

twenty-five years." His official correspondence with the Admiralty commenced in October, 1868; the early proceedings were reported to the House of Commons in July, 1869, and after much public discussion a statement on the general plan was made to the House in March, 1873. The collection of an efficient body of observers was then proceeded with, Colonel (then Captain) Tupman, R.M.A., who was one of the first to offer his services, taking an active part, on the recommendation of Sir George Airy, in the arrangements for the expeditions made under the authority of the Admiralty, and it may be stated here that since his return all the observers were placed under his superintendence at the Royal Observatory, for completing their special share in the reductions. He examined every step in the observers' computations, especially all that related to the adjustments of the instruments. "Never perhaps," says Sir George, "was such an enormous mass of calculations so severely criticised, and where necessary, repeated." In the latter part of 1880, the calculations with portions of introduction for each station, were handed over to Sir George Airy, by Captain Tupman, who was about to leave the country, and the remainder of the work was performed under the immediate guidance of the Astronomer-Royal, who states that it had occupied all the hours, not engaged on routine business, on which he could usually have reckoned for other matters of science.

The volume is divided into five parts, referring to as many expeditions for the observation of the transit, with an appendix. Part I. treats of the expedition to the Sandwich Islands, and the observations at Honolulu, Kailua, and Waimea; II. the expedition to Egypt (Mokattam Hills, near Cairo and Suez); III. that to Rodriguez, and the observations at Point Venus, Point Coton, and Hermitage Islet; IV. that to Kerguelen Island, and observations at Observatory Bay, Supply Bay, and Thumb Peak; and Part V. details operations in New Zealand. The observations and reductions in the expedition to the Sandwich Islands are printed at much length, but particulars relating to the other expeditions were presented on the scale which Sir George Airy had proposed in an address to the Royal Astronomical Society in March, 1875. It is hardly necessary to say that the actual observations of the transit are given *in extenso*, with full descriptions of the determinations of longitude, whether by telegraph, runs with chronometers, or lunar observations with the transit or alt-azimuth, to which last method Sir George Airy had called early attention, as one which it might be essential to apply in certain cases. The reduction of the observations is carried to the formation of the equations of condition, from which the parallax, &c., have to be determined. Sir G. Airy says he has "endeavoured to give the equations in the shape that will admit of combination in the easiest way for the computer's further operations—(whether he may desire to use the Calculus of Probabilities for the whole, or to make any special selection of combinations)—when he shall have decided on the recorded phase of contact of limbs which he thinks best to adopt."

The Appendix contains some tabular details and an account of photographic observations of the transit. The photographs are preserved at the Royal Observatory, and

Sir G. Airy considers it possible that some astronomer may deem them worthy of rediscussion, though he does not anticipate that any great improvement can be made in measuring them.

This important volume, which extends to over 500 pages, is printed for Her Majesty's Stationery Office.

#### OUR BOOK SHELF

*Worked Examination Questions in Plane Geometrical Drawing.* By F. E. Hulme, F.L.S., F.S.A. (London: Longmans.)

THE Art Master at Marlborough College has gathered together in this book 300 problems, chiefly from papers set at the examinations for entrance to the military colleges. He gives fully worked out solutions to two-thirds of the questions, leaving the student to exercise himself unaided with the remainder. The figures embodying the solutions seem to have been very carefully prepared, and are clearly printed, and each plate is furnished with a blank fly-leaf, making reference easy.

A fair knowledge of geometry is assumed, but to certain of the questions notes are appended on special points as they arise, such as might not have been dealt with in the text-book or course that the student has worked through. These notes are very good, and not too long; the author's experience enabling him to anticipate difficulties and to give warning against pitfalls. Especially is the attention of the student drawn to constructions which, though they do not involve much head knowledge, yet require great care to ensure accuracy, and are thus severe tests of neatness and power in the use of instruments. In view of the growing importance of graphical methods of obtaining numerical results, the acquisition of this sort of hand-skill is becoming every day more desirable.

This book will be a welcome addition to the appliances of all teachers of the subject, for it will help to fill a wide gap; still the author might have made it more generally useful by a more judicious arrangement of his materials. The current text-books resemble treatises on arithmetic with very few examples: this volume furnishes an admirable collection of miscellaneous examples, but they are neither graduated nor classified; and they are too numerous for use by ordinary students *after* going through a systematic course of instruction in the subject. Teachers will know how to use the materials here provided whilst developing the subject, but their labour would be lightened, and the book made more serviceable for private students, by a classified table of contents or index to the problems. A. R. W.

*Contributions to the History of the Development of the Human Race.* By Lazarus Geiger. Translated from the second German edition by Daniel Asher, Ph.D. (Trübner and Co.)

THE firm of Trübner and Co. has done well in admitting this translation as a member of its *Philosophical Series*. The work is a thoughtful contribution by an able linguist to the science of anthropology as elucidated by the study of language. It is full of interesting facts and suggestive ideas concerning each of the following subjects, which form the headings of the six chapters of which the work consists:—The importance of language in the development of the race, the earliest history of the race as elucidated by language, the colour-sense of primitive times, the origin of writing, the discovery of fire, and the primitive home of the Indo-Europeans.

*The Brain and its Functions.* By J. Luys. International Scientific Series, vol. xxxvii. (London: Kegan Paul and Co., 1881.)

WE consider this a disappointing book, whether we regard it from a physiological or a psychological point of view.