the year of his stay in Sistan the lake was always clear and deposition proceeded very slowly. Even during the great flood of 1903 the water was muddy only off the river mouths, although everywhere covered with the wreckage of reeds and tamarisks. The transition from submergence to exposure must also have been comparatively slow, for the change from pink to green deposits is frequently gradual, although always distinct. The sandy layers mixed with the upper and lower portions of the lacustrine clay seem to indicate shore conditions, and the layers of purple and yellow clay, with the included fossil plants, probably point to the existence of marshes during the disappearance of the lakes. In brief, an examination of the sections exposed in the bluffs of Sistan suggests that in very recent geological times the basin of Sistan has been subjected to a long series of slow and gradual changes by which large portions of the floor of the basin became alternately areas of subaerial and of lacustrine deposition. In other words, the predecessor of the present lake of Sistan has either again and again passed from conditions of extreme expansion to those of great diminution or else has repeatedly and systematically shifted its position.

THE CAUSE OF THE ALTERNATIONS OF THE SISTAN STRATA.

When we attempt to explain these variations in the lake, four plausible theories present themselves. (*a*) The lake may have had an outlet which was repeatedly dammed by volcanic eruptions or otherwise, and as frequently swept clear. (*b*) Some large tributary may have been diverted alternately to and from the lake, first filling it and then leaving it diminished. (*c*) The basin of Sistan may have been subjected to rhythmic earth-movements by which the lake was poured alternately from one side to the other. (*d*) The fluvial period may have consisted of a greater number of epochs than has been supposed, and each epoch may have caused an expansion of the lake.

(*a*) *Outlet Theory.*—If the lake had an outlet as recently as the time of deposition of the clays, traces of it must still remain. The Shila can not be considered in this connection, because the Hamun-i-Sistan and the God-i-Zirrah are on nearly the same level and form parts of a single lake so far as the present problem is concerned. The entire border of the basin of Sistan has not been explored, but it is certain that even the lower passes stand at least 1,500 or 2,000 feet above the lake of Sistan. Any outlet which may have existed in former geological times must have ceased to do duty ages before the formation of the modern clays which now concern us.

(*b*) *Diversion Theory.*—In the case of the lakes of Sistan and Zirrah we have seen that the diversion of the Helmund caused great changes in the area subject to inundation. If a similar change could have taken place repeatedly in earlier times it might have caused the deposition of alternating lacustrine and subaerial strata. The diversion, if such there was, must have taken place much nearer the mountains. This theory can not be absolutely excluded, because our knowledge of the rivers in Afghanistan is exceedingly limited. The extreme improbability that a river should be diverted back and forth eight or ten times at regular intervals is a strong *a priori* argument against it. Moreover, if such diversions did take place, it is still necessary to explain why. Such behavior on the part of a river could only be due to some systematic cause, such as repeated warping of the crust or climatic changes.