The origin of oceans and continents : lecture / by Dr Mackie.

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THE ORIGIN OF OCEANS AND CONTINENTS.

Lecture by Dr Mackie.

The following is a summary of a paper read by Dr Mackie before the British Association and delivered last week in the form of a lecture to the members of the Elgin Institute:—

Before proceeding to unfold his own theory, Dr Mackie gave a rapid but comprehensive review of the various theories advanced on the above subject by Sir Wm. Herschel, Sir James Hall, Rev. O. Fisher, G. H. Darwin, J. W. Gregory, Lord Avebury, C. Lapworth, Lord Kelvin, and the veteran Suess. Having indicated wherein these theories failed to establish their claim to be the solution of the matter, the doctor proceeded to unfold his own theory, not for a moment asserting dogmatically that his hypothesis was the true solution of the origin of continents and ocean basins, but at the same time venturing to claim for it that, if accepted, it presented a colourable and rational solution of the difficulties which present themselves in endeavouring to account for the origin and outline of the great features of the globe.

His own theory, he said, might be briefly described as depending on the more or less symmetrical breaking up of a primitive earth crust by reason of tidal action in an underlying originally liquid stratum. It was, therefore, a very special phase in the process of tidal evolution.

Without vainly attempting to give anything like a full account of the lecture, it may be of interest to state briefly one or two of the more salient points. The lecturer started with the natural supposition that the earth had arrived at a stage at which it might be represented as consisting of a more or less solid nucleus—a slowly thickening acid crust with a liquid and more or less basic interstratum. At first the crust would be sufficiently flexible to accommodate itself to the tidal movements of the subjacent liquid stratum; but when it became too rigid to admit of this tidal movement, it would be broken up. The first great breach was in all probability effected at some conjunction of the sun and moon with cataclysmal suddenness, and is the prototype of the Pacific Ocean. Other fractures would of course follow in directions running north-east and south-east from the equator, giving rise to the other oceans and separating the remaining crust into three great blocks—an hour-glass shaped fragment corresponding to America and two other chevron-shaped fragments representing the Old World. The fragments caused by these great fractures in the remaining crust were separated, and floated away westward by tidal action, and finally moored at their respective distances by the resolidification of the new crust. With the resolidification of the crust a series of stresses is set up between the ocean basins, which consist of the more basic, consequently specifically heavier, more quickly conducting material and the specifically lighter, more slowly conducting, continental masses. Further cooling leads to the sinking down of the former on the cooling and shrinking nucleus and their elbowing aside of the continental masses, which come to be elevated in lines parallel to and extending along their margins. With further cooling the superficial layers of the continents are thrown into folds and overfolds, which would tend to find relief along the ocean margins by thrusts directed from the continents towards the oceans. Central uplifts in the continental areas also may have resulted from such pressure. The learned lecturer then proceeded to explain separately the origin of the Mediterranean basin and the cause of the unequal distribution of land and sea in the northern and southern hemispheres, the latter being explained on the theory of what would practically be an early glacial period at the North Pole, in which the solid product was rock-crust and not ice, as in the last glacial period, the South Pole being then left with little formation of crust. The Mediterranean basin was explained as the trough of a big earth-wave caused by the pressure from the ocean basins directed at right angles to the margins of the continental masses.

The origin of mountain axes—the bridging of the ocean basins—and the distribution of earthquake zones, &c., were brought into relation with the theory, and their general arrangements described.

Explaining as it does the general outlines of continents and ocean basins, as well as a large number of facts both in geology and geography, Dr Mackie contended that his theory, as sketched, probably represents in a general way the actual process by which the permanent features of the globe took origin.