

NEW BOOKS, ETC.

FUNDAMENTAL PRINCIPLES OF CHEMISTRY. An Introduction to All Textbooks of Chemistry. By Wilhelm Ostwald. Translation by Harry W. Morse. New York: Longmans, Green & Co., 1909. 8vo.; pp. 349.

Prof. Ostwald's name is one to conjure with in almost every branch of science and in chemistry particularly. It would be difficult indeed to mention a chemist who has contributed more to the advancement of his science in our time, or one who occupies a more eminent position as a teacher. In this book Prof. Ostwald has presented with remarkable ingenuity and simplicity the actual fundamental principles of the science of chemistry, their meaning and connection, and stripped them so far as possible of irrelevant additions. The book may be regarded as an attempt to work out chemistry under the form of a rational scientific system without bringing in the properties of individual substances. Hence, it has been necessary to restate elementary principles in a new light, and to bring out many new connections in regions hitherto untouched. That is why this work will be found different in its treatment from any other work on chemistry that has ever been written. The pedagogic value of the preceding can be judged only by the instructor of chemistry. But to anyone familiar at all with chemistry, its merit must be apparent from an impartial consideration of the book.

A HAND BOOK OF PRACTICAL CALCULATION AND APPLICATION OF REINFORCED CONCRETE. Kahn System Standards. Compiled and published by the Engineering Department of the Trussed Concrete Steel Company. 12mo.; 126 pp.

The rapid growth of reinforced concrete construction makes necessary a hand book on design, similar to those in use for the ordinary classes of building material. The object of this hand book is to present to the designer tables and information in such form as to be made immediately available for use in actual designs, and at the same time to have these tables founded on scientific formulæ approved by our best engineering practice. The work as presented deals mainly with the Kahn trussed bar. The Kahn system of reinforced concrete, however, uses in its application several other types of reinforcement, including rib metal, hy-rib, cup bars, column hooping, rib lath, and rib studs.

HOW TO OBSERVE AND RECORD THE WEATHER.

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mounted very nearly horizontally. These two instruments are usually supported as they appear in Fig. 3.

The minimum is read and then "set" by raising it gently until the index slides to the surface of the alcohol (Fig. 5). The maximum must be lowered to a vertical position before it is read (Fig. 4). After this reading is taken and recorded, the thermometer is then "set" by gently swinging it up and down, until that amount of mercury is shaken back into the bulb that represents the difference in temperature between the maximum and the present, if any. When no more mercury can be returned to the bulb, the thermometer is allowed to hang vertically, and a second reading is taken. The mercury now gives the temperature at the time of reading; and this reading is recorded as "set maximum." In other words, the maximum thermometer serves in place of two thermometers. First, it records the highest temperatures during the twenty-four hours; and secondly, when it is set, it gives the temperature at 7 P. M.—the time of reading.

EXPOSURE.—The marked variation between the readings obtained from thermometers owned by private persons and Weather Bureau thermometers is due much more frequently to the difference in the manner of exposing them than to difference in quality, accuracy, or cost price. Thermometers exposed against buildings, on verandas, in windows, cannot often be trusted to give even approximately the true temperature of the atmosphere. For the air is not a stationary body, but is a continuously intertwisting, expanding, and contracting gas perpetually seeking an equilibrium, which is seldom even momentarily gained, than it is instantly lost. All gross inaccuracies attending exposure of thermometers are overcome by the shelter adopted by the Weather Bureau and provided to all observers (Fig. 9).

The outside dimensions are 42 inches long by 36 inches wide by 36 inches least height, and a second roof, 6 inches above, has two ends open. The air has free ac-

cess to the interior, for the four sides of the shelter are louvered; that is, composed of shutters. These shutters overlap, and have a pitch which enables them to shed water, and intercept also the rays of the sun, even when level at sunrise or sunset.

Shelters ought to be placed in a large open space, or upon a house top or other high building, where the circulation of the air is unimpeded. Correct temperatures are recorded only when the air flows freely round the shelter as well as through it. When the shelter cannot be situated in an open area, it may be set up on the north side of a building, with a space not less than four inches intervening.

