

weirs or barrages similar in type to the present Band-i-Sīstān. Like every terminal river-course where it enters a deltaic area, the Helmand is periodically liable to great shifts of its channel. Such shifts are marked by the abandoned dry beds of the Sana-rūd and Rūd-i-biyābān or Rūd-i-Trākun. That the latter has carried water at widely different periods into the southern delta of Sīstān, now wholly desert, is proved by the ruined sites which I shall have occasion to discuss below.¹

But whichever channel receives the fertilizing water of the river, the use of this for regular cultivation over a wider area can be assured only if control is maintained over its discharge by means of a barrage. The necessity for this arises from the fact that the drainage which the Helmand brings down from the mountains greatly diminishes after the cessation of the spring rains and the completion of the melting of the winter snow. At the same time heat and winds during the summer and autumn cause excessive evaporation in the plain and thus reduce the water-supply still farther. Hence whatever changes may take place at intervals in the direction of the main channel of the river, owing to the gradual rise of the bed through silting and from concomitant causes, the distribution from it of the available volume of water over the cultivated area must always for a great portion of the year depend entirely upon the maintenance of weirs.²

Seasonal
reduction of
volume in
Helmand.

The Band-i-Sīstān is but the latest of a series of such works which at different periods and in conformity to changing conditions served that purpose. Local tradition, supported from late mediaeval times onwards by historical records, assigns to these earlier works positions higher up on the present course of the river as far as the point known as Bandar-i-Kamāl-Khān.³ There the river, after emerging from the well-marked trough that it has followed all the way below Kala-i-Bīst, makes its great bend to the north, and there its delta may properly be considered to start. The interrelation between these older barrages and the areas that were once cultivated on the Afghān side of the river and now are all desert marked by extensive ruins is a subject of distinct historical and archaeological interest. Its investigation must be left for some qualified student in the future who is able to combine personal examination of those numerous ruined sites with the study of the abundant materials collected by Sir Thomas Ward, the great irrigation expert of the Sīstān Mission. It may, however, be stated with some confidence that those ancient works are not likely to have differed in essential features from the present Band-i-Sīstān, upon the skilful construction of which in each succeeding year the prosperity of Sīstān proper wholly depends.

Earlier
barrages.

As seen in the photograph, Fig. 476, the barrage consists of an earth embankment about 6 feet across on the top, strengthened with fascines of tamarisk brushwood, a material as abundant along Sīstān watercourses as it is on the banks of rivers in the Tārīm basin. Used also as a revetment it enlarges the *band* to about 21 feet in width at the bottom. This has annually to be built in the late summer or early autumn, when the water has fallen quite low. It is then thrown across almost the whole width of the Helmand-i-Kaḷān or 'great Helmand', from which the two branches of the Rūd-i-Pariūn and the river of Nād-'Alī take off some 10 miles lower down. Only a small channel is left for the water to pass down the main bed, the rest being turned into the Rūd-i-Sīstān, which irrigates the major portion of Persian Sīstān. By March or April the great spring flood of the river sweeps away the whole dam, and the chief concern of the people is then to prevent the two eastern river branches from breaking out of their channels, destroying the heads of local irrigation canals and inundating the cultivated land towards the northern parts of the Hāmūn. The rebuilding of the dam was said to keep about a thousand labourers hard at work for twenty to thirty days. Com-

Construc-
tion of
Band-i-
Sīstān.

¹ See below, ii. pp. 972 sqq.

² For an account of the several beds followed by the Helmand, cf. Tate, *Seistan*, pp. 127 sqq. Data as to the volume of water carried by the actual river-course, the con-

ditions governing its use, &c., would be very welcome, but were evidently reserved for another record of the Sīstān Mission, not accessible for reference.

³ Cf. Tate, *Seistan*, pp. 153 sqq.