

bed in the gorge, and consequent checking of the gradient immediately above it. These circumstances might well give rise to the formation of an actual lake; the existence of an exit, on the other hand, would depend on the rapidity of the movement, the supply of water, and the nature of the climate.¹

Oldham's view is no doubt applicable to the twin-lakes of the Manasarovar and Rakas-tal as well as upon the twin-lakes of Tso-ngombo and Panggong-tso. The same differential movements which raised the western parts of the Panggong basin at a rate which was too quick for the erosion of the river to follow, may have influenced the valley of the uppermost Satlej in such a way that its two lakes had to be formed. In the bed just west of the Rakas-tal no signs of a damming fan are to be seen, and here the theory of Oldham seems to be the most plausible one.

There is, however, as pointed out before, a great difference in the state of development of these two pairs of lakes, namely, that the Panggong lakes are already definitely cut off from all contact with the Indus system, and therefore forming an entirely independent and self-contained basin. The last recipient of this basin is Panggong itself, which is a salt-water lake.² The eastern lake, Tso-ngombo, has still an effluent to the Panggong and is therefore perfectly fresh. In the case of the Manasarovar lakes both are perfectly fresh and therefore in intermittent communication with the Satlej. From the above quotations we have found that the Tso-morari has slightly brackish water and therefore it is cut off; regarding salinity it thus takes an intermediate stage between the Manasarovar and Panggong. Or, in other words, the salinity of the lakes increases from S.E. to N.W., or, the progress towards isolation from the rivers and desiccation, proceeds quicker the farther N.W. the lakes are situated. This state of things depends, at least to a considerable degree, upon the rainfall in N.W. Himalaya which decreases from S.E. to N.W. Naini Tal has a rainfall varying at different places, from 234 to 280cm., Mussooree has 234, Chakráta 157, Simla 173, Marri 147cm. In the interior valleys and ranges the rainfall is much less. Srinagar has only 94, Almora 96cm.³ The drainage areas of the Tso-morari and Panggong-tso must therefore receive comparatively less precipitation than that of the Manasarovar. The state in which we now find the two first-mentioned lakes probably indicates the direction towards which the Manasarovar proceeds.

¹ A Manual of the Geology of India by H. B. Medlicott and W. T. Blanford. Second edition: R. D. Oldham. Calcutta 1893, p. 481.

² From descriptions of different travellers Hermann von Schlagintweit arrives at the conclusion: »Überall waren es Reste einer früher viel ausgebreiteteren Seebildung; überdies befanden sich die meisten der Seen *jetzt* in einem eigenthümlichen Zustande stetig zunehmenden Salzgehaltes.« — Untersuchungen über die Salzseen im westlichen Tibet und in Turkistan. München 1871, p. 1.

³ Hann, after Hill. Handbuch der Klimatologie, II Band, I Teil, Stuttgart 1910, p. 220.