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Author(s): C. R. Markham and R. J. Mann

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3. Dr. R. J. MANN'S *Observations on Sand Bars at the Mouths of South African Rivers ; with Remarks on the Formation of Dams.* By C. R. MARKHAM, Esq., C.B., Secretary R.G.S.

AN experiment of a very interesting character is now being tried in the Neilgherry Hills, to ascertain how far *bunds* or dams can be raised for the purpose of forming artificial tanks or lakes, by means of the action of water in depositing silt. Mr. McIvor, the able and energetic Superintendent of the Chinchona Plantations in Southern India, developed and submitted a scheme for raising *bunds* by the silting process, and in 1869 the Madras Government sanctioned the trial, under Mr. McIvor's superintendence. The immense saving of labour and expense, in the event of this natural process being proved to be efficient, is obvious; and it appears that the idea had suggested itself to Mr. McIvor, from watching natural processes of a similar kind. A site was selected on the Koondah Mountains, at a point in a ravine, where a high and stable dam would have the effect of forming a large artificial lake covering several square miles; and the water was led on to the site, and made to deposit its silt by a simple method. In this way a dam, composed entirely of silt deposited by water, was raised to a height of about 80 feet, and a splendid sheet of water was formed behind it. But when the rains commenced in June, a tremendous storm raised the level of the lake until it began to overtop the embankment, and a catastrophe was the consequence. It is evident, however, that this accident was entirely due to an insufficient provision for the escape of surplus water, and not to any defect in the substance or composition of the dam. Indeed the very opposite was proved to be the case, for the silt had become so solid, that when the flood cut the dam down, perpendicular cliffs were left on either side of the opening, and large blocks were carried down the stream for more than half a mile, without being broken into fragments.

This application of the forces of nature to the use of man, to a use which in tropical countries is of the utmost importance to man's welfare, namely, the storing of water for irrigation, must have a special interest to the physical geographer; and one naturally looks round for analogous results of the action of water in the deposit of silt, under circumstances where man's ingenuity has been absent, and where Nature has worked in her own way.

Dr. Mann has furnished the following instance of such action.

Along the sea coast of Natal, including the recently annexed "No Man's Land," from the 30th to the 31° 30' meridian of east longitude, not less than sixty-four rivers, of larger or smaller size, discharge themselves into the sea. Across the whole of these rivers distinct sand-bars are thrown up by the action of the sea. In consequence of there being several months of comparatively small rainfall, in the winter season of the year, these sandbanks from complete barriers across the mouth in the case of the smaller rivers in the dry season, which can ordinarily be traversed on horseback from side to side, but which are occasionally washed over by the sea, when there are heavy gales from the south. In such rivers a wide lagoon, extending from 2 to 3 miles inland, or even further, is formed in the winter season, in which the surface of the accumulating water continually rises higher and higher, until at last, and generally on the accession of summer rains, it bursts through the barrier, and opens a summer channel into the ocean. This channel is generally restricted within the breadth of a couple of hundred yards, and lies at one end of the sand-barrier, which elsewhere still continues to bound the lagoon. It is quite a common occurrence for *drifts* or fords of rivers, lying some 5 or 6 miles in from the sea, which are easily passed by horsemen and in waggons during the season of actual rain and flood, to become so deep in

the dry season, in consequence of the rising of the surface of the water in the barred lagoons, that they cannot then be traversed. The expedient of the traveller is to descend to the seashore, and to cross upon the sand-bar. When the channel is opened by the rains, the route returns to the upper ford. In the case of the larger rivers the sand-bar is never complete, and the lagoon is never completely formed. There is then always a clear and rather deep channel open, both to the outflow of the river and to the influx of the tide. The consistency of the sand-bars is so solid, and the silt is so well and closely driven down, that it becomes as hard as rock; and, on one occasion, it was actually cut out and quarried for building purposes.

In the action of these Natal rivers we find Nature working exactly as Mr. McIvor is striving to do in the Neilgherry Hills. The heavy surf of the ocean forces the fresh water to deposit its silt and form a bar; exactly as the artificial contrivance, invented for the purpose, forces the Neilgherry mountain stream to do the same thing. The rains of Southern Africa force a channel annually through the bar, just as the Monsoon storm cuts down the *bund* in the Neilgherries; and all that man has to do, to preserve the lake in its integrity, is to provide for the escape of the surplus water.

4. *Report on a Journey through Mekran.* By MAJOR E. C. ROSS.

[Abstract by C. R. MARKHAM, Esq., C.B., Secretary R.G.S.]

THE region between Persia and India, which was traversed by Alexander the Great, and the coast of which was minutely examined by his General, Nearchus, has, from that time until the present century, been almost unknown to Europeans. Our knowledge of Beloochistan was confined to the routes of Pottinger (1810) and Grant (1811), and to the surveys of the coast by officers of the Indian Navy. But the recent operations connected with the establishment of telegraphic communication between India and England, and the Persian boundary questions, have led to the exploration by British officers of this region,—the Gedrosia of Alexander and the Greeks, now known as Mekran or Beloochistan. Colonel, now General Goldsmid, has taken the lead in the examination of this country, and has supplied geographers with much new information. Major Ross, Assistant to the Political Agents at Kelat and Muscat, has also traversed Mekran by a new and unexplored route, and the results of his journey are given in the present "Report on a visit to Kej, and route through Mekran from Gwadur to Kurrachee."

Leaving Gwadur on the 10th of September, 1865, he took the shortest route to Kej, the most important place in Mekran, accompanied by a Sepoy escort and by one Moola Doora, a confidential agent of the Naib of Kej. Mekran may be described as a series of parallel ridges, rising one above the other, from the shores of the sea of Oman, enclosing intervening terraces or valleys. The route of Captain Ross led, at first, over a barren and almost uninhabited tract at right angles to these parallel ridges; but after crossing a ridge of rocky mountains by a pass called Talar, there is a marked alteration in the character of the soil and country, and the pleasant green of the under-wood and occasional patches of cultivated land were refreshing, after the barren ugly tract previously traversed. This district is known as the *Dusht*, a valley or plateau of great extent, containing much rich and fertile land, with a river, called the Khor Dusht, flowing through it, and enriching it with the alluvium which it brings down in certain seasons. It reaches the sea near Jewni, to the westward of Ras Pishkan. It is not, however, a continuous stream, at all times, from source to mouth. It is only during the rains that it