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THE PERMANENCE OF OCEANS AND CONTINENTS.

IN Dr. Wallace's paper on "The Permanence of the Great Ocean Basins," published in the August number of *NATURAL SCIENCE*, p. 418, he mentioned as a reason for bringing forward new arguments in favour of the theory of permanence the circumstance that that theory had been attacked by Mr. Jukes-Browne in "The Building of the British Isles," and by myself in an address to the Geological Society, in 1890. Mr. Jukes-Browne has very justly shown, in his paper on "The Evolution of Oceans and Continents," printed in the September number of this journal, that Dr. Wallace's arguments are directed against views not supported by either of us and now held by but very few, if by any, well-informed geologists. How far such extreme views were advocated in my address, and in what respects that address should be regarded as an attack on the permanence theory, will, I think, be shown by the following extract, taken from the concluding remarks (*Proc. Geol. Soc.*, 1890, p. 107):—

"It will thus be seen that while the general permanence of ocean-basins and continental areas cannot be said to be established on anything like firm proof, the general evidence in favour of this view is very strong. But there is no evidence whatever in favour of the extreme view accepted by some physicists and geologists that every ocean-bed now more than 1,000 fathoms deep has always been ocean, and that no part of the continental area has ever been beneath the deep sea."

I think anyone who reads my address will see that this passage is a fair summary, and that my principal arguments applied, not to the theory of general permanence, but to the view then held by Dr. Wallace and some other naturalists and geologists, that the continental area is limited by the 1,000-fathom line. This view is now admitted to be untenable by Dr. Wallace, and as he concurs in the possibility of ancient land-connections between the three southern continents and the Antarctic land, he concedes every case that I dwelt upon except one, the existence, in Mesozoic times, of land uniting Madagascar and India, to which he does not refer. Under these circumstances, I think anyone reading Dr. Wallace's paper might suppose that the differences between us are much greater than is really the case.

The three arguments now brought forward by Dr. Wallace, are, as he says, "altogether inconsistent with any general interchange of oceanic and continental

areas"; but the first does not apply to partial and local changes; the second, as Mr. Jukes-Browne has shown, is open to considerable question; and the third, which appears to me of more weight, is an old argument restated, for it depends entirely upon the absence of deep-sea formations in continental rocks. This I have always regarded as the strongest and most important piece of evidence in favour of the permanence of continental areas. I dealt with the subject at some length in the address already quoted, and I can only add that the caution I then recommended in accepting the evidence as complete, and in supposing that no deep-sea deposits exist in continental areas where none have hitherto been detected, has been justified by several additional discoveries of such deposits in various parts of the world.

Professor James Geikie, in the very interesting address recently delivered to the Geographical Section of the British Association at Edinburgh, expressed himself thus:—"The continental plateau and the oceanic hollows have never changed places, although from time to time portions of the latter have been ridged up and added to the margins of the former, while ever and anon marginal portions of the plateau have sunk down to very considerable depths." This appears to me fairly to represent our present knowledge of the subject, and to be in no respect opposed to the views I expressed in 1890.

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