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 conju with in almost every branch of science and in chemistry particularly. It would be difficullt 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.

(*Continued from page 412.*)

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 access 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 sheety 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 cylin-

(*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.]

Adding machine, C. N. McFarland	940,709
Adding machine, C. Wales	940,758
Adding machines, keyboard locking mechanism for, C. N. McFarland	940,708
Adding machines, lock for numeral wheels for, N. White	940,766
Adding machines, ribbon feeding and reversing mechanism for, H. Kuntzler	940,814
Adjustable chair, R. Ramsey	940,824
Advertising device, C. H. Collins	941,012
Agricultural implements, journal for, A. C. Ditmar	941,191
Agricultural machine for rolling, mowing, and other similar operations, G. H. Colt	941,309
Air brake appliance, safety, T. W. Ash	941,295
Air brake coupling, automatic, Campbell & Ingham	941,348
Air brake systems, automatic bleeder for, E. V. Conley, 2d	940,676
Air compressor, W. R. Thompson	940,751
Air ship, H. Mesinger	940,701
Alarm mechanism, time-controlled, H. W. Howard	940,692
Ammonia, especially sulfate of ammonia, making salts of, O. P. Hurford	940,972
Amusement device, M. B. Becker	940,664
Amusement device, W. J. McLean	941,334
Animal cover, C. L. Hastings	940,967
Antislipping attachment, J. S. Gajewski	940,799
Anvil, G. E. Freeborn	940,798
Arm chair, E. P. Wanner	940,995
Auto-horse, C. E. Birky	941,301
Automatic switch, E. F. Bubb	941,227
Automobiles, radiator for, J. E. Lewis	940,976
Axles, reworking worn car, J. M. Hansen, 940,805,	940,806
Bag fastener, E. S. Erickson	941,016
Bale wiring mechanism, J. H. Sawyer	940,897
Bean separator, F. C. Britt	941,305
Bearing, roller center, J. F. O'Connor	940,819
Bearing, thrust, G. Rennerfelt	941,097
Bed pad, J. P. Duval	940,958
Belt tightener, D. R. & H. W. Blakeslee	941,226
Bench. See Piano bench.	
Binder, A. C. Hafely	941,142
Binder, loose leaf, J. S. McComb	940,706
Binder, loose leaf, M. von Hertzberg	941,198
Binders, extensible post for loose leaf, J. S. McComb	940,705
Binders, support for loose leaf, J. S. McComb	940,707
Blade holding means, H. L. Barton	940,778
Blower or pump, F. J. Miner	940,984
Boiler, D. Hanlon	940,684
Book, loose leaf, L. E. Marsh	941,084
Bookcase, L. Nelson	941,168
Boot, G. Watkins	941,116
Bottle, P. A. Thorin	940,993
Bottle, non-refillable, F. W. Herbert	940,687
Bottle, non-refillable, L. C. Foster	940,962
Bottle, non-refillable, J. Berg	941,184
Bottle stopper, W. E. Gaston	940,926
Bottles and similar vessels, machine for cleansing, Strasburger & Granges	940,948
Box, R. W. Carroll	940,922
Box, D. H. Glover	941,140
Box, A. E. Klingenberg	941,323
Box handling attachment for shelves, Jones & Nicholes	940,878
Brake shoe key, C. N. Smith	941,107
Bread cutting machine, M. J. Ferren	941,065
Bricklaying machine, M. Falcone	941,137
Briqueting machine, Elsworth & Dowell	940,959
Brush holder, antiseptic tooth, W. D. Jones	941,200
Brush ware, J. A. Burnside	941,306
Buckle, belt, A. M. Gardner	941,242
Buckle for waist belts, J. A. Dubois	941,136
Buckle, lever, C. E. Smith	940,829
Building blocks, machine for making hollow, Scott & Dilgard	940,741
Butter treating apparatus, Nulf & Jackson	940,716
By-pass, E. Burhorn	940,920
Cabbages, machine for splitting and core slicing, L. Lecheler	941,262
Cabinet, folding and sliding safe, I. J. Wing	941,052
Cabinet, towel, R. T. Parisen	940,717
Cable grip, J. F. Sallows	940,732
Cable hanger, C. L. Peirce, Jr.	941,039
Calculating implement, E. J. Brandt	941,004
Cameras, roller blind for photographic, E. Brauburger	941,126
Can body forming machine, W. W. Jones	941,076
Can heading machine, L. C. Krummel	941,346
Can opener, W. G. Kircher	940,932
Canceling machine, ticket, Fisk & Seely	940,681
Candelabrum, O. H. von Guelpen	941,213
Candle end forming machine, C. B. Manbeck	941,083
Canvas carrier, artist's wet, R. P. Tolman	941,212
Car, W. H. Son	940,202
Car brake operating mechanism, C. A. Williamson	941,219
Car door, grain, H. W. Richards	941,099
Car door hanger, Frame & Harrington	941,069
Car, dump, J. B. Rhodes	940,893
Car fender, Youngberg & Parnall	940,772
Car, railway, H. S. Hart	941,249
Car, steel box, Frame & Harrington	941,067
Car ventilator, railway, J. E. Ward	941,290
Car window ventilator, D. W. Snow	940,946
Cars, passenger controlled register for street, O. Speckenbach	941,108
Card attachment, J. E. Ralph	941,273
Carriage and wagon checking attachment, W. F. Young	940,771
Carrier, C. B. Willenborg	940,768
Carriers, automatic dumping device for elevated, T. O. Werner	940,760
Cash register, W. J. McKee	940,816
Caster, G. W. Bent	940,780
Caster, self-adjusting, T. C. Luce	941,082
Cat guard, Z. D. Underhill	940,755
Causticizing tank, E. F. Parker	941,036
Cement washtub mold, T. V. Galasse	941,139
Centrifugal extractor, W. Bartholomew	940,662
Chair, C. J. Travers	940,907
Chair, E. H. Milner	941,160
Chair fan attachment, L. Hildreth	940,688
Chairs, binding means for, A. G. Walter	940,759
Checkrein, J. S. Mirgan	940,886
Churn, F. A. Grant	941,318
Circuit breaker, automatic, Lawrence & Torchio	940,881
Clamp and rail brace, Griffin & Muth	940,864
Clasp fastener, M. Pugatsky et al	941,096
Cleaner. See Gun cleaner.	
Cleansing compound, J. A. Lester	941,155
Clock, alarm, W. E. Porter	941,042
Clothes line prop, W. Hetherington	940,875
Clothes pounder, E. W. Lynch	940,699
Clothes reel, R. W. Robinson	940,729
Clutch, Hovey & Stebbins	940,970
Clutch, F. P. Huyck	941,349
Clutch, friction, P. Evans	940,679
Coasting record device, Hedley & Doyle	940,810
Coating machines, feeding and dusting device for, M. Schenck	940,737
Cock, compression, C. S. Frishmuth	941,316
Coffee cleaning and grading machine, E. C. Smith	940,989
Coin-controlled apparatus, A. G. Kennel	940,973
Colter attachment, plow, C. Hightower	941,252
Comb attachment, F. N. Plamondon	940,890