

to the method of equal altitudes for the determination of latitude and time, and the application of this method to the particular forms of observation for which the instrument is suited. The problem of determining geographical longitude is treated in the fourth chapter, and forms a very pretty example of astronomical geometry.

The authors are not content with thus having given at length, yet tersely, the fullest instructions as to the principle, the construction, and the use of their admirable device; they now give complete directions as to the preparation of the observations, the preparation and use of tables in the reduction, graphical solutions, and special cases.

The second part of the book is eminently practical, in which actual operations are described, actual tables given, and values from actual observations are reproduced.

It will be seen that the manual is intended to leave no question in reference to the *astrolabe à prisme* unanswered, and the intention has been rigidly followed. For example, in any astronomical operation the question as to the ease with which accidental and instrumental errors may be isolated and eliminated is a crucial one, and to this question MM. Claude and Driencourt pay special attention. Possible, but not obvious, imperfections in the glass of the prism are, perhaps, the chief source of error; therefore they make the determination of the possible amount and action of this error a special feature.

As to the practicability of the method and apparatus, the book contains actual evidence in the observations of the difference of longitude Paris-Brest, and in those made by Lieutenant Mailles in delimitation of the Congo and the Cameroons. In both cases was the *astrolabe à prisme* employed, and in both cases were results of the highest precision secured.

The different types of instrument are well illustrated by diagrams and reproductions at the end of the book.

THE TEETH OF VERTEBRATES.

Vergleichende Anatomie des menschlichen Gebisses und der Zähne der Vertebraten. By Dr. P. de Terra. Pp. xiv+451+200 figures. (Jena: Gustav Fischer, 1911.) Price 12 marks.

TO write a comprehensive treatise on the teeth of vertebrates demands a familiarity with a very wide range of anatomical, zoological, and especially palæontological literature (the book under review contains a bibliography of about 3000 titles!), infinite patience to master and assimilate it, and industry to arrange and set forth so vast a material in orderly fashion. That this colossal task should have been accomplished with some measure of success by a dental surgeon reflects great credit upon the author of this book, Dr. Paul de Terra, of Zürich.

He describes his aim as an attempt to fill what has hitherto been a serious lacuna in German literature, namely, the lack of any book of the nature of the English classic, Tomes's "Manual of Dental Anatomy, Human and Comparative."

He has also endeavoured to supply the generally felt want of a detailed and systematic summary of

the scattered literature embodying the results of recent research in odontology—a statement of the facts, and the theories put forward to explain them, in such a manner as to suggest the phylogenetic development of teeth.

Dr. de Terra is of opinion that the time has not yet arrived for compiling an adequate treatise upon the comparative anatomy of teeth, because many of the most fundamental problems relating to the interpretation of the arrangement, structure, and evolution of teeth are still in dispute. He has aimed, therefore, at presenting an impartial statement of all the facts and the views of different authorities, without committing himself to any one explanation. A good example of his mode of dealing with such disputed problems is seen in his non-committal statement (pp. 60-69) concerning the hypotheses of trituberculy and concrescence.

This attitude may perhaps commend itself to the expert reader and be useful to the teacher, who wants a detailed statement of the evidence for and against a particular view; but we think the student has a right to expect from the author of a treatise, who presumably has a much more intimate acquaintance with the evidence than even his writings reveal, some guidance in picking his steps amidst the tangle of conflicting views.

This book is really an encyclopædia of dental anatomy: it deals in great detail with the comparative anatomy of teeth, jaws, and skull, their minute structure, their developmental history, and the discussions that have sprung from attempts to interpret the significance of their form and arrangement. It consists of an introduction, in which such general questions as nomenclature, general embryology, and zoological classification are discussed, and three sections, dealing respectively with (1) the comparative anatomy of the skull and buccal cavity in the Vertebrata; (2) the nature, composition, structure, and significance of teeth; and (3) a detailed systematic account of the teeth in all the vertebrate groups.

The colossal bibliography is well classified; but it includes a number of references to small handbooks on general anatomy, zoology, and embryology which might have been omitted with advantage. Moreover, one may search in vain in this list of literature for many of the most important memoirs on strictly dental anatomy that the last decade has produced. Osborn's important treatise on mammalian teeth is a case in point. Andrews's monograph on the evolution of the teeth in the Proboscidea, which is not mentioned, is perhaps of more importance than the whole of the fifty-six works quoted in reference to this subject.

There are also some curious groupings of mammals: the Sirenia and Cetacea are included in one order (Cetomorpha) and the Hyracoidea are included in the order Proboscidea!

No doubt it would be easy for the specialist to find fault with much of the detail in a compilation such as this. But the book will serve a very useful purpose as a work of reference; and the majority of those who will have occasion to consult it are not likely to be led astray by its inaccuracies or omissions.

G. E. S.