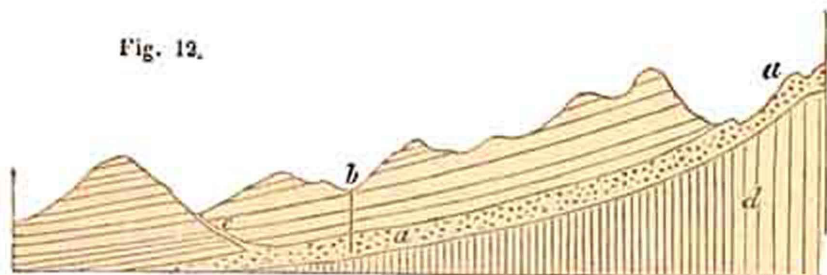


they had descended above 1800 English feet below the surface, the water rose through the tube (which was about ten inches in diameter,) so as to discharge half a million of gallons of limpid water every twenty-four hours. The temperature of the water increased at the rate of $1^{\circ} 8'$ F. for every 101 English feet, as they went down, the result agreeing very closely with the anticipations of the scientific advisers of this most spirited undertaking.

Mr. Briggs, the British consul in Egypt, obtained water between Cairo and Suez, in a calcareous sand, at the depth of thirty feet; but it did not rise in the well.* But other borings in the same desert, of variable depth, between 50 and 300 feet, and which passed through alternations of sand, clay, and siliceous rock, yielded water at the surface.† The geological structure of the Sahara is supposed, by M. Rozet, to favour the prospect of a supply of water from Artesian wells, as the parched sands on the outskirts of the desert rest on a substratum of argillaceous marl.‡

The rise and overflow of the water in these wells is generally referred, and apparently with reason, to the same principle as the play of an artificial fountain. Let the porous stratum or set of strata, *aa*, rest on the impermeable rock *d*, and be covered by another mass of an impermeable nature. The whole mass *aa* may easily, in such a position, become saturated with water, which may descend from its higher and exposed parts — a hilly region to which clouds are

Fig. 12.



attracted, and where rain falls in abundance. Suppose that at some point, as at *b*, an opening be made, which gives a free passage upwards to the waters confined in *aa*, at so low a level that they are subjected to the pressure of a considerable column of water collected in the more elevated portion of the same stratum. The water will then rush out, just as the liquid from a large barrel which is tapped, and it will rise to a height corresponding to the level of its point of departure, or, rather, to a height which balances the pressure previously exerted by the confined waters against the roof and sides of the stratum or reservoir *aa*. In like manner, if there happen to be a natural fissure *c*, a spring will be produced at the surface on precisely the same principle.

Among the causes of the failure of Artesian wells, we may mention those numerous rents and faults which abound in some rocks, and

* Boué, Résumé des Prog. de la Géol. en 1832, p. 184.

† Seventh Rep. Brit. Ass. 1837, p. 66.

‡ Bull. de la Soc. Geol. de France, tom. ii, p. 364.