

of Kan-chou were surveyed on the second expedition.

The compilation of the sheet is primarily based on the positions adopted for Su-chou (see Notes on Sheet No. 43) and Kan-chou. The latitude of the latter city was determined by closely concordant astronomical observations taken on the two journeys ( $38^{\circ} 55' 41''$  and  $38^{\circ} 55' 36''$ , respectively). But the plotting of the several traverses carried on the third expedition between Kan-chou and points lower down on the Kan-chou river (No. 43. D. 1, 2) has led to a change in the longitude value assigned to Kan-chou. It is shown now as  $100^{\circ} 38' 20''$  against  $100^{\circ} 49' 30''$  in the map of the second journey (see Sheet No. 94. D. 1 in *Serindia*, vol. v).

This new value approximates very closely to the longitude of Kan-chou as indicated in Sheet No. XXI of the Russian Asiatic Transfrontier map (circ.  $100^{\circ} 37' 30''$ ), but differs notably both from Mr. Clementi's chronometric longitude,  $100^{\circ} 21' 29.16''$ , and that adopted by the Survey of India in previous publications, approximately  $100^{\circ} 49' 30''$ . These discrepancies as to the position of an important and well-known city strikingly illustrate the need of exact longitude observations by telegraphic or wireless methods along this great highroad from China into Central Asia.

The area shown in this sheet corresponds in all essential physical features to the three regions distinguished in Sheet No. 43, of which this is the continuation. In the south we have the eastern portion of the Central Nan-shan, as far as it is drained by the headwaters of the Kan-chou river and by its upper tributaries. The broad valley of the O-po-ho, the river's eastern main feeder (B. 4, 5, C. 5), is a *pendant* to the wide uplands met near the sources of the river's main western branch (No. 43. B, C. 3). But the snow-line appears to lie somewhat higher on the eastern continuation of the enclosing ranges. The difficult gorges in which the Kan-chou river, below the junction of both branches, has cut its way through the Riehtshofen Range, are impassable except in the depth of winter and still

*Astronomically observed latitudes.*

1906 08. Sha-ho-p'u, Camp 227 (above left river-bank, outside eastern gate ;

A. 2)

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$39^{\circ} 9' 24''$

await their explorer.

The plateau stretching along the northern foot of this range gradually widens south-eastwards as the spurs descending from the latter recede. The large cultivated area around Kan-chou (A, B. 3) is accounted for by the fact that the abundant waters of the Kan-chou river can be utilized here to full advantage for irrigation over a wide alluvial fan. The same holds good also with regard to the oases around Sha-ho-p'u (A.2), irrigated by the Li-yüan-ho.

To the east of the longitude of Kan-chou cultivation along the foot of the Riehtshofen Range becomes independent of irrigation, owing to the increased precipitation which approach to the Pacific drainage assures. This important change of climatic conditions is duly reflected also in the extensive patches of conifer forest which the map shows here right down to the foot-hills (A. 3, B, C. 4). Further away from the Nan-shan, however, this influence of a moister climate appears to diminish rapidly, and north of latitude  $38^{\circ} 45'$  no cultivation seems possible without irrigation.

The hill range which on the north separates the inhabited plateau from southernmost Mongolia rises in the vicinity of Kan-chou to heights well over 10,000 feet; yet its slopes are uniformly barren throughout. The route surveyed from Mao-mei to the Kan-chou river near Kao-t'ai (A. 1, 2) afforded striking evidence of the great aridity of the climate prevailing in the belt of low hills and wide desert valleys which stretches north of the middle course of the Kan-chou river.

The route through the mountains, followed in 1907 from the Kan-chou river headwaters to the city of Kan-chou, is described in *Desert Cathay*, ii. pp. 328 sqq. For observations on the historical topography of the Kan-chou tract and of the old Chinese highroad passing through it, see *Serindia*, iii. pp. 1131 sqq. Brief preliminary notes on the routes followed by me in 1914 from the Etsin-gol basin to Kan-chou, and thence to the eastern headwaters of the river, are recorded in *Geographical Journal*, xlviii. pp. 199 sq.