survey the past summer. Butterfield and Heard have been at work on the Maine coast and Larkin and Rogers have been at the Boston office on Milk street.

A. D. Flinn and C. W. D. Dyer have accepted positions with Evans, Rice & Co., Civil Engineers of Boston. During the summer they have been at work on a survey for the proposed elevated road in that city.

J. W. Buzzell has a position with F. A. Shaw, Contractor, of Providence, R. I.

L. P. Strong is at work for the Deane Steam Pump Company of Holyoke.

D. H. Hodgkins was in town last week, and stopped long enough at the Tech to revisit the scenes of his former labors.

A. C. Comins will continue his studies at Harvard.

Gumpei Kuwada sailed for Japan, August 1st. It was very sad indeed to hear that his mother died in the last part of July, just a few weeks before Gumpei reached home.

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**COLLEGE NOTES.**

The students of Iowa college have subscribed $10,000 for a Y. M. C. A. building.

The first college paper was published at Dartmouth in 1800.

The plan of college government at Wesleyan, in which the undergraduates are admitted to a share, has been definitely framed by the Faculty. Four Seniors, three Juniors, two Sophomores, and one Freshman will be associated with not more than five members of the Faculty.

At Tufts college a scientific and manual training school for students of both sexes, will be established by the generous provisions of the will of the late Henry B. Pearson. An additional sum of $30,000 is also secured from the same source to be used under certain circumstances.

The college library at Dartmouth will hereafter be opened for its students on Sunday afternoons.

Professor Turner of Edinburgh receives $20,000 salary, which is the largest remuneration of any college professor in the world.

A university for women is soon to be established in Germany. It will be the first of its kind in that country.

The eighth annual session of the World's Student Conference took place at Northfield, Mass., July 1-12. The colleges of New England were well represented, Yale reporting a delegation of forty; Brown, twenty-five; Amherst, eighteen; Dartmouth, sixteen; Wesleyan, eleven; Harvard, ten, and Williams, ten. Princeton, Cornell, Colgate, and University of Pennsylvania, among institutions of learning outside of New England, sent good sized delegations.

The delegates met nearly every morning for the consideration of Christian work in the colleges, and a missionary institute was held for those interested in foreign missions. The twilight meetings on Round Top—where, it is said, four hundred men have dedicated their lives to foreign missionary work—are always interesting, and this year was no exception. Questions relating to a college man's life are considered at these meetings. The annual field day was held on the Saturday preceding the close of the conference. Princeton won first place in the events, Brown second and Dartmouth third.

Extensive work is being done on a tract of land bordering on the Charles river, a short distance from Harvard University, in Brighton. About twenty acres of land are being drained for a playground for the students of Harvard University. The entire tract comprises about 100 acres, which was presented to the university several years ago by Henry W. Longfellow and some of his friends, the Willard estate of twenty acres, which was conveyed to the university in 1890 by William Higginson, and a twelve-acre lot, purchased recently between the Charles river, Soldiers' Field, and the Longfellow tract. It is proposed to lay out a ball field with a grandstand, a foot-ball field and a quarter-mile cinder track, with seats on both sides. There will be ample space for practice fields, tennis courts and cricket grounds. A brick building is also contemplated near the street. This building is to be of fine architectural design by Peabody & Stearns, and will be known as the "Locke
Building. It will be fitted up for the accommodation of those using the grounds. It is proposed to erect, later on, on the river side of the boulevard projected by the city of Boston, a two-story wooden structure, to be fitted with lockers, bath and dressing rooms. The lower floor of the building will be for the use of the university and class crews.—Brown Herald.

**SCIENTIFIC NOTES.**

The Joseph Dixon Crucible Company is said to be the only concern in the world which manufactures any article of which graphite is a component part. With the invention of Joseph Dixon, in 1827, of the plumbago crucible, the crucible business was revolutionized, and at that date also begins the manufacture of the Dixon stove polish, foundry facings, and the development of an industry now grown to enormous proportions and fittingly represented by the Joseph Dixon Crucible Company. They have two exhibits at the Fair, one in the Manufacturing Building, of lead pencils, etc., and one in the Mines and Mining Building. The latter exhibit is of a general nature and includes a wide range of articles depending more or less upon the graphite industry. A very handsome cherry façade fronts the space, while the sides are hung with very tasteful portières, crucibles, retorts, ladles, stopper-heads and nozzles, graphite boxes, phosphorus chargers, resistance rods and devices, incandescent filament forms and other special goods made of graphite are shown in upright cabinets.

