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RECORDS OF THE HIMALAYAN CLUB

THE HIMALAYAN JOURNAL: Records of the Himalayan Club. Edited by KENNETH MASON. *Calcutta and London: Thacker, Spink & Co.* Vol. 1, No. 1, *April* 1929. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 150 pages; with illustrations and sketch-maps. 5 rupees or 8s*

THE first number of the *Himalayan Journal*, dated April 1929 and recently received, is a handsome testimony to the vigour with which the Himalayan Club has entered upon its task of encouraging travel and climbing in the Himalaya. A preliminary note on the foundation of the Club gives the welcome news that the projected amalgamation with the Mountain Club of India, formed at almost exactly the same time, is now accomplished, and that a strong and united organization of all the enthusiasts who were moved by the same impulse can now work economically and efficiently for the common end. The Himalayan Club are fortunate in their Honorary Editor, Major Kenneth Mason, who brings to his task long experience in editing records of the Survey of India dealing with the trans-frontier regions. He has begun on the sound line of consulting the leading spirits of the *Alpine Journal*, even to the imitation of its slightly conservative format. But with a wider scope of interests and less concentration on the technique of climbing, as distinct from mountain travel, the *Himalayan Journal* will attract perhaps a wider public.

The first articles are a careful account of the Shyok Dam in 1928 by Mr. F. Ludlow, and a valuable discussion of the connection of the earlier Shyok dams with historical floods on the Indus by Major Kenneth Mason, who himself narrowly escaped an acquaintance with the Upper Shyok flood in 1926 on his return from the Shaksgam Expedition. A paper with the genially misleading title "The Attraction of the Himalaya," by Dr. J. de Graaff Hunter, deals with phenomena which must have a limited attraction to most members of the club, but are of wide interest to geodesists. It is useful to have so clear a discussion of the whole problem of local attraction as it has presented itself to the Survey of India over a space of some seventy years. The severe aspect of Dr. de Graaff Hunter's paper is balanced by Mr. Hugh Whistler's interesting and valuable account of Bird-life in Kashmir, and a very attractive paper by Mr. Kingdon Ward on "Botanical Exploration in the Mishmi Hills." Then comes a series of brief papers on detailed topography, which may be taken as contributions to what the Himalayan Club will make for the present its principal work: the collection, classification, and publication of Himalayan routes based upon a revision of Colonel Montgomerie's well-known 'Survey of India Route Book.' A revised edition of the section covering Gilgit, Kashmir, and the route to Central Asia was published by Major Kenneth Mason in 1922, as 'Routes in the Western Himalaya, Kashmir, etc., vol. 1.' A second edition of this volume has just been published, and over 50 per cent. of the routes have been checked and corrected on the ground since 1922.

The Club now proposes an ambitious programme of preparing a new edition of the rest of Montgomerie's routes; a similar route book for the Eastern Himalaya; and a series of district guides, elaborating the route books, with additional chapters on all matters of interest to scientifically minded Himalayan travellers. To assist the Editor a large number of Honorary Assistant Editors, local secretaries, and correspondents have been appointed, and the list covers several pages in the Club Notices. The Editors are prepared not only to furnish all available information to travellers, but also to indicate what further information is required about existing routes and what new routes in the district might be explored.

For the present one number of the *Journal* will be published each year, in April. We wish it the success almost assured by the excellence of its beginning.

The
GEOGRAPHICAL JOURNAL

Vol LXXIV No 3 R.G.S. *September 1929*

THE ALAI-PAMIRS IN 1913 AND 1928: *A paper read at the Evening Meeting of the Society, 29 April 1929, by*

W. RICKMER RICKMERS

THE term Alai-Pamirs covers the mountainous regions between the Amu Darya, the Sir Darya and the Chinese border. Hence it applies to the Pamir block and its westerly fringes. In accordance with political frontiers one might also speak of the Russian Pamirs.

Besides having acquired a definite morphological meaning (a pamir=a valley of the Pamir type), the Pamir has become very elastic in a topographical sense, not to speak of the plural which appears to be of English origin. Khargush Pamir, Alichur Pamir are divisions of the whole (that part of the Pamir called Hare Pamir) like West London or South London. The Londons would therefore correspond to the Pamirs. We observe a transition from place-name to general term. It reminds me of a Russian peasant who once asked me: "Is your Volga as big as ours?"

Comparing the map in W. Geiger's book ('Die Pamirgebiete') published in 1887 with "The Pamirs" of the Survey of India (Sheet 42) reprinted with corrections in 1922, one is at once struck by their similarity. What one may call the small-scale features of the Pamirs (including the Alai and Bukhara) have undergone practically no change during the last forty years. Thus, apart from the more exact determination of heights and astronomical positions, the map of the Pamirs is now one for filling in detail. It may therefore be taken as an example of the step from extensive to intensive cartography.

