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The Circulation of the Earth's Crust

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existing Ordnance Survey is quite good enough for any one, and an aeronautical map would be an unjustifiable luxury. Let us start on localities of which the maps are poor and which offer prospects of regular aerial traffic in the future. Calcutta to Rangoon and Singapore; Aden to Mombasa; Khartoum to Nairobi; and similar links, spring to the mind as the most useful field for our first efforts.

W. S. BRANCKER,

Major-General R.A.F. (Retired).

2, Dorset Street, London, W.1,
9 May 1921.

The Circulation of the Earth's Crust.

May I be allowed a word of comment on the subject of Colonel Tandy's paper in the May number, at the reading of which I could not be present?

The paper dealt mainly in generalizations, and I would suggest that the validity of the theory might be tested by looking at the actual facts of erosion and deposition in an area easy of study like the English Lake District. I select this as an area of marked relief within small compass, and one with which I am more intimately acquainted than perhaps any other of like extent. As assistant to Dr. Mill in his survey of the under-water contours of the lakes in 1893-94, my attention was naturally called to the problem of the origin of the heights and hollows, and in the discussion after Dr. Mill's paper I ventured to draw some conclusions—arrived at independently, but in accord, I believe, with those of other observers.* In trying to account for the fact that the deepest hollows seemed generally associated with the greatest heights, it occurred to me for a moment that the matter from beneath the hollows had, as I then expressed it, "gone to make the mountains" (by a somewhat similar process to that supposed by Colonel Tandy). But an examination of the facts showed that the idea did not square at all with these. The deepest hollows seemed everywhere to be portions less subject to deposition, while the shallower parts were everywhere associated with areas of degradation, the products of which had been transported into the original basins. The steepness with which the deltas of the main feeders fall to the depths has struck all observers, large masses of shingle and even blocks of some size being pushed out by the current and resting at the edge at an angle even steeper than that at which such *débris* rest above water, *e.g.* on the spoil-heaps of quarries. The forward advance of such deltas is very noticeable, even within a limited period, and in some cases (*e.g.* in Haweswater) bids fair to divide the lake into two basins, a stage which has been reached in the case of Buttermere and Crummock, Derwentwater and Bassenthwaite, respectively. Surely all this is directly opposed to Colonel Tandy's theory. Why, *e.g.*, should such deltas persist at all, instead of being engulfed in the subjacent rocks?

Dr. Evans has already criticized the main idea of the paper on the ground that it would furnish a case of perpetual motion. However this may be, it would seem at least to introduce a new principle—multiplication, in place of conservation, of energy. Is there not some similarity between the ideas put forward and those of a would-be inventor who should propose to use the heat generated by a continuous brake to accelerate the motion of the train? He too might meet objections by saying that he was not pretending to create new force, but merely to draw upon that supplied by the combustion of the coal.

* See *Journal*, vol. 6, p. 165. Mr. J. Y. Buchanan afterwards told me that he had arrived at similar conclusions in regard to the Scottish Lochs.

The question also suggests itself whether, if the principle of circulation is of such minute and general application as Colonel Tandy supposes, we should not be able to detect its effects almost everywhere in the distortion of strata where, as in mines, their present position can be actually traced underground. Should we, for example, find a seam of coal preserving a regular course for any distance anywhere?

EDWARD HEAWOOD.

MEETINGS: ROYAL GEOGRAPHICAL SOCIETY: SESSION 1920-1921

Thirteenth Evening Meeting, 2 May 1921.—The President in the Chair.

ELECTIONS.—Herbert Arthur Baker; Miss Hilda Ann Hippisley Barnes; Reginald Bezzant; Albert Francis Barclay Bridges; John S. Burns; George Edward Nicholas Cheke; Lieut.-Col. Gerald Dalby, D.S.O.; Lawrence Thorne-waite Grace, M.C., A.M.I.C.E.; Major W. G. G. Grant, M.C.; Captain George M. Harding; Commr. Richard Harrison, D.S.O., R.D., R.N.R.; Horace A. Hawkins; John Richard Hobhouse; Arthur L. Humphreys; Reginald John Kiker, D.D., LL.D.; Arthur T. Loyd; Henry Walter Maclean, C.M.G.; Al-Haj Massequoi; Captain Frederick Samuel Mateer, R.F.A.; Claude E. Matthews; Henry Leslie Morgan; The Rev. Thomas Paxton; Sir Charles Ross; T. H. Seaver; Thomas Shenton Whitelegge Thomas, O.B.E.; Joseph Edward Thornton; Henry Buswell Wetherell, M.A.

PAPER: Travels in Turkestan, 1918-1920. Captain L. V. S. Blacker.

Fourteenth Evening Meeting, 23 May 1921.—The President in the Chair.

ELECTIONS.—E. W. Barron; William Bensley Cotton; George Ashmore Fitch, B.Sc.; Leopold A. Flint; Ralph A. Graves; Ahmed Hassanein Bey; George W. Johnson; Lieut. J. O. Lawson; Captain Robert Logan; Monsieur Hubert de Monbrison; Captain Donald C. Mudie, R.F.A.; Lieut.-Col. Cecil Rae; Dr. Alfred L. Sachs, M.A.; Lieut. A. R. W. Sayle, R.N.R.; Harold Schofield; Laurence Dudley Stamp; Mrs. Margaret Sully; Miss Mary Kathleen Langdon Thomas; Nicholas Tombazi; Miss Dorothy Wilford; Hubert Worsley Woolley, M.C., B.A.; Frederick R. Wulsin.

PAPER: Across the Libyan Desert to Kufara. Mrs. Rosita Forbes.

Seventh Afternoon Meeting, 9 May 1921.—The President in the Chair.

PAPER: On the Origin of Mountain Ranges. Col. Sir Sidney Burrard.