RESEARCHES IN PHYSICS DEPARTMENT

By PROF. H. F. GOODWIN.

A number of researches are at present in progress in the department of Physics, some of them being purely scientific in character, and others having a technical bearing.

In the Laboratory of Heat Measurements Professor Norton is carrying on a number of researches on the heat properties of various materials, which are of great technical interest and value. Among these may be mentioned the investigations of Mr. K. D. Stellwagen on the Protection of Steam Heated Surfaces, of Mr. W. W. King and Mr. Philip Hart on the Thermal Sonductivity and Fire Resistance of Cinder Concrete, and of Mr. J. T. Whitney on the Condensation of Moisture through Concrete Walls.

Mr. Stellwagen's thesis is an extension of the work carried on for a number of years in the Laboratory of Heat Measurements. The increasing use of high temperature steam having made it necessary to extend the older observations to cover higher temperature ranges, some new and original methods have been adopted which have greatly improved the precision of the measurements.

The thesis of Mr. King and Mr. Hart deals with the problem of protecting steel from fire risk, and sheds considerable light on the question as to whether the presence of unburned coal in small quantities is a fatal objection to cinder concrete from a fire proofing standpoint.

The thesis of Mr. Whitney is undertaken to determine the necessary thickness of concrete walls of varying compositions to insure dryness on the inside of the wall. As is well known one of the difficulties with many concrete houses has been the dampness of the interiors and the condensation of moisture upon the inner sides of the house walls. It is sought in this thesis to establish some relation between the thickness of such walls and the amount of condensation.

In the Laboratory of Electrochemistry Professor Goodwin and Mr. Read are investigating the electrical properties of subtances over wide ranges of temperature. Graphite and carbon are being at present studied and it is hoped to extend the work to metals both in the liquid, as well as the solid state. In addition to their practical importance, such data are much desired at the present time in connection with the modern theories of the nature of metallic conduction. Mr. Maxfield has been making a study of the performance of the new induction furnace for the production of steel, alloys, etc., which has been recently installed in the laboratory. It is roped to continue the work of this thesis next year to other uses of the induction furnace.

Professor Thompson has been engaged for some time on a series of investigations on high temperature equilibria. He has recently brought to a conclusion and published his results on the equilibrium of the system calcium carbide, ime, carbon and carbon monoxide. At present he and Mr. Lombard are studying the equilibrium of the system cyanamide, nitrogen, carbon and calcium carbide, the reaction nvolved being one of great technical importance in the problem of the fixation of atmospheric nitrogen.

Two other researches recently completed and published from this laboratory are,—The Seperation of Oil from Condenser Water by Electrolysis by Professor Goodwin and Mr. Ellis, and —The Electrolysis and Conductivity of Cuprous Chloride Solutions by Professor Thompson and Mr. Hamilton.

Professor Derr has, during the past year, continued his investigations in color photography, and has added to the Department collection a number of photographs illustrating the latest English and French prosesses.

Dr. Comstock is engaged on an important research in theoretical physics the results of which are awaited with much interest. The nature of the problem under investigation is outlined below.

In the modern theory of light a question of fundamental importance is "does the velocity of light depend upon the motion of the source, that is, if a source of light is moving rapidly toward the observer does the light reach him in a shorter time than if the source were stationary?" It is now generally believed, and, in fact, the modern theory of light in its othodox form almost requires that the motion of the source makes no difference in the velocity, but the question has never been dealt with in a proper way experimentally, and if answered affirmatively it would have a profound influence in modifying not only optical but also electromagnetic theory. There seems to be no easy terrestrial method of answering the question, but by the careful observation of the motions of double stars in their orbits, it seems possible to get definite data on the subject. A little thought will show that if the velocity of light does depend upon the motion of the source, we, on the earth, will see a revolving star relatively sooner in its approaching positions than in its receding positions for the light comes to us faster from the former than it does from the latter. The apparent motion will, therefore, be timed differently than the real motion and knowing the real motion from the law of gravitation we may hope thus to detect any deviation due to this cause.

This is now being done, but it involves the careful analysis of the results of many observations on double star orbits and consequently requires some time. A preliminary report will be published shortly.