The old Russian survey of 10 versts to the inch (1 : 420,000) has served as the foundation or framework for every subsequent map of the Pamirs. As time went on more or less sketchy improvements were added in irregular patches. Without exception this new topography had to do with inaccessible mountains, inaccessible that is to say from the military surveyor's point of view, for he had to work with a certain rapidity in order to finish the map of Russia's newly acquired possessions in Turkistan. Eating his way through the cake he struck hard objects in the shape of clusters or chains of peaks, glaciers, and gorges. Even had he been a member of the Alpine Club he could not have wasted time on these lumps of last resistance, for army and administration wanted to know as quickly as possible about all the places where war could be

waged and taxes levied. By a process of natural elimination the glacier districts were left over for the mountain explorer.

Considering its age, purpose, and speed of publication the old Russian map is really very good. Plains, rivers, villages, roads, and passes are shown with reasonable exactitude. In other words, the map is reliable where a horseman can travel. We have the arterial system of the rivers and everything it entails in the way of life, settlement, and trade. Hence the map nowhere shows considerable tracts of totally unexplored country. To make up for this, nearly the whole of the mountain skeleton between the river ramifications is, so to speak, imaginary. The unexplored orography is dovetailed into the known hydrography, so that for a re-survey of the mountains the whole ground has to be gone over again.

The filling in of mountain detail by Russian, British, French, and German travellers has never ceased during the last forty years. Yet such is the wealth of this detail that even the revised sheets of the 10-verst map still convey the same general impression. Unfortunately, it is difficult to distinguish fact from fancy because the old surveyor was possessed by a horror of the void. His aesthetic sense apparently revolted against white patches. These he peopled with contorted caterpillars created partly from hearsay, partly from his inner consciousness. A few larger areas, however, he tinged a lighter yellow, notably around the headwaters of the Bartang, Yazgulam, Vanch, and Khingab, on both sides of the Muk Su, and in Qarategin north of the Surkhab. These then are the big "white patches" of the Alai-Pamirs.

Let it be understood that I hold the Russian surveyor and traveller in high esteem. Knowing absolutely nothing about mountaineering, Mushketov in 1880 crossed the Macha pass at the head of the long and difficult Zarafshan glacier. In 1904 Korjenevski fought his way through the dangerous gorge of the Muk Su. I only mention these two out of innumerable feats generally accomplished with poor equipment and very little money.

This not being the place for a long history and bibliography, I may be allowed to lead up to 1913 and 1928 with my own work as illustrating the progress of mountain exploration in Russian Turkistan. After my first visit to Bukhara in 1894 I gradually moved eastward, attracted by the cream-coloured patches of Eastern Bukhara and the Western Pamirs mentioned above. An unwieldy and forgotten volume gives the condensed results of my wanderings up to 1912 ('The Duab of Turkestan': Cambridge University Press, 1913).

The two expeditions which form the subject of this paper are separated by fifteen years, but connected by the same fundamental idea, namely the exact survey of certain mountains. During the interval very little happened in a region which, in my innermost heart, I had reserved for myself. On the other hand, something had happened which allowed me to visit the Pamirs which a former government had closed to foreigners since Filchner's military speculations.

In 1913, when I led the expedition of the German and Austrian Alpine Association, the late Dr. Deimler made a photogrammetric survey of part of Qarategin and more especially of the Range of Peter the Great. After Dr. Deimler's early death Dr. von Gruber prepared two maps from the negatives,

Morainic landscape of Tupcheq

Moraine shelf of Little Tupcheq: on left Baizirek valley, eroded later

one showing the Barolmas and Qizil Su glaciers in great detail on a scale of 1 : 50,000 (*Zeitschr. für Gletscherkunde*, xiv, 1926). The other is a "Kammkarte," *i.e.* a ridge-map of Qarategin on which the lower valleys are not shown (*Zeitschr. d. Ges. f. Erdkunde*, 1925).

In 1928 Dr. R. Finsterwalder surveyed about 4000 square miles of mountains and glaciers between the Sel Tau, Trans-Alai, and Zulum Art ranges and the Tanimas river. The completion by stereoautograph will, of course, take some time. I think I may predict a great stride in automatic cartography. It would be unfair to compare Deimler's and Finsterwalder's maps on the lines of merit. In 1913 photogrammetric surveying was still in its infancy. According to present-day standards Deimler's quarter-plate apparatus was fairly primitive. Moreover he had to work single-handed. Finsterwalder and his assistant Biersack used a set of the most modern half-plate photo-theodolites by Zeiss. Deimler was a climbing mathematician who had taken up surveying for this particular trip ; Finsterwalder is a highly trained specialist.