Sunshine does not give the average temperature of the air, but the highest; and so a thermometer, hung in the sun, falsifies or greatly exaggerates. If the temperature is 87, a thermometer in the sun will run up to 100 or more. The confiding observer, suddenly aware how hot it apparently is, grows faint from the imaginary heat, runs for a fan, and rapidly raises his bodily temperature by his vigorous gesticulations trying to cool himself.

Instruments that measure the depth of the fall of rain are neither well known by sight, nor is the method by which they record the rainfall very familiar.

Fig. 7 shows the essential parts of a rain gage, which are a receiver, a measuring tube, and an overflow. The rain is caught by the receiver, the bottom of which is funnel shaped, and falls into the measuring tube. Should the amount that falls be excessive, and more than fill the measuring tube, the excess overflows into the outer cylinder. The rain gage is designed to catch the precipitation of rain, and to facilitate the reading of the amount by mechanically magnifying the quantity. The diameter of a Weather Bureau rain gage receiver at the top is 8 inches; the diameter of the measuring tube is 2.53 inches. In consequence of this difference in area, the water in the measuring tube stands ten times deeper than if spread over the area of the receiver; so that a rainfall of one inch in the receiver stands ten inches in the measuring tube. The scale by which the water is measured is graduated in hundredths of an inch; but that inch on the scale is really ten inches long (Fig. 8).

In the normal temperate climate, there are only a few rains in a year when a reading of one inch is observed. A fall of rain amounting to two inches is uncommon; a precipitation recording three or more inches is the exceptional record of a decade or two. Some rains, attended by strong wind, vivid lightning, and apparently heavy downpouring of sheet rain, give a reading as low as twenty-five to sixty or seventy hundredths of an inch; while other rains, not so accompanied by electric phenomena and aerial disturbances, occasionally give a reading of an inch or more. Only an experienced observer is competent to make a fairly close guess of the amount of precipitation; and at best his guess is subject to the errors that so commonly invalidate all suppositions.

Snowfall is caught in the large cylinder (Continued on page 419.)

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending November 23, 1909,

AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

Table listing inventions with names and dates, such as 'Adding machine, C. N. McFarland, 940,709'.

'Star' Foot and Power Lathes advertisement with image of a lathe and text: 'FOR FINE, ACCURATE WORK'.

Engine and Foot Lathes advertisement: 'MACHINE SHOP OUTFITS. TOOLS AND SUPPLIES. BEST MATERIALS. BEST WORKMANSHIP. CATALOGUE FREE'.

Incorporate Your PATENTS and BUSINESS in ARIZONA advertisement: 'Laws the most liberal. Expense the least. Hold meetings, transact business anywhere'.

THIS GRINDER advertisement with image of a grinder and text: 'Has no pumps, no valves. No piping required to supply it with water'.

DIE MODELS SPECIAL WORK TOOLS MACHINERY advertisement: 'NATIONAL STAMPING AND ELECTRIC WORKS'.

MARSTON'S Patent Hand Foot & Power Circular & Band Saws advertisement with image of a saw and text: 'Send for Catalogue'.

WORLD'S ELECTRICAL EXHIBITION JANUARY 15 TO 29 1910 advertisement: 'Arrange to visit Chicago at this time and see everything new and wonderful in the field of Electrical Science, Invention and Industry'.

A Home-Made 100-Mile Wireless Telegraph Set advertisement: 'Read SCIENTIFIC AMERICAN SUPPLEMENT 1635 for a thorough, clear description'.

Two Good Books for Steel Workers

Hardening, Tempering, Annealing and Forging of Steel advertisement: 'By JOSEPH V. WOODWORTH'.

The American Steel Worker

The American Steel Worker advertisement: 'By E. R. MARKHAM'.

MUNN & COMPANY, Inc. Publishers advertisement: 'OUR SPECIAL OFFER: The price of these books is \$2.50 each'.

Legal Notices PATENTS advertisement: 'INVENTORS are invited to communicate with Munn & Co., 361 Broadway, New York'.

Table listing various patents and their numbers, such as 'Air brake appliance, safety, T. W. Ash, 941,295'.