

CHAPTER XVII.

SURVEYING THE DESERT.

My levelling telescope, obtained from Mr, Berg, mathematical instrument-maker of Stockholm, was adjusted and corrected before I left home. With the view of ascertaining whether it had suffered any injury on its long journey, and if so to what extent, I on 27th February made a traverse round the spring of Altmischbulak, the results of which are embodied on the accompanying sketch-map. As the beginning and end of this preliminary survey I selected the little threshold of hard rock on the right side of the torrent that flows down from the spring. The oval-shaped polygonal I measured had a circuit of 2756 m. The readings were + 8.005 and - 8.004 m., so that the error only amounted to + 1 mm., and for the purpose I had in view, the instrument might therefore be regarded as practically free from error. Even supposing that the error + 1 mm. were a constant error, the total for the whole survey across the desert would not amount to more than between 29 and 30 mm.

The levelling-staff was 4 m. long, and graduated to meters, dm., and cm., and it was also easy to take readings down to mm. The distance between the levelling-telescope and the staff could have been read directly from the horizontal lines of the telescope, but I preferred to use always the same distance, and for that end two of my attendants with a 50-meter tape measured off 100 meters, 100 m. from staff to telescope and 100 m. on the other side from telescope to the next staff-position, and so on all the way across the desert. This was not only a saving of time, but it afforded me an opportunity to jot down my observations whilst the men were measuring off the next 100-meter distance. Sometimes the nature of the ground compelled us to take a shorter interval than 100 m.; but in the last part of the traverse, after the surface became perfectly level, I increased the intervals a little. The direction was controlled by the compass. As I had reason to suppose that the Kara-koschun extended towards the north-east, I thought it advisable to aim for the south-east, so as to reach its shore as speedily as possible. Had we steered south-south-west, as we had done the year before, we should have got into very heavy sand, and in a survey sand must under any circumstances be regarded as an additional source of error. Besides, in that direction we should also have struck the