Notwithstanding the gulf of time the expedition of 1928 is the immediate continuation of that of 1913 inasmuch as both together are the first attempt to produce a complete and satisfactory map of considerable mountain areas in the Alai-Pamirs. Side by side we see here an illustration of the great stride made in photo-surveying: and we learn that sometimes one does gain by waiting. Photo-surveying would enable a score of topographers to revise the whole of the map of the Alai-Pamirs within five years.

The expedition of 1913 was financed and entrusted to my care by the German and Austrian Alpine Association. Besides myself the official staff consisted of the late Dr. W. Deimler (topographer) and Dr. (now Professor) R. v. Klebelsberg (geologist). The latter had then already begun to specialize in glacier work. Five members came at their own expense: Dr. H. v. Ficker, now head of the Prussian Meteorological Service ; Dr. A. Kaltenbach as physician and zoologist; Frau Kaltenbach, Mrs. Rickmers, and Herr E. Kuhlmann. The size of this personally conducted party of eight caused some misgivings in geographical circles, but I stuck to my optimism justified by former experiences. The secret is a very simple one. As Gordon MacCreagh ('White Waters and Black') so truthfully says, the leader should not march in front but alongside of his companions. Since then the three Mount Everest Expeditions have provided a brilliant demonstration of this principle.

A brain-wave made me try an unsuccessful experiment. For a scientific observer, I said to myself, walking is better than riding, and donkeys are hardier than horses. So we started out from Samarqand on foot, the baggage being carried by fifty donkeys. But these animals developed sore backs at an alarming rate. Worse still, they were stopped by the deeper fords. Bridges being rare, the rivers are usually forded, and the depth of a manageable ford is measured by the height of a horse. Hence donkey caravans only travel along certain trade-routes with shallow fords. One must remember that for more than a thousand years everything pertaining to travel, including the mentality of camp servants, has followed the horse-standard. Yet I firmly believe that a walking observer will find and note down many new things overlooked by dozens of travellers who passed that way on horseback. My ideal would be a

"handy" horse carrying collecting kit, cameras, etc., easily accessible without unloading; or, still better, a couple of porters. A "ferry-camel" for carrying valuables across the more dangerous fords would also be welcome. I have learnt something new about camels, by the way. The fine Bactrians of the Qara-Qirghiz will go almost anywhere in difficult mountain country. After a week I sold the donkeys and we took to horses generously provided by the Amir of Bukhara at the expense of his subjects.

