

that it is hopeless to look in this direction for any workable results. And this being so, it is necessary to attack this problem, as many other problems have had to be attacked, in a more roundabout way. Mr. Fisher finds, if I am not mistaken, the statical conditions of equilibrium in such solids when the forces exerted on them have increased to such an extent that they are on the point of exhibiting their plastic character. In doing so, however, he only considers the forces acting on the solid vertically and in one horizontal direction. It might perhaps lead to a useful result if he extended his method to the consideration of the problem in three dimensions, as it seems probable that another tension Q , corresponding to his tension P , but in a direction perpendicular to that of P , must arise during contraction. His present results agree in many respects with what we find in nature. Thus he leads us to expect that no direct faults caused by contraction will have less inclination to the horizon¹ than 45° . I do not know of any of less inclination than this, but if any such exist, the fact may most probably be accounted for on the supposition that the whole strata, fault and all, have been subsequently turned through an angle of dip sufficient to change the hade to its present value. He also leads us to expect that series of crossed faults will consist of two more or less parallel systems. A careful examination of series of faults with such a guide to our enquiries as Mr. Fisher's papers will afford, will be of infinitely more value to geology than any amount of random onslaught by careless critics.

A. F. GRIFFITH, M.A.

SANDRIDGE, ST. ALBANS, *August 12th, 1884.*

THE PERMANENCE OF OCEAN BASINS.

SIR,—Mr. Mellard Reade has drawn attention to the discovery that South Georgia is not a volcanic island, but is composed of clay-slate:² and argues from this fact against the theory of the Permanence of Oceanic and Continental Areas. He very fairly remarks that, if islands like New Zealand are largely composed of sedimentary rocks, they are said not to be oceanic, and that in arguing from the position that all truly oceanic islands are volcanic, *the advocates of the theory arbitrarily exclude the non-volcanic from the category of oceanic islands.*

There is, however, something to be said on the other side. The non-volcanic islands mentioned by Darwin in his "Coral Islands" are New Caledonia, and the Comoro and Seychelles. New Caledonia seems to be a link in the chain which connects New Zealand with New Guinea, and lies in the course of the great volcanic band which stretches through Java to New Zealand. The Comoro islands are too near Africa to be called oceanic; and the Seychelles appear to be on the axis of Madagascar, and may well be connected with it.

¹ There seems to be much uncertainty among geologists as to the use of the word "hade." Among miners it appears to be measured always from the vertical, and it would perhaps be well for us to assimilate our use of the word to theirs, as we borrowed the term from them.

² GEOL. MAG. May, 1884.

If these islands be permitted for the above reasons to be called non-oceanic, then, by a slight stretch, the same courtesy may be extended to S. Georgia (96 miles long and 10 broad),¹ for the chain of the Andes, where it enters Tierra del Fuego, takes a turn to the eastward, and the eastern cape points direct to S. Georgia. The rocks of Tierra del Fuego consist of clay-slate,² and so also do those of the Falkland Islands, which lie between it and S. Georgia. This similarity of composition points to a former connection.

Without committing oneself to an opinion upon the profitableness or otherwise of reconstructing the geography of past periods of the world's history, one cannot help seeing that this great question of the permanence of ocean basins is one of fundamental importance. At one time I was quite disposed to reject the theory, as does Mr. Mellard Reade. But the course of study which I went through in writing my *Physics of the Earth's Crust* led me to change my opinions, on grounds rather physical than geological. If there is any weight in the arguments I have there put forward, they give a support to the theory from a fresh point of view.

Extensive changes of level seem to me to be the most difficult to account for of all the phenomena of geology. And the greater the changes, the greater the difficulty. The permanence of the respective areas seems therefore to involve less difficulty than their interchange. I published in "Nature,"³ about two years ago, a suggestion to account for the origination of ocean basins. It is rather remarkable that the first and only allusion to it which I have seen has just now come from New Zealand in Dr. Haast's address at Canterbury College.⁴ Accepting Professor Darwin's theory that the moon broke away from the earth more than fifty million years ago, I think the ocean-basins may be the scar that was formed, and that the basement rocks of continents are fragments of the crust which had already solidified, and which were left behind. It has since occurred to me that the Archæan rocks may be veritable remnants of it. I would refer to my published article for the details of the grounds on which I think this theory plausible. Dr. Haast uses rather too strong an expression in saying, that I have attempted to prove it. It is probably incapable of proof, even if true.

O. FISHER.

THE INTERNATIONAL GEOLOGICAL CONGRESS POSTPONED.

SIR,—Will you allow me to announce in your columns that the International Geological Congress which was to have been held in Berlin next month is *postponed to September, 1885*, in consequence of the outbreak of cholera in the South of Europe.

WOODWARDIAN MUSEUM,
CAMBRIDGE, *Aug. 12th, 1884.*

THOS. MCKENNY HUGHES.

¹ Darwin's *Naturalist's Voyage*, p. 248.

² Scrope's *Volcanos*, 1862, p. 434.

³ "Nature," Jan. 12, 1882.

⁴ "Nature," Apr. 24, 1884, p. 609.