

of the Kingdom, as for the Colonies, it is sufficient that there should be access, as heretofore, to examinations and to degrees." This dictum, a curiously inaccurate one, if we consider the recent foundation of the Victoria University, not to speak of Colonial and Indian teaching Universities, will hardly be accepted by the country Colleges which still look, and must for some time continue to look, to the University of London for degrees. They will claim representation on its governing body, if not also on its Faculties and Boards of Studies; and if its functions are restricted to the control of examinations, we do not see on what principle the claim can be refused. The refusal to admit institutions at a distance is justifiable if the first business of the University is to teach; but hardly plausible if its function is only to examine.

Nor is this all. In order to obviate "the risk of practical injustice being done to candidates for degrees from country Colleges or from no Colleges at all," the Commissioners propose to establish what they call a "balance in the government of the University and in determining the course of the examinations and the choice of examiners," between the associated institutions and "independent elements." This they attempt by assigning a majority in the governing body to Crown nominees and the representatives of Convocation. This provision will in no way help to keep the University in touch with the teaching of the country Colleges; but it will undoubtedly entail the risk, which has been overlooked by the Commissioners, of producing a want of flexibility in the administration of the examinations, considered as accessories to study in the London Colleges. The University will thus start on its teaching career with a clog about its movements. Differences of opinion are sure to arise among its administrators, as often as an alteration of its programme is proposed in the interests of the London teaching; and these will be differences which no wisdom or moderation will entirely obviate, because they will be due to a fundamental difference in the point of view. We strongly apprehend that an institution so framed will be found to contain within itself the seeds of failure. In any case it will hardly obtain that large measure of confidence from the Colleges which would lead them to intrust it with any power over their teaching.

The initial fallacy of the whole Report may be traced to a little word in the twelfth page of it, paragraph 15. The Commissioners say: "Whatever difficulties there may be in the way of establishment of such form of connection as may be desirable between a teaching University for London and the different bodies and agencies now engaged in kindred work on an independent footing, we think it probable that these difficulties may be more easily overcome if *the ground* were occupied by one University only, and not by two." The ground proposed to be covered is not one field of work, but two. There is the work of affording by means of a general examination a test of attainment for students in institutions of as yet imperfect efficiency, and for private students. There is also the work of organizing the teaching, with its examinations closely following and dependent on the teaching, in the efficient Colleges of London. The two differ essentially, not merely in area, but in purpose. The attempt to devise an instrument competent to regulate both at once has failed, as it was bound to fail.

Whatever line is now taken by the University of London, we trust that the promoters of the movement, who have succeeded hitherto so far beyond expectation, will stand fast by their principles, and not forfeit, by a too great eagerness for immediate results, the success which is certain ultimately to crown their efforts.

#### TASMANIAN GEOLOGY.

*Systematic Account of the Geology of Tasmania.* By Robert M. Johnston, F.L.S. Pp. 408, with Geological Map and Sections, and 57 Plates of Fossils. (Hobart: Published by the authority of the Government, 1888.)

N EARLY forty-five years have elapsed since Count Strzelecki and Prof. J. Beete Jukes, working independently, made known to geologists the main features of the important island of Van Diemen's Land. In the interval between the publication of their researches and the present day, numerous papers treating on questions of local geology have been published by Mr. Charles Gould—who for a time was engaged in making a geological survey of the colony—and by many amateur geological investigators. No complete description of the geology of the whole colony has as yet appeared, however; and we therefore heartily welcome the large and comprehensive volume now lying before us, as supplying a long-felt and pressing want.

The author of this work, Mr. Robert M. Johnston is the Government Statistician and Registrar-General of Tasmania; and during the last sixteen years he has devoted much time and labour to the study of the geology and natural history of the colony in which he resides, and has published numerous papers dealing with questions of stratigraphical geology and palæontology, as well as of botany and zoology. In the year 1884, Mr. Johnston was requested by the Tasmanian Government to write a general treatise on the geology of the island; and the present work has been prepared during the leisure hours of a busy Government official.

The Island of Tasmania has an area of a little more than 26,000 square miles, or between four and five times that of Yorkshire. Over large parts of the island there is a covering of almost impenetrable scrub; while the rivers are large enough to make traverses of the country by no means an easy task; and the rainfall is heavy. The interesting details of the methods of exploration, given in the introductory chapter of this work, illustrate the nature of the difficulties which have had to be overcome in making the researches upon which the work is based. We cannot but admire the energy and zeal which have been exhibited in carrying out the numerous and valuable observations that have made the present work possible.

The excellent sketch-map of the geology of Tasmania, drawn on a scale of 15 miles to the inch, gives a very good idea of the general distribution of the several rock-masses. The oldest formations appear on the west and on the north-east of the island, and consist of crystalline schists, apparently belonging to the Archæan periods, associated with clayslates, quartzites, sandstones, and limestones of Cambrian, Ordovician, and Silurian age, with some small and doubtful representatives of the Devonian. The palæontological evidence concerning the

age of the different Lower Palæozoic rocks appears to be of a fairly satisfactory character.