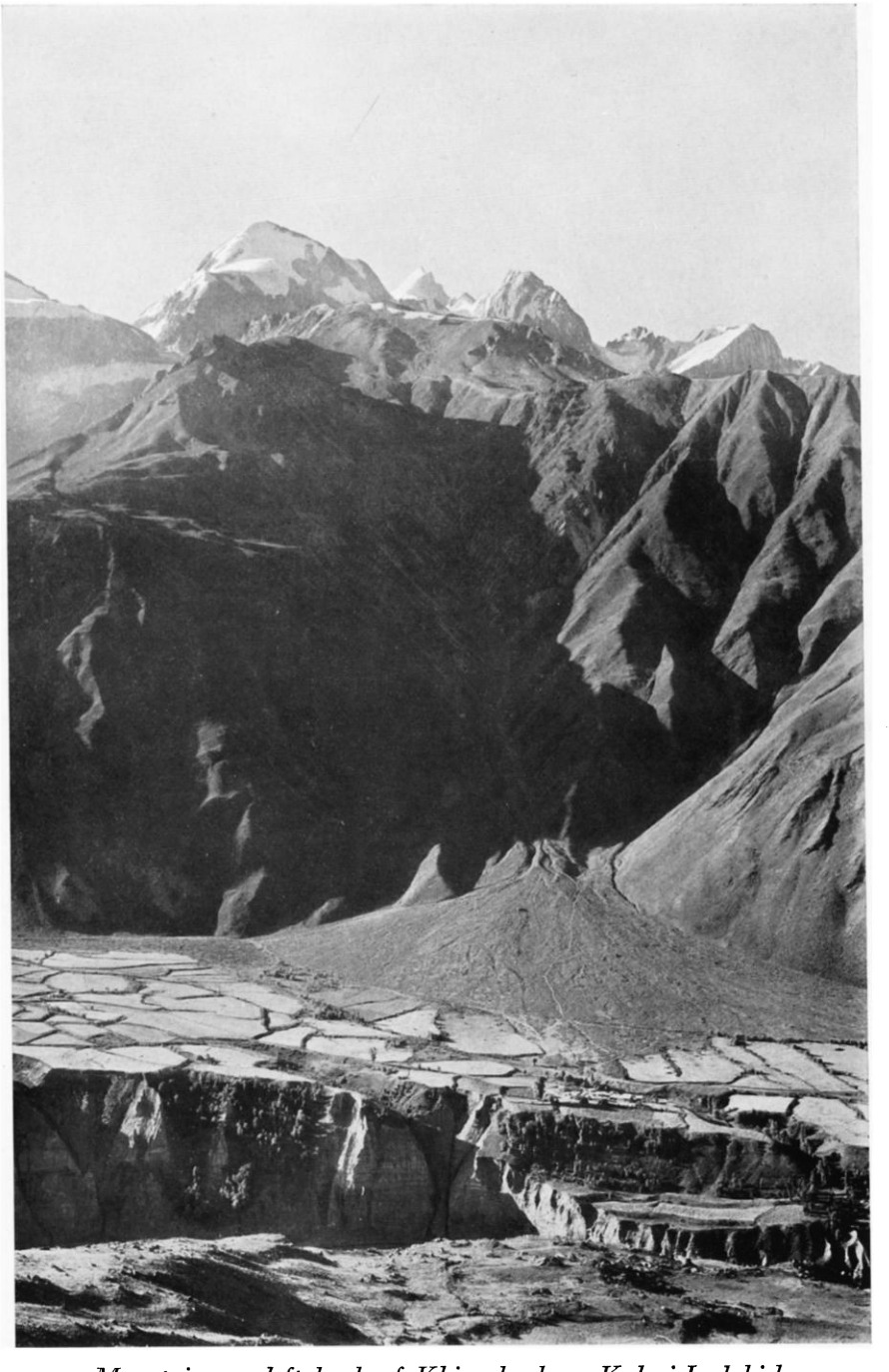
The journey lasted from 2 May to 13 December 1913, and cost £1350. From Samarqand we travelled by the Manis pass (1850 m.) across the Kemkutan mountains, a granite spur of the Hissar range, to Kitab in the valley of the Kashka Darya. Thence to Yakkabagh—Chakman Kuidi pass (2700 m.)—Tashqurghan—Langar-i-Mardan pass (3380 m.)—Sariasia—Qaratagh—Dushambe—Faizabad (1200 m.)—Ab-i-Garm (1400 m.)—Vakhsh river—Muj-i-Kharv (1300 m.)—Garm in Qarategin (1400 m.)—Kala-i-Laleh Ab (1600 m.)—Kanishbeg (1800 m.)—Tupcheq (3300 m.)—Gardan-i-Kaftar pass (3890 m.)—Langar in the Khingab valley (2200 m.)—Pashimgar (2750 m.)—Garmo glacier (to 4000 m.) and back—Aqbai Sitargi pass (4660 m.)—Sitargi on the Vanch (2340 m.)—Kala-i-Rokhar (1880 m.)—along the Panj to Kurgovad (1630 m.)—Aqbai Viskharvi (4160 m.)—Sangvar—Saghir Dasht (3000 m.)—Sariab pass (3600 m.)—Ravnau (2300 m.)—Ravnau pass into Ab-i-Nab valley—Deh-i-Baland (2000 m.)—Langar (1300 m.)—Qashbandon pass (2500 m.)—Muminabad (1200 m.)—Kuliab (600 m.)—Island of Urta Tugai in the Amu Darya—Qurghan Töbe—Kabadian—Baba Tagh—Yangi Bazar in the Surkhan valley—Mirshadi—Baisun—Gusar—Karshi—Bukhara.

Ficker and Klebelsberg took another route home: Khingab—Tabidara (1730 m.)—Talbar pass (2700 m.)—Khovaling (1490 m.)—Baljuan (970 m.)—Faizabad (1200 m.)—Dushambe (930 m.)—Kala in the Varzab valley (1100 m.)—Sigdi (2010 m.)—Shutur Gardan pass across the Hissar range (3555 m.)—Takfan (1820 m.)—Laudan pass (3675 m.)—Kshtut (1400 m.)—Panjkent—Samarqand. To this itinerary must be added a great number of side excursions, glacier explorations and mountain climbs. We ascended about thirty peaks, the highest being 5700 m. As we climbed for topographical and geological purposes only, we had no time to waste on the highest and most difficult mountains.

I shall now briefly refer to the main results and various points of interest. Of Deimler's maps I have already spoken. Klebelsberg wrote 'Beitrage zur Geologie Westturkestans' (Innsbruck, 1922, 480 pp.). The Vienna Academy of Science published Ficker's 'Untersuchungen über die Meteorologischen Verhältnisse der Pamirgebiete' (Wien, 1919).

Klebelsberg's most brilliant discovery is perhaps that of the great Vakhsh fault marked by hot springs (Ab-i-Garm, 40° C.) and frequent earthquakes (destruction of Qaratagh in 1907). From the writings of Mushketov and others it is possible to pick up the continuation of this fault along the Alai valley and the Kashgarian Qizil Su. Extending from the Hissar province to the Tarim basin the Vakhsh fault coincides with the valleys marking the orographical boundary-line between the mountain systems of the Alai and the Pamirs.

