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Further Information on the Turgun or Kundelun Mountains in North-Western Mongolia,
and Notes on a New Map of This Region

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The ice col at Knob head had been cut out by an overflow of ice, probably from the slopes of Mount Lister to the south.

The ice drainage of this area is extremely complex at first sight. But I think the following explanation is correct. I imagine that we have two types of glacial erosion, one superimposed on the other. The earlier cwm or cirque erosion is to some extent obliterated by the later outlet glacier erosion. The problem reminds one of an old Greek *palimpsest*.

Thus I think that the lower Ferrar was originally a cwm-headed valley like Blue glacier, the head being just east of Knob Head mountain. In the same way, I think, Dry valley shows a cwm head at the great Nussbaum Riegel.

The outflow from the ice-cap has swamped these isolated drainages and tended to unite them. It has rounded off the bars and opened out the valley-bottoms, but is unable to obliterate their "cwm valley" origin altogether.

(*To be continued.*)

FURTHER INFORMATION ON THE TURGUN OR KUNDELUN MOUNTAINS IN NORTH-WESTERN MONGOLIA, AND NOTES ON A NEW MAP OF THIS REGION.*

By DOUGLAS CARRUTHERS.

THE Turgun or Kundelun highlands are a more or less isolated mountain group, situated on the Mongolian plateau in long. $91^{\circ} 25' \text{ E.}$, lat. $49^{\circ} 45' \text{ N.}$ The existing maps of this range showed that up to the year 1910 only the eastern slopes had been visited by any travellers with a view to geographical research, and that the topography of the remainder of this group was practically unknown. Sighting the remarkably beautiful peaks of this glaciated range on August 12, 1910, from the rolling hill country to the east of the Saklia or Saglik range, which borders the basin of the Uriu Nor on the north, from this place I made a plane-table survey of the region depicted on the accompanying map. Lack of time and opportunity forbade me from joining up the survey with the work already accomplished—chiefly by Potanin in 1876–1879—on the eastern portion of the group, namely, in the region drained by the Kharkira and Turgun river systems. I have, however, added a rough indication of the configuration of that area to my survey, so as to make the construction of the mountain group complete. The valleys which drain towards the south-east, namely the Kargachu and Kumuir, are those most requiring further exploration. The areas lying outside the scope of my work have been shaded in, without contours, so as to give a general idea of the extent and topography of the entire range in relation to the surrounding plateau and lake-basins. This has been taken from the Russian Government map of the "Southern

* Map, p. 428.

Frontier Region of Asiatic Russia," published by the Topographical Section of the General Staff, St. Petersburg, Sheet XIII. ; the position and form of Uriu Nor and Achit Nor are from the same source.

The whole region constitutes the headquarters of the Durbet tribe, a Mongol clan of considerable influence, the eastern portion being under the Wang, and the remainder belonging to the Dalai Khan of the tribe. A few words as to the distribution of the population may be of interest, as showing both the fewness of the inhabitants in proportion to the size of their country, and the wealth of their pastures at a comparatively low altitude at the poorest season of the year. At the time of our visit, in August, the main bulk of the nomads were encamped on the middle course of the Kundelun river, in the neighbourhood of the Kundi Kuria, and in the valley above it ; the Kundelun valley itself above the Kuria and its large left affluent were not so well populated. None were camped above 7500 feet, the majority between 5500 and 6000 feet. The Yamachu valley was practically uninhabited ; the plateau to the south of it, bearing its name, was also without sign of habitation, although consisting of the most perfect pasture land and being of a suitable altitude for use in late summer. Travelling westwards towards Achit Nor, we found a few encampments on the west side of the 9204 feet pass dividing the Yamachu plateau from the Achit Nor basin. It was not until we dropped to the comparatively low altitude of 4630 feet in the neighbourhood of Achit Nor that we found any considerable number of Durbet encampments. Here much water comes to the surface and nourishes the pastures throughout the heat of summer. The southern side of the Uriu Nor basin was not found by Mr. Price to be utilized by the nomads. The northern declivities of the Barmen range were practically uninhabited. Probably the western shores near the mouth of the Kharga river, and the northern side where much water from the Saklia range must enter the lake, are more likely to be inhabited. On the whole, the zone between 6500 feet and 8000 feet, which is generally well tenanted by nomads throughout inner Asia in the late summer, was here unused or very poorly populated. The entire population dwelt in "yurts" (felt tents), there were no permanent abodes except the lamaseries, the winter abode of the Dalai Khan, and a few houses of Chinese traders situated around Kundi Kuria, and one house near our camp to the north-west of Achit Nor, which was occupied in summer by some Russian traders from Biisk.

We were on the range in mid-August, the period of the highest snow-line ; it is thus depicted on the map. It should be understood, however, that the precipitation on these particular mountains is phenomenal, and cannot be taken as typical of Northern Mongolia in general. As described in my book 'Unknown Mongolia,' Vol. 1, pp. 284-285, the snowfall is great, mist and cloud envelop the ranges during the summer, and thus the snow-fields and glaciers are preserved.

