FRESHMAN TEAM WINS COUNTRY RACE

F. L. Cook Finishes First in Good Time With H. S. Benson Second.

Last Saturday the Cross Country men held a double race over the Tech course in West Roxbury. This was the date scheduled for the Freshman-Sophomore race, and the Spring Run postponed from the previous Saturday, was decided at the same time. Men from all classes were allowed to participate but two separate systems of scoring were kept.

The Captains of the Spring Run were chosen by lot on the outbound train and the choices fell on J. D. Donnelly '16 for the "Reds" and D. H. Parker '17 for the "Grays." These men chose the teams that at the start were kept.

The Junior and Sophomore teams seemed to be about on a par, and the surprise in this case balanced itself up so that the results were very close with the Freshmen in the lead.

The course was very muddy and there were several places where the men went out of their way to escape the exceptionally bad spots. At the start F. L. Cook '16 took the lead and he was never headed, crossing the line in the fast time of 34:26:36. Close behind him came H. S. Benson '17, who was the first man to score in the Freshman-Sophomore race. Although he was slow to Cook for a great part of the race he was about 100 yards ahead at the finish. In the meantime the interested parties of the day in A. C. Litchfield '17, starting in the centre of the bunch of twenty-six runners Litchfield slowly worked himself up, passing into the third position at about four miles.

ADVANCE SALE FOR TECH SHOW CLOSES

More Seats Sold Than Last Year — Opera House Tickets Go to Herrick.

The advance sale of seats for "Rip Van Winkle" closed Saturday. More tickets have been actually sold than in the same time last year.

A number of tickets for which applications were sent in have not been called for, and these are to be sent to Herrick's with the rest. Any student who applies for seats and is not called to fill them at the shows office last week should go to Herrick's early today and do the best he can.

A special arrangement has been made with all those who are to handle the tickets from now on and there will be no increase in price. Seats at the Malden, Providence and Northampton performances must be purchased at the theatres where the Show is to be given.

GLEE CLUB REHEARSAL

Another Glee Club rehearsal with the coach will be held today at five o'clock at the coach's studio, Jefferson Hall, Trinity Court Chambers. The men are reminded that they can save the fifty cent fine by getting seats on time. The management insists upon attendance at this rehearsal as the practice is absolutely essential to the success of the club at the coming concerts.

As a result of the Freshman-Sophomore wrestling meet last Saturday night, the Class of 1917 has proved its superiority at mat work, and six of its men have won their class numerals. The matches on the whole were very much closer than the result would indicate, and if the Sophomores had not had a bit of bad luck, they would have had a larger score than zero. The Freshman team has nothing but praise for the manner in which the Sophomores, out of training as they were, came forward and did their best to win.

The most spectacular bout was between Blinkney '16, and Dowell '17. Dowell was outweighed nearly ten pounds, but threw himself into the...
THE TECH, BOSTON, MASS., MONDAY, APRIL 6, 1914.

THE TECH

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GROUNDS,
EDISON STATION
VISITED SATEURDAY

Electrical Party Inspects All and Boiler Rooms. Parts of Modern Engine

Nineteen members of the Electrical Engineering Society took in the trip to the street stations of the Edison Company Saturday afternoon and went through the entire plant, the boiler and engine rooms, the very points of interest in this room.

The boiler room, which is cleaner than most engine rooms, also featured the yard machines taking up the rest of the tour. Outside of this station the means of handling coal and unloading boats was one of the most interest points of the inspection.

FRESHMAN BASEBALL

Game With Hyde Park Cancelled — Team To Play Somerville.

The Freshman baseball game scheduled with Hyde Park for last Saturday was cancelled by the Hyde Park management on account of the poor condition of the field. Practice will be held today and tomorrow at the Field in preparation for the game Thursday with Somerville. There is still a scarcity of catchers and it is hoped that more will come out.

The following men have been excused from Gym since a week ago, March 25th. These men must report at 9 a.m. for practice at least three times a week or the cuts will be recorded as present:


FACULTY NOTICE

The exercises of the Institute will be suspended on Thursday, Friday, Saturday and Monday, April 17, 18, 19 and 20.

By vote of the faculty, instructors are requested to send to the Dean the names of all students who are absent from classes on Wednesday, April 15, and on Thursday, April 16.

A. L. MERRILL, Secretary

THE TECH, BOSTON, MASS., MONDAY, APRIL 6, 1914.

INVESTIGATION OF SKIN EFFECT IN CURRENTS

Interesting Research Work Being Carried Out by Electrical Department

Throughout the present school year there have been inquiries from time to time as to the purpose of the short transmission line in the passageway between the Lowell and Pierce buildings. Through the courtesy of Professor Harold Pender, Director of the Research Division of the Electrical Engineering Department, we are able to give below a brief description of the recent experiments conducted upon this experimental line.

When a direct-current of electricity flows along a conductor, the current is distributed uniformly over the surface of the conductor. When the frequency is high, the current will tend to confine itself to the outer skin of the wire. This phenomenon is designated in electrical parlance by the term “skin effect.” For a given area of conductor the effect is substantially the same for either stranded or solid copper wires, but very much larger in the case of iron wires. Although this skin effect is now recognized as an important element in several branches of the electrical field, it has not as yet been studied experimentally to any considerable extent.

The thesis of F. H. Achard and H. E. Randall, Jr., Course VI students in 1913, was an experimental investigation of this very interesting subject. In connection with this work an experimental line was erected in the passageway between the Lowell Laboratories and the Pierce building.

The line was arranged for connection to measuring instruments in the Electrical Research Laboratory. Arrangements were also made for the substitution of different wires on the support insulators.