Upper Qarategin presents a number of old land surfaces, notably that of



Mountains on left bank of Khingab above Kala-i-Lodzhirk

Looking into Garmo and Bokhud valleys, Darvaz

Tupcheq (Qara Shura), which is at the same time associated with moraines of various ages. The grandest of the old surfaces is that of Darvaz (Saghir Dasht and surroundings).

The snow-line rises from about 4000 m. in Qarategin to about 5000 m. in the Garmo valley, following as usual the elevation of the central mountain mass. To this may be added the increasing distance from the western sources of precipitation. The difference between the north and south faces is enormous, amounting to not less than 1000 m. In September I climbed Mirza Tash (5300 m.) on dry rock from the south. On the top a parapet of snow 4 feet high proved to be the upper edge of a precipitous ice-slope falling away thousands of feet to the Gando glacier on the north side.

It is as yet too early for linking the stages of glaciation with those of the Alps. One of the farthest advances is marked by the fine landscape of terminal moraines left by the old Muk Su glacier (Fedchenko glacier) at the junction of the Muk Su with the Qizil Su. Witnesses to the most recent retreat are the dirty and rubbish-laden lower reaches of dead ice often extending upwards for miles before the white or live glacier is reached. These black snouts seem to point to some comparatively sudden change in which the shortness of the glaciers may have acted as a contributory cause. The longest glacier of the range of Peter the Great does not exceed 12 miles. Many considerable ice-streams such as the Barolmas have neither upper snow basins nor lateral feeders, but depend for their subsistence entirely upon ice-avalanches from the steep walls of corries at their head. Altogether the Alai-Pamirs form a glaciological laboratory which owing to its accessibility facilitates and, owing to climatic contrasts, deserves continuous systematic observation. As an island surrounded by deserts this mountain region forms a splendid object of comparison with the Alps. Here one can apply to new surroundings the knowledge acquired in the Alps during more than a century. On the other hand Turkistan, owing to the dryness of the climate, and the lucidity of the processes of denudation or accumulation, may throw fresh light on the history of Alpine glaciation.

I cherish the fond belief that the solution of the riddle of the dead cities of Chinese Turkistan is to be sought among the Pamir glaciers. Nothing seems to warrant the assumption that the Tarim basin was a zone of rainfall cultivation in historical times. If the change of climate responsible for glacial periods also produced more rain in Central Asia, then it must have been before the advent of historic man, or, to be exact, before the immigration of peasants. The dead cities lived on agriculture by irrigation which drew its water from rivers partly fed by residual ice, by dead ice not replenished from precipitation above the snow-line. This store of ice left over after the last glacial retreat, or cessation of surplus feeding, gradually dwindled. The rivers decreased in volume and after a time were unable to fill the irrigation canals of outlying districts. In that case the problem of the (historic) desiccation of Inner Asia would be changed from one of rainfall to one of residual melting. Thus we should be able to detach this narrower problem from the wider one of climatic change, which looms beyond. We are at once struck by the fact that the stoppage of supplies from the atmosphere must have been more rapid than the melting of old stores. This would point to a comparatively

sudden change of climate. But then everything is or appears sudden in Central Asia. It is a country where every difference is magnified into glaring contrast. The dead glaciers of to-day furnish an example on a smaller scale, although here earthquakes may often be a cause of irregular feeding by shaking the heavy breast-plates of ice from the towering precipices of the upper corries.

From Tashqurghan at the foot of the Sang Gardak mountains Mirza Akhram, the secretary of the Beg of Yakkabagh, led us to the cave Kala-i-Shiran in the limestone canyon of the Kala Sai torrent. The floor of the picturesque gorge is covered with thick jungle where hoary junipers mingle with the slender birch. From a round hole high up in the red-encrusted cliff bursts a powerful jet of water. The two porticoes of the cave open out on the right bank at a height of about 2400 m. above sea-level. The familiarity of our guides with the locality, the remains of torches, and broken stalactites showed that the place is used for pilgrimages or tamashas. Legend calls it Tamerlane's horse-stable, which seems justified by the thick layer of droppings, although these come from the less romantic sheep. Digging a hole we came upon layers of broken bones, and in a cranny we found a very old clay lamp. One of the caverns—its continuation runs into the main cave after a short distance—is neatly walled up with alternate layers of blocks and wooden beams ("gallic" wall). Earth filled in behind makes a wide platform. We went in about 500 yards through halls alternating with narrow passages. In one of these worm-holes I had to crawl flat on my belly. It makes one feel buried alive. The fat Aksakal of Tashqurghan stuck and had to be pulled out by his feet. I refrained from excavations on a large scale for fear of spoiling the work of future experts. Kala-i-Shiran certainly promises well, for its human record must stretch unbroken far into the dim past, although it remains doubtful whether neolithic man ever roamed in this neighbourhood. But cave animals there may have been.