In another case is shown the development of an electrotype plate in which process the use of graphite is an essential. In still another case are shown over fifty varieties of graphite, for as many different uses and under as many different names, such as graphite for lubricating, stove polish, foundry facings for green, dry or loam castings, core work, ingot mold wash, shot and powder glazing, electrotypers, gilders' and hatters' use, rubber packing, piano and organ actions, "potleading" yachts, for crucibles, lead pencils, paint pigment, etc. There are also shown graphite from all the principal sources from which that article is obtained. One very fine sample from the Island of Ceylon weighs nearly 300 pounds.

Recently a steel casting weighing over forty-five tons was cast successfully at the Standard Steel Works, Chester, Pa. The casting is intended to be used in the stem of a new steamship, now under construction at Philadelphia. The president of the company claims that this is the largest casting ever made from steel in the United States. The contents of the two steel furnaces were used in the pouring.

When showing the violet shade the thickness of the film of a soap-bubble is about 1,240,000th of an inch.

So rapidly has the art of wire-drawing advanced, that platinum can now be drawn into strands so fine that twenty-seven of them twisted together can be inserted into the hollow of a hair.

A method of sounding the deep sea without using a line has recently been devised by Mr. John Munro. It consists in dropping a lead containing a cartridge, which explodes on striking the bottom, and the sound is received by a submerged microphone apparatus communicating with the ship. The depth is estimated by the time occupied by the lead in sinking to the bottom.

Professor Bernard, of the Lick Observatory, expects that three years will be required to complete the series of photographs he is making of the Milky Way. The work is proceeding rapidly at the observatory, and the astronomer is confident that when his labors are finished the results will revolutionize the old conceptions of the Milky Way. He expects to reveal the presence of at least 500,000,000 suns.

In olden times asbestos was spun and made into table-cloths, serviettes, etc., which were cleaned by being passed through the fire; and this material was also used by the ancients to wrap round corpses before placing them on the funeral pile, in order that the ashes might not be mixed with the wood. In the Vatican Library at Rome an asbestos shroud can be seen which contains ashes and half-burned bones, with which it was found in a sarcophagus. The ancients also made wicks for funeral lamps of the material.

The Royal Society of England has just been informed by Sir William Thompson that the axis of the earth is altering its direction, says the New York Press. Berlin was some time ago discovered to be further north than it had been previously marked on the map. Geographical investigation at Honolulu prove that the Sandwich Islands have moved just about as far south as Berlin has moved north, so the eminent geographers decided that the axis of the earth must be changing its angles to the ecliptic. If the progression is very rapid North America is likely to become somewhat tropical and the United States would lose its place in the temperate zone. The change is taking place so slowly, however, that nobody need get into any heat over it.

Mr. Francis Galton is much to the fore again now with his plea for "finger prints" as a means of identifying criminals. The Council
of the British Association, it is known, have memorialized the Home Department and certain of the Colonial Governments on the subject of what is called in France "bertainage," the registration of criminals by means of anthropometrical traits, urging an official enquiry into its efficiency and utility. According to Mr. Galton, as those who have read his two interesting books are aware, there are no external features in the human being more characteristic or more enduring than the skin ridges on the finger tips, which are capable also of classification on a neat system for purposes of reference.

A curious objection to the use of the telephone is said to exist in the mind of the Sultan. He will have none of it in any of the cities of his dominions, on the ground that his subjects are all too ready to intrigue and conspire against his happiness, and he does not propose to allow the introduction of any device whereby this conspiring may be made easier. It is stated that this prejudice is so deep rooted that those interested in telephone development have ceased to make any efforts to secure franchises in the land of the Turk.

Innumerable are the devices of utilizing steam. A new method consists in taking the exhaust steam from an engine by a main pipe, and leading the same by a branch connection to an injector or other condenser, while another branch connection leads to a separate low-pressure boiler working under a back pressure, or to a reservoir. Valves are fitted on the pipe, connecting, so that the steam supply may be shut off to the condenser or to the reservoir as desired. By this means the steam in the separate boiler or reservoir can be utilized for heating purposes, or to drive another engine at a low pressure.