The measurements made by Messrs. Achard and Randall over a limited range of frequencies with No. 0000 B. & H. solid and stranded wires, checked very closely with the theoretical values of skin effect for the given conditions. On the formation of the Research Division of the Electrical Engineering Department in the summer of 1913, it was decided to continue this study of skin effect as one of the investigations to be conducted under the sponsorship of the American Telephone & Telegraph Company. Mr. C. P. Eldred, Technology 1912, now Research Assistant in Electrical Engineering, was assigned to conduct this study.

The first work upon this research was the development of technique in making high frequency measurements. A suitable bridge for the measurement of resistance and inductance was designed and constructed.

(Continued on Page Four)
WRESTLING MEET (Continued from Page One)

bout with such amazing vigor that he won the sympathy of all the spectators for nearly eight minutes, however, he was outwrestled in spite of his energy. At last, with but thirty seconds left, he turned Blakney over by superhuman effort, and got a fall.

Captain Hoffman of the Freshmen also starred for his team by defeating Berger of the Sophomores. Berger is one of the few 1916 men who has kept up wrestling all year, and he in a hard man to beat. Hoffman managed to get on top of him at the beginning of the match and remained there throughout. Upon several occasions the outcome was doubtful, but Hoffman won the decision by a good margin.

In the first bout Stubbins '17 had little trouble in handling Doherty '18, and threw him in about five minutes. Crosby '17 also won in five minutes after a struggle. Both men were strong, but Doherty was out of practice, as he did not train until a few days before the meet.

Peterson '17 and Bousquet '16 had things nip and tuck for a time, the latter having a slight advantage. Peterson got aroused by the middle of the bout, however, and turned the tables upon his man. By hard work he threw the Sophomore, and added his share to the Freshmen score.

Bond '17 was matched against Moore '16, who outweighed him nearly twenty-five pounds. This did not dismay Bond, however, for by taking advantage of a lucky opportunity he was able to throw his man in thirty seconds, the shortest time of the evening.

The last bout, between Bone '17 and Levi '16 was full of interest. Levi, although out of training, showed plenty of grit and strength, which enabled him to put out of many tight places. He was finally caught in a hold from which he could not escape, and Bone got a fall.

In order to decide the novice championship of the 125-ib. class, and also the receiver of class numerals in that class, Hoffman and Crosby were matched. They started off at a rapid clip, and things were just becoming interesting when Hoffman obtained a hiplock and threw his man heavily to the mat. The shock of the fall dizzied Crosby so that he was unable to finish the bout and Hoffman was declared winner. Crosby was only temporarily stunned, and recovered in a few minutes.

Six men, all Freshmen, won their numerals. They were: 115-lb. class—Bone; 125-lb. class—Crosby; 135-lb. class—Hoffman; 145-lb. class—Peterson; 155-lb. class—Doherty; heavyweight class—Bond. Captain Kelly and Manager Smythe-Martin of this year's varsity team alternated as timekeeper and referee.

The summary:

115-lb. class—Bone '17 threw Levi with head and body hold in 4 min. 39 sec.
125-lb. class—Crosby '17 threw Levi with head and body hold in 5 min. 09 sec.
135-lb. class—Hoffman '17 won decision from Berger in 9 min. Crosby '17 threw Bousquet in 7 min. 00 sec.
158-lb. class—Dowell '17 threw Blakney in 5 min. 30 sec.
Heavyweight class—Bond '17 threw McSweeney in 30 sec.

RESEARCH WORK

(Continued from Page Three)

bridge is capable of making measurements with an accuracy of less than 1 per cent over a very wide range of frequencies. As some of the resistances to be measured are low, it is apparent that exceedingly delicate manipulation is necessary for readings of this accuracy. There have already been made two series of observations upon the change in resistance and inductance of a No. 6 & B & S. solid copper wire at frequencies ranging from 6000 down to 25. It is in the plan of the Research Division to carry through a similar series of observations upon several other experimental lines, including different sizes of stranded copper wires, different sizes of copper clad steel wires, and also upon copper conductors. The skin effect in stranded, copper-clad and rectangular conductors is not susceptible to mathematical determination, and are there any reliable experimental data upon the resistance and inductance of these conductors when carrying currents of light frequencies. The problem of skin effect in steel rails of different chemical composition is being studied by Mr. W. E. Wells, a graduate student in Course VI.

There are at least four prominent cases in electrical industries in which skin effect may be an important factor, as follows:

(1) In third rail transmission for electric railways.
(2) In power or telephone transmission by means of copper clad steel conductors.
(3) In the heavy copper conductors used for carrying alternating currents to electric furnaces.
(4) In the heavy leads used between the common battery and the switchboard in a telephone exchange.

It is thus apparent that the Research Committee has undertaken a study of considerable magnitude, the results of which will undoubtedly prove of value to engineering practice.

March 5, 1914.

The electricals at Ohio State will hold a big show on April 16, 17 and 18. Forty new electrical features are planned.

M. I. T. RIFLE CLUB

The M. I. T. Rifle Club held a practice shoot Saturday afternoon at Walnut Hill. The following members of the team and several others were present: J. E. Connell, C. T. Dunn, Parsons, M. F. Brandt, and H. H. McDonald. Rapid fire shooting at the target of a man lying prone on the ground was the feature of the shoot. The averages were comparatively high, being about twenty-three out of a possible twenty-five.

FINANCE COMMITTEE

The regular monthly meeting of the Finance Committee will be held on Thursday, April 9th, at 7:30, in Room A of the Union. Dinner is to be served in the Dining Room at 6:30. A good attendance is desired.

AT THE THEATRES

TRENTON THEATRE

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Evgs. 8, Mat. Wed. & Sat. at 2

HOLLIS ST. THEATRE

Evgs. 8, Mat. Wed. & Sat. at 2

THE POOR LITTLE RICH GIRL

PARK THEATRE

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FANNY'S FIRST PLAY

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