Another little-known place I visited was the island of Urta Tugai formed by two arms of the Oxus south of Kuliab. It was a wonderful paradise of jungle, reed swamps, water runnels, steppe, and sandy stretches, swarming with pheasants, wild pigs, stags (Bukhara type), and tigers. Here I should have liked to roam in the crisp October air, but the unconcealed impatience and contempt of the mathematician drove me from the land of happy play after I had slain only a big tusker. At Kokul just beyond the lower end of Urta Tugai there was a permanent ferry to the Afghan bank.

The climate of the Alai-Pamirs is on the whole as simple as it is dry, though complicated by local vagaries which still require close investigation. The traveller delights in long spells of fine and steadfast weather which does away with much uncertainty in the planning of mountain excursions. To make up for this, visibility is often impaired or entirely suppressed by yellow dust-fogs due to loess carried upwards by currents of hot air. The finer the weather the thicker the mist.

To the temptations of nomenclature we only yielded within forgivable limits. Explorers being poor men, or young men, or both, how can they show their gratitude to helpers of the financial or professorial world better than by writing their names on the map? Our most pressing want seemed to be a

uniform designation of the whole of the range from Mount Sandal (Altin Mazar) to the mouth of the Khingab. Peter the Great already being represented by the western half, we considered the imperial house of Romanov appropriate to the whole. The eastern portion is sometimes called Periokh Tau on older maps, being a corruption of Pir Yakh Tau (peak-snow-mountain, or range of the snowy peaks). Since then the wheel of history has caused the demands of topography to be supplied from other sources, but here as in Canada the bad habit has apparently come to stay—I mean the habit of turning mountains into monoliths in memory of the living.

Is it then so difficult to invent names with local colour? Nobody ever suspects nowadays that Mirza Tash, the "Stone of the Scribe," was invented by me in honour of the official who accompanied me as representative of the Amir. Scholars versed in Persian or Turki or the old Indian dialects of Canada should be able to turn out pithy or poetical names by the hundred.

Our easternmost point was 10 miles up the Garmo glacier, where Dr. Deimler and I were turned back by bad weather late in September; bad weather always means difficulties with porters. From the top of Mirza Tash, which rises above the right bank of the glacier, I obtained a wonderful view of the central Sel Tau and its western branches. Here, then, was my dreamland of the future. And this future more than justified its name, for it lasted fifteen years.

When from a large party in 1913 I blossomed forth into a still larger one in 1928 the step was accepted almost as a matter of course. The era of collective travel by land had established itself in the natural course of events, and the Mount Everest expeditions had restored public confidence shaken by earlier failures.

Consisting of eleven Germans and eleven Russians, the Alai Expedition of 1928 was not only a very large one, but also characterized by the close collaboration of two peoples. This latter feature also has come to stay. Nations on whose territory there is something to investigate no longer care to appear as the passive object of foreign scientists. To begin with, it might be thought that they were incapable of describing their own country. Furthermore, they do not see why their antiquities or ethnographical rarities should be the booty of museums abroad. And finally, a tradition lingering in the popular mind places every explorer into a country peopled by savages. Nobody wishes to exclude helpful neighbours, but everywhere self-esteem has begun to formulate this condition: There shall be no foreign exploration by others without our own active share as homeland explorers.

On sea voyages big scientific staffs have long been customary, for the ship at once suggests a floating university. But on land a geographical levy in mass was rarely attempted with success. Yet one may well ask why Jenghiz Khan and Alexander the Great were able to push vast armies into Europe and India. It seems however that military undertakings belong to another plane of comparison, nothing being easier than to raise money for war, whereas the ventures of trade or science are usually dependent upon private enterprise. Generals have unlimited means and unlimited powers. Military discipline cannot be enforced in exploration because a really capable specialist

will always be an independent thinker and worker. It is therefore easier to manage five thousand soldiers than five scholars.

On the vast expanse of desert or steppe the motor car enables us to mimic sea traffic on land. One feels tempted to elaborate the obvious analogy between a fleet of desert-cars and a fleet of polar vessels.

Apart from these considerations the modern exploring party shows the inevitable evolution from the journey of discovery to the journey of study or committee of investigation. The preliminary survey of the field is followed by an inventory of every detail. Discoverers hunt better alone or in couples, their wide spaces calling for a corresponding liberty of movement. Whatever he may have been besides, say a geologist or botanist, the older traveller had always to be a route-surveyor. His foremost duty was the map, for without a map his work in other directions, however good, remained unscientific in the geographical sense. Geography is the science of map-making and of coordinating all knowledge with the map. In those times it was enough to be a topographer, for mountains, forests, man, and animals were so new that one had only to look at them with open eyes and describe them with a vivid pen.

