

The South Atlantic Islands.

British Museum (Natural History). Report on the Geological Collections made during the Voyage of the Quest on the Shackleton-Rowett Expedition to the South Atlantic and Weddell Sea in 1921-1922. Pp. ix + 161 + 3 plates. (London: British Museum (Natural History), 1930.) 12s. 6d.

THE voyage of the *Quest* in 1921-22, in spite of the change of plans after the tragic death of Sir Ernest Shackleton, has thrown important light on the geology of the South Atlantic islands owing to the energy of the geologist, Mr. G. Vibert Douglas, and the use that has been made of his collections by Mr. Campbell Smith. The specimens were presented by Mr. Rowett to the Mineral Department of the British Museum (Natural History), and an authoritative account of them, with several new analyses, has been prepared by Mr. Campbell Smith and other experts.

The volume includes twelve reports, including descriptions by Mr. Vibert Douglas of South Georgia and Tristan da Cunha and an account, in conjunction with Mr. Campbell Smith, of the rocks of Zavodovskii Island and of rock fragments, sedimentary, metamorphic, and plutonic, dredged from the Weddell Sea. Mr. Campbell Smith, the editor of the volume, describes the petrography of Tristan da Cunha, Gough Island, St. Helena, and Ascension; Dr. G. W. Tyrrell, the geology and petrography of South Georgia; Mr. G. H. Part, the rocks of St. Vincent; Dr. H. S. Washington, those of the St. Paul's Rocks; Dr. C. E. Tilley, the basalts of Elephant Island, South Shetlands; Miss A. Vibert Douglas, the deep-sea deposits, and Prof. Gordon, fossil wood from South Georgia.

The contributions which throw most light on the history of the South Atlantic are those on South Georgia, regarding which there are two theories. Suess interpreted the island as a fragment of an arc that once connected the main Andean chain with its extension in Grahamland. This view is supported by the claims that South Georgia consists of a series of overfolded and faulted Mesozoic rocks and that its igneous rocks are represented in the Andes of the Argentine. According to the alternative view, which is based mainly on the observations and collections of Mr. D. Ferguson, South Georgia is a remnant of an old South Atlantic land and the connexion of the Andes and Grahamland passed to the west of it. This view rests on the conclusions that South Georgia consists of three series of rocks, of which one is Lower Palæozoic, the second Mesozoic, and the third includes igneous rocks of the

Atlantic type, which are also found in the pre-Andean foundation of Argentina, while the typical Andean igneous rocks are unknown in South Georgia.

The new evidence is consistent with the latter theory. The only new fossil found is a piece of fossil wood; it is referred to that indefinite genus *Dadoxylon* (*Araucarioxylon*), by Prof. Gordon, who regards its age as more likely to be Mesozoic than Palæozoic. This identification is consistent with the age assigned to the Upper and Middle parts of the Cumberland Bay Series. The claim that the whole of the sedimentary rocks belong to one Mesozoic series is not supported either by Mr. Douglas, who argues in favour of the separation of the two sedimentary series by an unconformity, or by Dr. Tyrrell, who points out the difference in composition between the older and newer sediments. The main change that seems not unlikely in Ferguson's classification is that the beds which yielded his older fossils may be more closely associated with the underlying Cape George Harbour series than with the Cumberland Bay series as now restricted by Dr. Tyrrell.

The structure and relations of South Georgia can only be settled by the collection of more fossils, which will establish horizons which are at present provisional. Fortunately, further fossils have been discovered by Dr. Høltedahl and are being investigated by Prof. Wilckens. It is to be hoped that these fossils will solve the South Georgia problem.

The contribution to the petrography of the St. Paul's Rocks, by Dr. H. S. Washington, has also an important bearing upon the history of the South Atlantic. He shows that the rock is a wehrlite-dunite, which has undergone change by pressure, and includes such characteristic metamorphic mineral species as jadeite and actinolite. Dr. Washington nevertheless hesitated before accepting the rock as non-volcanic because of its geographic position, and he considers the possibility of its being a submarine lava. He concludes, however (p. 134), that "the rock is almost undoubtedly metamorphosed or shows signs of pressure"; also (p. 136) that jadeite "is generally regarded as being characteristically, if not exclusively, of metamorphic origin". He concludes, "if it were not known whence the specimens came, the microtexture, with the mineral and chemical composition, would lead unhesitatingly to the belief that the rock is a somewhat metamorphosed peridotite, and probably of plutonic origin"; and he considers that the St. Paul's Rocks are part of the Atlantic floor that has been upraised to the surface, and that the wehrlite block found by Daly at Ascension indicates that that island also stands on a continental basis.

J. W. G.