Plans have been drawn up for what, when finished, will be one of the world's greatest bridges. This new structure is to cross the river Mersey at Liverpool. It will be of arched suspension type in three spans, the roadway being suspended from an arch. Each span will have a clear waterway of 1,000 ft., the centre span having a clear headway of 150 ft. above high water of ordinary spring tides. The bridge will allow for a roadway 40 ft. in width, sufficient for at least four lines of wheel traffic, and two outer footways, each 7 ft. 6 in. wide, the roadway being laid with wood and the footpaths with granolithic pavement. In addition to the provision for ordinary wheel and passenger traffic, an overhead electric tramway is to be constructed along the centre of the road.

For some time past a street railway company of St. Louis, Mo., has been making careful tests of air-brakes on six of its cars, and the test is said to have been so successful as to warrant its adoption. The brake is the same in principle as that used on steam railways, with the exception of the method of pumping the air. This is done by a pump attached to the axle of the car. As the axle revolves it operates the air-pump by means of cogs. The maximum pressure is 40 lbs. to the inch, and this can be obtained while the car is running a distance of 200 feet. The car can be stopped 10 times in the space of one block without exhausting the air.

**TECHNICALITIES.**

What's your number?

But the cat came back.

Several W. P. I. students are singing in the festival chorus.

E. A. Pratt, late of Madison University, Wis., has joined the '94 chemists.

C. H. Dwinnell has discontinued his studies for a few weeks to take a trip to the West including a short stay at Chicago and the Fair.

The Y. M. C. A. gymnasium opened for the winter's work Sept. 25.

A swimming-tank is now in course of construction and it is said that it will be one of the best in the country.

The work in mineralogy which part of the senior class lost last year will be made up this year by out-door practice. Half the division will make excursions on Wednesday afternoons, the other half on Thursdays.

The tennis courts are in good condition and are being used considerable. The general interest, however, does not seem to be as great as usual.
The tackling-bag was put up for the first time last Monday afternoon. It was suspended from a branch of the big tree in the foot-ball field. A squad of twelve or fourteen christened it that afternoon and it has been in pretty general use since then.

Mr. Rice, Mr. Viles and Mr. Coombs are coaching the foot-ball team.

It looks rather unnatural in the vicinity of the John St. engine house not to see Capt. Flinn. The Captain had been there ever since the building was put up, and he knows most of the Techs who have graduated in the last ten years.

The Seniors and all interested in the welfare of foot-ball, heartily appreciate the change made in the physics lecture so as not to interrupt the practice of the eleven.

Every loyal Tech should be at the game Saturday with two or three friends.

The American Engineer in reviewing trade catalogues, includes the following: The Worcester Drill Grinder, manufactured by the Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass. This is a small pamphlet (5½ x 8 in., 20 pp.) describing the various kinds of drill grinders which are made at the shops of the Worcester Polytechnic Institute. It is illustrated with a number of good engravings, and gives sizes, prices, and other information which a buyer will be likely to want.

The Senior mechanics have quite a job to do in the Shop. A compound condensing engine, designed especially for the purpose, is to be built entirely by them. Six of the class are at present making the patterns and as soon the castings can be obtained, the work of construction will commence. The engine will be tested and if satisfactory will probably take the place of the one now running the Shop. It is the intention of Mr. Higgins to have a steam pump and the annual lathe also made.

At a class meeting of '94, Tuesday noon, action was taken on Dr. Fuller's request of the class that they should appoint a committee to confer with him whenever the class as a whole wished the flag raised. Some discussion took place, not at all pugilistic, but relating simply to the appointments. The following gentlemen were nominated and approved by the class, in order:—Messrs. Plummer, Linnell and Allen, M. C. It was also stipulated that this committee be empowered to temporarily "enlarge themselves according as the occasion demands."

A large number of the students were fortunate enough to visit Chicago and the Exposition during the summer vacation. Most of those who went saw Tommy Stevens and talked locomotive with him.

How will the Freshmen ever get acquainted now they are in the wood-room only so few hours a week? It seems really lonesome to think that those genuine Prep days are no more.

There were some changes made in the machine shop during the past summer. Mr. Mitchell now has a throne in the centre of the room where he can sit and take in all the loafing. Of course we appreciate the change greatly.

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