

the great gravel-covered peneplain already referred to above in connexion with the Hsi-wan-ho.¹³ On the east the divide from the Su-chou river lies mainly on two similar saddle-like peneplains, one to the west of the Chia-yü-kuan defile (Map No. 43. A. 1), and the other crossed by Lāl Singh's and my own routes from Ko-ta-ch'üan-tzū to Su-chou (Map No. 42. A, B. 4), but otherwise unsurveyed.

Transverse
range
dividing
drainageless
area.

A very peculiar feature of the drainageless area thus circumscribed is its division into two well-defined transverse portions by the rugged and comparatively high range which stretches from the close vicinity of Chia-yü-kuan with an approximate north-westerly bearing towards Ch'ih-chin-sê. General orographical considerations make me inclined to recognize in this range the westernmost extension of the Ala-shan system which winds round the northern confines of Kan-su. But without geological evidence this view can be put forward only as a conjecture. The range is cut through by the river of Ch'ih-chin and the Po-yang-ho, the head-waters of which in the Nan-shan we were able partially to survey in 1907.¹⁴ There is reason to believe that the gorges in which they make their way through the range resemble in character those in which the rivers of Su-chou and Kan-chou break through the lower hill chain eastwards before uniting near Mao-mei to form the Etsin-gol.

The southern of the two previously mentioned portions of the Hua-hai-tzū drainage area for the most part consists of a wide open plateau resembling that which extends along the foot of the Nan-shan from Su-chou to Kan-chou, but distinctly more arid. The range stretching from Ch'ia-yü-kuan to Ch'ih-chin-sê (for which no general name was ascertainable by us) is utterly barren. What water is brought down by the streams from the outermost Nan-shan is soon lost at its foot. Judging from the observations I was able to make on my passage along this plateau in July and again in September, 1907, the few little oases found there depend for their irrigation mainly, if not solely, on subterranean drainage from the Nan-shan breaking out in springs.

Oasis
dependent
on irriga-
tion from
springs.

The water thus gathered on the plateau reappears in small streams on the line followed by the high road from Su-chou to Yü-mên-hsien. Yet it is practically certain that none of it reaches the depression to the north of the range except as subsoil moisture. Only at times of exceptional floods is it likely that the beds of the Ch'ih-chin river and the Po-yang-ho carry any surface flow to the northern foot of the range. Beyond this the Po-yang-ho course becomes altogether lost; ¹⁵ that of the Ch'ih-chin river ordinarily carries only such water as is derived from springs which rise in the bed some distance to the south-west of the Hua-hai-tzū oasis.¹⁶ This water and that of other springs which issue at Hsiao-ch'üan-tzū farther north, at the edge of the gravel Sai, account for the cultivation of the small area, measuring about four miles from south to north and three miles across, comprised in the Hua-hai-tzū oasis. Thus the hydrographic conditions that here prevail closely resemble those of the small oases to be found below the gravel glacia of the K'un-lun to the east of Khotan.¹⁷

Cultivable
area at
Hua-hai-
tzū small.

The ground at present capable of cultivation represents but a small portion of the area over which the Ch'ih-chin river at an earlier period has deposited fertile alluvium; for both to the north and south our surveys showed stretches of ground where the same soil of alluvial loess, unprotected by vegetation, is undergoing wind-erosion into regular Yārdangs. Indeed, on our march eastwards,

¹³ See above, p. 387.

¹⁴ See *Desert Cathay*, ii. pp. 268 sqq.

¹⁵ The route sketch of M. Obrucheff, who actually descended into the Hua-hai-tzū basin by way of the Po-yang-ho, makes the river disappear at the northern foot of the range. No trace of its course was met with by us on our march from Hua-hai-tzū to Ko-ta-ch'üan-tzū.

¹⁶ I regret that shortness of the available time did not allow us to determine the exact position of these springs, of which we learned from local information.

¹⁷ Cf. *Ancient Khotan*, i. pp. 96, 115; *Serindia*, i. pp. 202 sqq.; iii. 1263, &c. See also the remarks on the irrigation of the Nan-hu oasis, *ibid.*, ii. pp. 612 sqq.