To-day the world is discovered, that is to say known everywhere in outline. Bold sketching no longer helps; the mosaic between the contours has to be filled in. The finder is being replaced by the examiner, the prospector by the sinker of shafts, the eye by the instrument, the story-teller by the measurer and statistician. The Earth is shrinking, and peoples begin to discover each other instead of waiting for that ridiculous man from Berlin, London, or Harvard. And of the more primitive tribes there are hardly any left who do not expect to be explored at more or less regular intervals, while a few hidden away in dark corners take it for granted that they will soon be discovered.

All human activity moves from extensive to intensive cultivation or organization. The nomad becomes a peasant, the peasant a gardener. But as movement cannot be dissociated from life, nor travelling from exploration, the new order of things has been brought about by a division of labour. Geographical exploration is split up into pure travel and pure study. The leader becomes a travel specialist with an understanding of the needs of each science. At home he builds up an institute. This he lifts bodily through space, setting it down in the distant playground. His companions do not travel there, but are transported. They are let loose on the plot to be cultivated, each starting on his own career of adventure and discovery. Yet all remain united by a central organization, for it is the duty of the leader to relieve his scientific collaborators of the routine of travel. Not theirs to ask how to move, what to eat, or where to sleep. Horse, food, and bed await them at the appointed place and time.

As in all big modern factories, so here, greater capital expenditure must be compensated by quicker results within a given time. The old explorer often stayed away for years; a year may be taken as the minimum. The Russo-German Alai Expedition lasted six and a half months, only five of which were devoted to actual work on the spot. In spite of this the scientific results will fill the usual volume of a thousand pages.

And now one will understand why I have nothing sensational to report.

There simply had to be no adventures if our task was to be done thoroughly and in time. Formerly discoverers went out in search of adventure, for they opened up new ways across oceans and continents, and an unknown road always means adventure. Now adventure has been driven from the high-roads to the lanes and by-paths. For the modern leader any adventure worth talking about means an engineering accident or a flaw in the organization. If thus he foregoes the full measure of popularity which is the reward of mighty deeds, he should remember that it was the heroism of his countless predecessors which made a science of travel possible.

A sympathetic public will have to change its mental attitude towards explorers, if in future it wishes to do them justice, for the adventure of accidents is gradually being transformed into the adventure of organization, almost of high finance. Instead of the sensational fight with unexpected obstacles there is the noiseless war with detail, with equipment, tactics, and accounts. Only the final result of the undertaking becomes visible. For ever invisible remain the sensations surging in the breast of the leader.

The sponsors of the Alai Expedition (1928) were the Notgemeinschaft der Deutschen Wissenschaft in Berlin and the U.S.S.R. Academy of Sciences in Leningrad. The costs were shared by the Soviet and German sides. Elsewhere I have enumerated the long list of those to whom thanks are due. Let me here concentrate my gratitude upon our chief representatives, upon His Excellency Dr. Schmidt-Ott, President of the German Society in Aid of Science, and our Russian leader, Nikolai Petrovich Gorbunov, Chief of the Executive of the Soviet of Peoples' Commissaries. As the third participant in the honours and expenses I must mention the German and Austrian Alpine Association, which contributed four excellent mountaineers. This is not the place for a complete list of our staff and their functions. I shall mention names as occasion offers. During August climbing visitors from Moscow brought our party up to thirty. There never was any grousing or sulking to interfere with work, but only the usual relief of overpressure through the safety-valve of a few well-chosen words. And Russian hospitality was as wonderful as ever. I do not mean sumptuous dinners—those days are past—but the eager interest taken in visitors, and the wish to be helpful.

The official name of the expedition is now the Alai-Pamir Expedition. During its inception it had however been decided to camouflage it as the Alai Expedition. Its main objective, the Sel Tau, was ruled out as being too little known. We did not like to mention the Pamirs, fearing to arouse suspicion, for the Pamirs are like three mighty hands clasped in a grip of steel, each holding on for dear life, yet each hoping that the others might let go. Now that all is over, one realizes that the schemers of dark plots would not have taken a dozen foreigners into their confidence, least of all map-makers. All the same the governor of Kashgar concentrated troops on the border, and many Qirghiz fled into Chinese territory when they heard of our coming.

