

We have given the title at length, cumbersome as it is, because it expresses the nature of the work, and because this book has the merit of being what it pretends to be. More than that, it is the successful working out of a well-considered and philosophical plan. The purpose, in short, is to offer to students a guide to the general principles governing the morphology of the human skeleton, considered according to development and comparative anatomy. The great beauty of the book is the subordination of details to principles. It does not teach the bones as they must be taught to a student of medicine, but we wish that all medical students could have been put through this book before the beginning of their medical studies.

With the bones are very properly considered both cartilages and ligaments. It is not the disjointed skeleton that is before us, but the real framework of the body. There is first a short chapter on the histology of bone and the other connective tissues involved, and then we begin the development of the skeleton from the *chorda dorsalis*. Then we have the shapes of bones, their connections, the development of joints and the various kinds. Then we come to the description of the particular parts of the skeleton with the scientific significance dwelt upon and the details suppressed. What a relief from the compendium of anatomy which thinks well of itself because it gives the several surfaces of the orbital process of the palate bone! On the other hand, to take one example of many, how interesting to have the comparative anatomy of the malar bone!

It is not necessary to discuss the book in further detail. There are many morphological questions concerning which different opinions may be held, and an author is not necessarily wrong even if the reviewer should not agree with him on all points. That the plan of the book is good and that the aim of the author has been true is praise enough. We will add, that we wish someone would 'do it into English.'

THOMAS DWIGHT.

HARVARD MEDICAL SCHOOL.

Evolution of the Thermometer, 1592-1743. By HENRY CARRINGTON BOLTON. Easton, Pa., The Chemical Publishing Co. 1900. 98 pp.

This neatly printed and tastefully bound little monograph will be of interest to all physicists and chemists, and to the general public as well, for it deals with one of the most indispensable instruments in every laboratory, and one which, almost alone of those used by scientific men, has become an instrument of interest and use in every household.

In dispelling the fallacies and clearing away the obscurities which have enveloped the evolution of the thermometer, Dr. Bolton has again placed scientific men under an obligation, while at the same time he has afforded them an hour's entertaining reading.

The book opens by disposing of the oft-repeated claims that the inventor of the thermometer was Drebber. The first use of the name, thermometer, and the first accurate description, comes from Leurechon in 1624, but the real inventor of the instrument was Galileo, and the date between 1592 and 1597. This is proved, not from any statements of the inventor, but from letters written to him, and the proof is complete. This first thermometer consisted of a bulbed tube, inverted in colored water, in which the liquid rose and fell with the temperature of the bulb. With such an instrument Sanctorius discovered that there was a normal body temperature. In 1632 Jean Rey made a water thermometer, in which the expansion of a fluid replaced that of air, and not long after this Ferdinand II. of Tuscany, by sealing the top of the tube, gave approximately the modern form to the instrument. Mercury had been previously used to show expansion by heat, but in 1714 Fahrenheit constructed the first mercury thermometer with a reliable scale.

Many different scales have at various times been applied to the thermometer, and in most of them the graduation has been almost purely arbitrary. The origin of the Fahrenheit scale is involved in much obscurity. Réaumur was the first to use the melting point of ice for zero, while his boiling point of water, 80°, was obtained by the expansion of one thousand parts of 80 per cent. alcohol between the freezing and boiling points of water. As this was eighty parts, he used this number for his higher fixed temperature. The first to adopt 0° and

100° for the two points was Celsius, but in his instrument 0° represented the boiling point of water. Finally the change to the modern centigrade scale was made independently by Christin of Lyons and Strömer of 'Upsala, in 1743. With this date, Dr. Bolton's story of the evolution of the thermometer ends.

At the close of the book is given a table of the relative values of thirty-five different scales which have been used at various times; a chronological epitome; a list of authorities, and an index to the book.

J. L. H.

BOOKS RECEIVED.

A Treatise on Elementary Dynamics. H. A. ROBERTS. New York and London, The Macmillan Company. 1900. Pp. xi + 258. \$1.10.

An Introduction to Modern Scientific Chemistry. LASAR-COHN. Translated by M. M. PATTISON MUIR. New York, D. Van Nostrand Company. 1901. Pp. viii + 348. \$2.00.

The Foundations of Botany. JOSEPH Y. BERGEN. Boston, Ginn & Company. 1901. Pp. x + 412; v + 257.

SCIENTIFIC JOURNALS AND ARTICLES.

IN the November-December number of the *Journal of Geology* James Perrin Smith discusses the 'Principles of Paleontologic Correlation.' He lays great stress on interregional zones and concludes that correlations upon homotaxis and synchronism should not be very different. Under 'Contributions from Walker Museum' E. C. Case describes 'The Vertebrates from the Permian Bone Bed of Vermillion County, Illinois.' A forty-page article by C. R. Van Hise on 'Some Principles controlling the Deposition of Ores' discusses the concentration of ores by underground water. He urges a new and natural classification of these ore deposits based upon their genesis, believing that such a division would also be of the greatest importance in the practical problems of engineers.

THE contents of the *Journal of the Boston Society of the Medical Sciences* for December 4, 1900, are as follows: 'Demonstration of a Photomicrograph of the Bacillus of Soft Chancre,' by F. B. Mallory; 'The Etiology of the Chancroid,' by Abner Post; 'A Simple Method of cultivating Anaërobic Bacteria,' by James H.

Wright; 'Occurrence of the Typhoid Bacillus in Suppurative Processes and in the Fœtus,' by Oscar Richardson, being the annotated record of a number of cases, and 'Observations on Milk Coagulation and Digestion,' by Franklin W. White.

The Plant World for December, 1900, opens with a popular article on 'Irises,' by F. H. Knowlton, in which he notes that there are about 160 species, and W. J. Beal presents, with illustrations, 'A Few Observations on Root Hairs'; Arthur Hollick gives 'An Example of Deductive Reasoning,' this being that the bottom deposits in a small swamp on Staten Island should represent the Quaternary age, a deduction that was verified by the excavation of the swamp. Edward Hale Brush gives some notes on 'Horticulture and Landscape Gardening at the [coming] Pan-American Exposition.'

The Auk for January contains two biographical sketches, 'In Memoriam: Elliott Coues,' by D. G. Eliot, and 'In Memoriam: George Burritt Sennett,' by J. A. Allen, both accompanied by portraits. Outram Bangs gives some observations on 'Birds of San Miguel Island, Panama,' incidentally describing four new species. James H. Fleming presents 'A List of the Birds of the Districts of Parry Sound and Muskoka, Ontario,' comprising 196 species, and E. W. Nelson gives 'Descriptions of Five New Birds from Mexico.' 'The Sequence of Moults and Plumages of the Laridæ' (Gulls and Terns) is discussed by Jonathan Dwight, Jr., a subject that has received little attention, save at the hands of Brehm, in 1854. John H. Sage, the secretary, has an abstract of the 'Eighteenth Congress of the American Ornithologists' Union.' The 'Report of the Committee on the Protection of North American Birds for the Year 1900,' by Witmer Stone, shows that while much has been accomplished, a great deal remains to be done, and that decided help may be hoped for from the recent 'Lacey Bill.' William Dutcher gives the 'Results of Special Protection to Gulls and Terns obtained Through the Thayer Fund,' the expenditure of \$1,400 having resulted in the preservation of many birds.