An experimental investigation is also being carried on by Dr. Comstock and Mr. Washburn to test the electron theory of magnetism. It is hoped to show that the paramagnetic metals like iron are also diamagnetic. The difficulties of the investigation are first in getting rid of the large paramagntetic effect so that the smaller diamagnetic effect, if it exists, may show itself, and second in obtaining instruments sensitive enough to detect, or perhaps measure, the diamagnetic effect. These difficulties seem now in a fair way to be overcome and it may soon be definitely asserted that within the range of the experiments the electron theory is or is not verified.

Dr. Kalmus and Mr. Faxon are engaged upon an investigation of the effect of tension on the resistance ot certain metals, such as nickel, copper, iron and German silver. Some very interesting results have been obtained, particularly with nickel which shows an anomalous behavior under tension.

H. M. GOODWIN.

NOTICES

The dinner for Company B will take place tonight at 6.30 P. M. at the card room in the Union.

Meeting of all members Aero Club 4.15, Tuesday, Union. Election of next year's officers.

GREAT CHANCE.

Those wishing photographs which appeared in Technique communicate with K. W. Faunce. Team pictures, 50 cents; individual, 25 cents.

LECTURES BY MR. BARNABY.

Lectures will be given by Mr. Sidney W. Barnaby at 4.00 P. M. in Room 11 Engineering Building B on the 10th, 12th, 16th, 18th and 20th, to students of the Department of Naval Architecture and Marine Engineering. Students of other Departments are also cordially invited to attend.

C. H. PEABODY.

FOR SALE—Two 17-foot canoes for sale, in the best of condition. See Frazier or Fitzherbert, in The Tech office.

N. E. I. A. MEET

(Continued from page 85.)

third; W. H. Marble, Brown, fourth. Time 16 2-5s.

220-YARD LOW HURDLES.

First heat—Won by Gutterson, Vermont; Bacon, Wesleyan, second. Time 26s.

Second heat—Won by Roberts, Amherst; Edwards, Bowdoin, second. Time 26 2-5s.

Third heat—Won by Marble, Brown; Smith, Dartmouth, second. Time 26 4-5s.

First semi-final heat—Won by S. Edwards, Bowdoin; A. L. Gutterson, Vermont, second. Time 25 3-5s.

Second semi-final heat—Won by E. M. Roberts, Amherst; W. H. Marble, Brown, second. Time 26 3-5s.

Final heat—Won by S. Edwards, Bowdoin; E. M. Roberts, Amherst, second; A. L. Gutterson, Vermont, third; A. H. Marble, Brown, fourth. Time 25 3-5s.

HIGH JUMP.

Won by E. R. Palmer, Dartmouth, 5 ft. 11 in.; R. D. Ely, Williams, second, 5 ft. 10 in.; Thomas, Dartmouth; Herrick, Colby; Burlingame, Bowdoin, and McKay, Brown, tied for third at 5 ft. 7 in. McKay won the toss for third prize.

BROAD JUMP.

Won by A. L. Gutterson, Vermont, 23 ft. 1 in.; E. M. Roberts, Amherst, second, 22 ft. 5 in.; L. McFarland, Bowdoin, third, 21 ft. 2 1-2 in.; J. Marks, Dartmouth, fourth, 21 ft. 1 3-4 in.

POLE VAULT.

Won by O. 7. Holdman, Dartmouth, 11 ft. 8 1-2 in. (record); C. H. Jenks, Dartmouth, second,, 11 ft. 4 in.; A. R. Wessells, Trinity, third, 11 ft; D. N. Mles, Amherst, C. Deming, Bowdoin, and S. A. Herrick, Colby, tied for fourth at 10 ft 6 in.

SHOTPUT.

Won by C. C. Clough, W. P. I., 40 ft 11 1-2 in; G. Mason, Williams, second, 40 ft 11 in; C. W. Tobin, Dartmouth, third, 40 ft 3-4 in; J. H. Parkinson, Wesleyan, fourth, 39 ft 9 in.

HAMMER THROW.

Won by M. E. Warren, Bowdoin, 130 ft 5 in; J. L. Crosby, Bowdon, second, 127 ft 2 in; W. W. Marden, Dartmouth, third. 125 ft 1 in; G. C. Lewis, Dartmouth, fourth, 121 ft 7 1-2 in.

DISCUS THROW.

Won by J. H. Parkinson, Wesleyan, 115 ft; J. E. Douglas, Tufts, second, 114 ft 9 1-4 in; J. S. Thomas, Willams, third, 110 ft 6 in; L. E. Lovejoy, Dartmouth, fourth, 110 ft 4 in.

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