Lying in the district between the two areas of older rocks, we have, in the central parts of the island, a tract of great extent, which is occupied by the important coal-bearing strata. These strata have, however, been greatly invaded by igneous extrusions, and are, over a considerable area, covered up by Tertiary deposits. While the lower series of these coal-bearing strata contain the remains of plants, like those of the Carboniferous strata of Europe and the United States, the higher Coal-measures yield many plants having Mesozoic affinities.

Mr. Johnston, like all who have had to deal with the geology of countries in the East and in the southern hemisphere, has been compelled to confront a very serious difficulty—that of making his nomenclature and classification fit in with the scheme that has been adopted in the countries which happen to have been the first systematically studied by geologists. His biological training and knowledge have here, however, stood him in good stead; and there are few contributions to this difficult question more worthy of attentive consideration than the chapter of this work which deals with nomenclature and classification, and the suggestions offered by the author on the subject of the “distribution of genera in time, from independent or widely-separated geographical centres.”

Mr. Johnston divides his Tertiary strata into the two groups called by him Palæogene (including perhaps the Eocene, Oligocene, and Miocene of European geologists) and Neogene (corresponding with our Pliocene). It is perhaps unfortunate that in the latter case a name is employed which has also been used by the geologists of Eastern Europe with a somewhat different signification.

Coming down to post-Tertiary times, the author gives an excellent account of the caverns and native shell-mounds, containing the rude flint-implements of the aboriginal inhabitants. Portraits are given of the last surviving man and woman of the Tasmanian race (King Billy and Truganini), the former of whom died in 1869 and the latter as recently as 1876. Drawings of the rude instruments made of chert which were used by this interesting race of human beings, and details concerning the mode in which the natives employed the different kinds of weapons, will prove of great service to those engaged in studying the remains left by various ancient races in Europe and America.

Full justice is done to the different kinds of igneous rocks, so far as they have yet been studied; to the various economical products; and especially to the useful ores, of the island. Interesting details are given concerning the mode of occurrence of the “Tasmanite,” or “white-coal,” which attracted so much attention a few years ago, and first led to the investigation of many similar “spore-coals” in Europe and America. The character of the deposits from which stream-tin and gold have been obtained is also described, and their importance is indicated by accurate statistics: the value of the tin obtained in Tasmania is now shown to be between £300,000 and 400,000 per annum. Nor are more purely scientific and theoretical questions neglected. An interesting discussion of the probable distribution of land and water in the Australasian region before and during the

Tertiary period is illustrated by sketch-maps; and here, too, the author's biological knowledge has aided him greatly in dealing with a very complex and difficult problem.

But quite independently of the scientific value of the work, which as we have seen is certainly very great, we think the Government and people of Tasmania are to be congratulated upon the character of this remarkable and handsome volume. It aims at being above all things of practical use, and its great object is to direct the attention of the colonists to questions of pressing interest and importance, as well as to secure their aid and co-operation in solving the important problems presented by the geology of the country.

The bibliography of Tasmanian geology has, with the assistance of Mr. Robert Etheridge, Jun., been very amply dealt with. Chapters containing a key to the determination of rocks, and instructions for the blowpipe examination of minerals, together with an excellent glossary of geological terms, which might seem out of place in a memoir on European geology, will make this work of service to many colonists who have not had the advantage of a scientific training or access to libraries. The numerous plates, too, if not so highly finished in some instances as we are accustomed to in works of the kind, serve their purpose admirably; and the plan of giving side by side with the imperfect fossils found in the colony a number of well-marked types from the other Australian colonies, and even from Europe, can scarcely fail to prove of the greatest service to many a traveller or resident in the country, whose only work of reference may be this volume.

In the execution of his task, which has evidently been a labour of love, the author has received much assistance from the geologists in other Australian colonies and in New Zealand, and this he warmly acknowledges. No less valuable has been the co-operation of many of his fellow-colonists, who have aided him by drawing plates, in making special inquiries, and in many other ways.

When invited to undertake the work, the author was requested to prepare a volume which should be “specially suited for the guidance of local students, mining prospectors, and others.” We can heartily congratulate Mr. Johnston, and the Government which have so liberally paid for the publishing of the book, upon having not only completely accomplished their primary object, but of having at the same time issued a work which is of the highest scientific value. It is not often that the wants of the general public and of the scientific specialist have been so admirably met; or that a book has been produced, which is at the same time accurate and thorough in its treatment of technical questions, while it is not wanting in the more elementary details required by those who have not had the advantages of a scientific training.

JOHN W. JUDD.

#### CACTUS CULTURE FOR AMATEURS.

*Cactus Culture for Amateurs.* By W. Watson. Profusely Illustrated. (London: L. Upcott Gill, 1889.)

QUAINTNESS of form, extraordinary brilliancy of colour in the flowers, facility of cultivation, all supply reasons why these plants, independently of the