The vegetation of the range is luxuriant on this account, pastures and

forests abound ; most valleys contain larch groves, but these lessen in the western and southern valleys. According to Mr. Price's investigations : "At 5900 feet, the flora was of the plateau-desert type, containing *Arenaria capillaris*, var. *nardifolia* and *Stipa capillata*. At 6300 feet larch forest commenced in shady places, accompanied by *Aconitum* sp. The forest continued up to 7600 feet on the shady side of the valleys only. At 7000 feet the Alpine association began to creep in with *Gentiana prostrata*. At this height good grazing-land was found in the bottoms of the valleys, and the Mongol population grazed their flocks here during the latter part of the summer. Between 7500 and 7600 feet there is an area of dry peat-beds containing old tufts, upon which grass is now growing. Above this there is an area of bog and swamp. There were some indications that the swamp once extended lower down the valleys, and that the drier floral association is extending over the area once covered by Alpine meadow. There were some evidences that the glaciers were retreating, for several recently evacuated moraines were to be seen, upon which vegetation of *Sphagnum*, *Allardia glabra*, and *Sedum quadrifidum* were beginning to appear. In the little glacial lakes *Sphagnum* and *Ranunculus natans* were obtained. Vegetation continued up to 11,000 feet, which can be taken as the line of the summer snow. The specimens found at this altitude were *Allardia glabra* and *Sedum quadrifidum*." *

As regards the distribution of Central Asia fauna, the Turgun highlands are a landmark. I have already drawn attention to the chief points of interest in the natural history of this portion of Mongolia in the Appendix D. of 'Unknown Mongolia.' The nomenclature of this mountain group, and of its valleys and peaks needs some explanation, especially as I have found it necessary to somewhat modify certain statements made in an earlier account of this region. Accepting Turgun as the name of the highest summit of the northern group, I have given the same name to the principal valley draining from it ; Kharkira valley, for the same reason, drains Kharkira peak of the southern or Yamachu range. Consequently, I have had to substitute a name for the upper portion of the Kundelun river, which Potanin called Turgun, but which has nothing to do with Turgun peak. As it is the true source of the Kundelun river, I call it such, and name the glaciers and peak at its source—Kundelun. I could find no native names for the other two main affluents of the Kundelun. Kundelun should, therefore, be substituted for Turgun, when I speak, in my book, of the drainage northwards from Kundelun peak.†

The map has been compiled from a plane-table survey, plotted on the scale of 1 : 500,000. I was dependent upon Russian authority for the fixed point from which I began work—namely, Bodkhon-Khalat, a Chinese karaul or guard-house. Up to this point my survey had been on a prismatic compass route-traverse, from here onwards a plane-table was used.

* See Linnean Society's *Journal*, "Botany," vol. 41, October, 1913.

† See p. 266, footnote ; pp. 281, 282, vol. 1, "Unknown Mongolia."

The altitudes were taken with an hypsometrical apparatus, in most cases readings were recorded from two thermometers, which were tested before leaving England, and on my return, at Kew Observatory. After twenty months' work in the field the thermometers read the same as they did at the start, and the same corrections have been applied throughout, when working at the results. In working out the altitudes the mean readings for sea-level, for the month of the year, have been taken from the charts off the "Climatological Atlas of the Russian Empire" published in St. Petersburg in 1910. The temperatures have been corrected by the isothermal charts for the same atlas. Other altitudes were taken with a clinometer attached to the folding telescopic alidade (Reeves' pattern made by Casella), in use with the plane-table.

SOME ROUGH "WAR" NOTES.*

By Professor L. W. LYDE.

THESE rough and hastily compiled Notes are an attempt to answer a request for an article—to be delivered at very short notice—giving "a brief and clear statement of the geographical characteristics of the various sections of the field of war." As I have very little military knowledge, I cannot give anything which will be a real guide to the direct bearing of the geographical conditions on the conduct of the campaign; and I can only hope that this very inadequate substitute for such knowledge may serve as a sort of introduction to more detailed articles or lectures which may be arranged for early in the new session.

The essential scene of the general operations lies, of course, between lat. 45° and 50° N., *i.e.* southwards from the Dogger Bank and Memel, and northwards, between long. 0° and 26° E., from Epinal, Munich, Vienna, and Czernowitz. As a whole, it is a land of relatively low relief, allowing easy internal communication in all directions; but this feature is more pronounced north of the main line of rail which links Liège and Cologne *viâ* Magdeburg with Cracow and Lemberg. Further, the fact that the ease of movement depends largely on rivers that drain in different directions has always favoured political subdivisions of the area—with the result that the German Empire, like Austria-Hungary, is not an organic unit racially, temperamentally, or economically.

Nationality is an artificial product, and must ultimately depend on the power of a predominant partner to attract the other elements,—to submerge political, religious, linguistic, and other diversities,—to offer a substantial national gain for the diverse sectional self-denials. The

* The Editor regrets that he has been compelled to condense somewhat Professor Lyde's discussion of the racial aspect of the subject.

Map of the
TURGUN OR KUNDELUN MOUNTAINS
 IN
NORTH-WEST MONGOLIA
 from a plane-table survey by
DOUGLAS CARRUTHERS
 1910.

With material added on the South-Eastern slopes from
 Sheet XIII of the Russian Government map of the Southern
 Frontier Regions of Asiatic Russia.

— Reference —

Kuria or Buddhist Temple	⌘	Route of Expedition in 1910	
Glaciers (Blue) Perpetual Snows	⬡	Other routes	
Moraines	⬢	Russian trading post	□
Passes	X	Camps	Δ

All heights in feet. Hypsometrical readings, except
 those shown thus 12408' which are from Clinometer
 angles. Approximate contours at 500 feet intervals.

Scale 1: 350,000 or 1 inch = 5.52 Statute Miles.

56°