SCIENTIFIC BOOKS

Vergleichende Anatomie des menschlichen Gebisses und der Zähne der Vertebraten. Von Dr. Paul de Terra. Jena, Fischer. 1911. Pp. v + 451. Mit 200 Textabbildungen.

Thoroughly Germanic is the stamp of this work: in its tireless massing of details, in its bibliography of three thousand titles and no less in its comparative anatomy.

The author, Dr. Paul de Terra, "vorm. Zahnartzt in Zürich," has not been content to regard the human dentition solely as the subject matter of a lucrative profession, but conceives odontology rather as a branch of morphological science. After a section devoted chiefly to the masticatory apparatus of vertebrates and to the development of the mouth cavity and its parts we find an apparently reliable account of the dentition in general, dealing with the macroscopic and microscopic form, the development and calcification of the milk and permanent dentitions, the mechanism of replacement, the reduction and degeneration of teeth, supernumerary teeth, chemical composition of the dental elements and the like.

The author is of the opinion that odontology is still very largely an empirical science with no great number of well-founded doctrines. He says it is difficult, in view of the multitude of controversial matters, to write a consistent text-book of odontology. He has, therefore, striven to state all sides of the controversial questions with great impartiality. This is perhaps the reason why matters relating to evolutionary origins are left in such great uncertainty and why the now well-discredited and thoroughly archaic hypothesis that the molars of mammals arose through the concrescence of single peg-like teeth is treated with so much respect.

The "theory of trituberculy" is very briefly expounded, but without help from Osborn's later researches, especially "The Evolution of the Mammalian Molar Teeth," 8vo, 1908, which the author does not quote even in his bibliography. It is to be hoped that some day writers of text-books on zoology and odontology will become aware that the strong and well-founded part of the theory of trituberculy is *not* the view that the tritubercular molar arose from the triconodont and protodont types through "migration of the cusps"—a view that rests upon the slenderest of analogical evidence.

Another desideratum is the final rejection of one of the early trituberculy diagrams (reproduced on page 62 of the work under consideration) which has unfortunately gained a wide currency in text-books. This diagram, which purports to show the spatial relations of the cusps of the upper and lower molars when in contact, is thoroughly misleading. because no teeth known fit together in the way there represented. In every tritubercular-tuberculosectorial dentition, as well as in derived types, the protocone of each upper molar fits squarely into the talonid and behind the trigonid of the corresponding lower molar; as the hypocone is developed it reaches into the valley of the trigonid of the next following lower molar. Primitive Marsupials, Rodents, Insectivores, Carnivores, Primates, "Ungulates" of all orders, all conform to this rule, which furnishes a complete clue to the spatial relations of all parts of the upper and lower molars when in contact. As the reviewer has elsewhere shown, this fact has an important bearing on the derivation of the tritubercular dentition. The alternating relationship of the parts of the upper and lower molars was probably established very early in the history of the Mammalia and is indeed clearly foreshadowed in some of the extinct mammal-like reptiles of South Africa (*e. g., Diademodon, Sesamodon*).

It is unfortunate that the author with all his diligence should have made so little effective use of contemporary vertebrate paleontology which might have furnished him with a well-organized method of interpreting at least in part his great compilation of undigested facts about the dentition of fishes, amphibians, reptiles, birds and mammals, a subject covering about 200 pages of the present work. If one wishes to know how many teeth

there are in the jaws and of what kind they are, in recent forms and in a good many fossil forms, he will most likely find here a careful statement of the facts, which is after all the professed purpose of the book. Certain it is, however, that such odontographical information is merely the beginning and not the end of odontology, conceived as a division of comparative anatomy.

WILLIAM K. GREGORY

Modern Industrial Chemistry. From the German of H. BLÜCHER. Translation by J. P. MILLINGTON, M.A. (Cantab.), B.Sc. (Wales), formerly Scholar of Christ's College, Cambridge. The Gresham Publishing Co., 34 and 35 Southampton St., Strand, London. 1911.

According to the publisher's note, this volume is put forward as a standard work, now for the first time issued in an English translation, designed to cover the whole range of subjects with which the chemist and manufacturer are usually concerned. It is not intended as a text-book, but to occupy a position between the text-book and the lexicon. It is arranged in strictly alphabetical order and should therefore be regarded as a dictionary of chemistry.

It is conveniently issued in a single volume of 780 pages. With the exception of the convenience of having a compendium of this sort issued in a single volume, it is difficult to see in what respect this work presents any advantages over the standard dictionaries of chemistry such as those of Thorpe and Watts. It certainly can not be called up-to-date. Many of the leading industrial processes and products are not well handled, especially from the standpoint of American industry. The treatment of the chapter on industrial alcohol, for instance, is not in accordance with the best modern information, and the same may be said of the article on sugar manufacture. Under the descriptions of asphalts, petroleums, tars, etc., many of the statements seem arbitrary and misleading from the standpoint of American technology. The translator has evidently found considerable difficulty in finding synonyms for German technical names and phrases. The properties of both asphalts and tars, as related to their residual products, now so much used for paving purposes, are inadequately treated, and unimportant patented preparations seem to be given too much prominence. Water gas tars, for which considerable uses have been found, are not mentioned in the volume.

Under pigments and oils, we find a very fair but brief description of the various dry colors, mineral and artificial, as well as pigments used in the manufacture of paints. The treatment of the manufacture of white lead is, however, very old, and does not include any mention of the new processes now in use both in America and abroad, such, for instance, as the Rowley or the Picher processes. All of the more common oils and thinners for paints are briefly described, and considerable matter concerning the manufacture of varnishes is included. The newer paint oils which have come into prominence of late years are not mentioned.

Metallurgical processes are described only briefly, and for the most part the descriptions do not adhere to the usual or best practise common in American metallurgy.

Perhaps the most useful feature in the volume is comprised in the digest of foreign and local patents, which touch upon a number of the principal subjects cited and which afford considerable data for reference purposes. The book is well printed and presents an attractive appearance. It will undoubtedly be a valuable addition to a reference library for the chemist or manufacturer, but should not be accepted as authoritative or up-to-date in all the numerous subjects which are covered.

ALLERTON S. CUSHMAN

SCIENTIFIC JOURNALS AND ARTICLES

THE April number (volume 13, number 2) of the *Transactions of the American Mathematical Society* contains the following papers:

G. A. Bliss: "A generalization of Weierstrass's preparation theorem for a power series in several variables."