the elevated plateaus draining into the Khara-nōr and Koko-nōr lakes was surveyed along its northern face and proved to rise in its western portion to peaks over 20,000 feet high. [42] From the wide mountain-girt basin some 13,000 feet above sea-level, where the Su-lo-ho gathers its main sources on ground showing a curious combination of dunes and marshes similar to that of the river's terminal basin in the Tun-huang desert more than 300 miles away, we made our way over bog-covered uplands to the headwaters of the Ta-t'ung river. [43] This is the northernmost large tributary of the Hoang-ho, and here our surveys touched the drainage area of the Pacific Ocean.

Route across Richthofen Range.

Thence we gained the valley of the uppermost Kan-chou river by a difficult snowy pass and finally effected our passage through the Richthofen Range. A succession of high transverse spurs dividing the western tributaries of the Kan-chou river, had to be crossed on our way to the Li-yüan-ho and the valley plains of Kan-chou. They provided very good plane-table stations and thus offered compensation for the trouble experienced from the flooded streams in the deep-cut tortuous valleys between them. [44]

Journey from Kan-chou to An-hsi.

At Kan-chou I had reached the easternmost goal of my journey, and on September 3rd we started again westwards in order to gain our base at An-hsi. While I followed the high road to Su-chou and from it made an excursion northward beyond the oasis of Chin-t'a, Rām Singh skirted the foot of the mountains and thus usefully supplemented the survey of the Richthofen Range. [45] For the journey from Su-chou to An-hsi we followed what since ancient times must have been the great Chinese highway from Kan-su towards the Tārīm basin. A long reconnaissance pushed to the north of Yü-mên-hsien enabled me to determine the point where the line of the ancient *Limes* coming from the east first struck the course of the Su-lo-ho near the river's great westward bend. [46]

Rām Singh relieved by Lāl Singh.

At An-hsi Rām Singh whose health had proved unequal to the hardships of a second winter campaign in the desert, was relieved by Surveyor Rai Sahib Lāl Singh whom Sir Sidney Burrard in response to the request made by me on return from the expedition into the Lop desert in the preceding spring had kindly started on his long journey. Rai Lāl Singh subsequently gave splendid proofs of his exceptional zeal and fitness for surveying work under trying conditions, as tested before on many hard survey tasks he had shared from the Yemen to Tibet and Eastern China. Rai Rām Singh regained India *via* Khotan. Advantage was taken of his journey to traverse with a plane-table the more circuitous route through the mountains from Tun-huang to Charkhlik which alone is available for use until the salt springs on the desert route freeze towards the end of December. [47]

Desert route to Hāmi.

On October 8th we commenced the two months' journey of nearly 900 miles from An-hsi to Kara-shahr for our winter's work in the Tārīm basin. Lack of time and a heavy convoy of antiques obliged me to follow the usual caravan track across the stony desert of the Pei-shan to the oasis of Hāmi. [48] Though it has been followed by more than one European traveller since the days of the old Jesuit surveyors of the 17th century, its detailed survey proved of interest for the historical topography of a route which since the 1st century A. D. has served the Chinese as the main line of access to their Central-Asian dominions whenever they were able to assert their control. [49] The short stay I made in the Hāmi tract in order to

[42] See Sheets Nos. 41. D. 4; 43. A. 4; *Desert Cathay*, ii. pp. 322 sq.

[43] See Sheet No. 43. A. 4, B, C. 4; *Desert Cathay*, ii. pp. 323 sqq., Figs. 155, 242-244.

[44] Cf. Sheets Nos. 43. D. 3, 4; 46. A. 3, 4; *Desert Cathay*, ii. 328 sqq.; Figs. 245, 250, 251.

[45] See Sheets Nos. 46. A, B. 2; 43. B-D. 1-2; 42. C. 4.

[46] Cf. Sheet No. 40. C. 4; *Serindia*, pp. 1136 sqq. For the high road from Su-chou to An-hsi, see Sheets Nos. 43. A. 1; 41. D. 1; 40. A. 4, B. 4, 5, C, D. 5.

[47] See for this route Sheets Nos. 38. B. 4; 39. A. 1; 36. A-C. 2, D. 1; 33. A-D. 2; 30. B-D. 2. The latitude observations and clinometrical heights as well as some other details shown along it are added from Rai Lāl Singh's survey who retraced this route in the opposite direction from Mīrān to Nan-hu in November-December, 1913.

[48] See Sheets Nos. 38. B. 1, C. 1, 2, D. 2, 3; 37. A, B, 4; 34. D. 3.

[49] Cf. my paper *The desert crossing of Hsüan-tsang*, Geographical Journal, 1919, lix, pp. 265 sqq.