Early in 1927 I was ordered to start on the somewhat appalling task of getting the equipment ready. How this is done can best be gathered from the three Mount Everest volumes, so that I need not repeat history. But I may

be permitted to dwell upon a hobby of mine which is The Permanent Equipment Shop, "shop" here to be taken in the sense of modelshop and workshop. The science of equipment lacks centralization, so that each traveller or expedition is forced to build up a new organization. It is easy enough to assemble the theory from books, catalogues, and experts, but one misses the rooms where the tradition of tangible things is continued unbroken. To begin with, it is difficult to rent comfortable and business-like quarters for so short a time. I have vivid recollections of odd corners in draughty warehouses, of basements kindly lent, and other localities which one must often be ready to leave at a moment's notice.

What I want is a spacious well-lighted hall which can be made reasonably warm in cold weather. On the floor are painted the ground plans of various tents, boats, wagons, trucks, and cabins, their sections being repeated on the walls. There is a stuffed horse, a camel, a sheep, a porter for trying on loads. Scales big and small will not be forgotten, nor a shaking machine for testing packs. There are work benches and tools of every description for the amateur mechanic, together with an ever-increasing collection of materials (wood, metal, paper, glass, celluloid, textiles, etc.) in their various shapes (flat, long, hollow, etc.). It is most important that one should be able to see, handle, and compare all the possible stuffs from which a thing can be made. There is a representative collection of articles of outfit, models, and dummies, especially receptacles, boxes, and bottles. Next door is the shed for packing and storing. The garden offers space for experimental camping, as well as for playing with fire, mild explosives, pungent chemicals or big noises. All this is in permanent charge of a handy man, a many-sided amateur mechanic. An office contains every facility for correspondence, drawing, and filing. There is a library, while card-indexes furnish classified information on every possible subject connected with equipment: sizes, measurements, carrying capacities, the physical properties of materials (waterproof, insulating, absorbent, soft, elastic, etc.). An Honorary Equipment Secretary surveys the whole. Here at last the art of equipping is brought into line with the scientific management of a modern navy yard or brewery. One can afford a high fee for the use of these rooms, say 10 per cent. of the sum ear-marked for outfit. Why, one would save three times as much in the shape of money otherwise wasted on ballast or useless transport.

There is always the choice between the extremes of a large luxurious outfit and a small Spartan kit. The former is easier to buy, but causes endless trouble and disgust unless one has a special store-keeper (in this case myself). The frugal furnishings require very much more thought at home, but make for a care-free life on the road. There are no lists to keep, as nearly every article is in daily use. When a traveller feels overburdened, there is only one remedy, namely jettison. I was able to save my surplus stores owing to a permanent caravan hired for five months. This was rendered necessary by the constant shifting of base-camps and the frequent redistribution of our skirmishing groups. When we were not actually marching the horses went to and fro between dumps.

The modern travelling scientific institute has to be provided for regardless of weight, for to ensure success within a given time there must never be the

shortest delay due to the temporary want of food, spare parts, or refills. As in scientific industrial management, the proportion between time and work done is a question of money. Other conditions being equal the quick but more expensive management of bulk comes cheaper in the end than piecemeal haulage. The Alai Expedition with its 30 Europeans, 40 servants, 180 horses, and 70 camels accomplished within six months what would have been the task of many years for smaller units. It meant, of course, that the leader had to do all the housekeeping of the expedition, and nothing else. Even then I might have found my hands too full had not Professor Shcherbakov taken many a burden upon himself.

Two large boxes of medical stores have been left at Tashkent for future use, for we had only three surgical accidents and no sickness worth speaking of. As I started my companions on quinine in Leningrad, we had not a single case of malaria. The drawing of teeth was a relaxation which I reserved for my own moments of leisure.

As regards presents one should distinguish between friendly free gifts and presents instead of money. Worldwide trade has by now educated the savage of the story-books who gave food or valuable things in return for rusty pocket-knives or cheap trinkets. Asia with its ancient trade-routes is the last place for speculating in presents. The simplest and in the end cheapest plan is to pay with money or with the standard trade goods, which are but another form of currency. I carried two horse-loads of silver equal to ten camels in the guise of universal providers. Special services or liberal hospitality were rewarded by excellent tools, razors, scissors, hunting knives all of stainless steel, field-glasses, and good jewellery.

In 1928 I wanted to continue where I had left off in 1913. To begin with, I must find out what had been done in the meantime. Fortunately the core of my "reservation"—the central Sel Tau—remained untouched, although the great wave of Russian exploration had thrown a few ripples into the outer bights. In 1917 Byelyaev visited the Garmo glacier and used up the wood which I had dumped on the ice. This pile consisted of trees gathered from a dead forest of juniper lower down on the right bank (change of local climate owing to advance of glacier?). I had hoped that in later years these logs would enable me to estimate the rate of glacier movement. Korjenevski continued his exploration of the Muk Su and also penetrated to the snout of the lowest glacier in the Tanimas valley. Right glad was I to see that Sir Aurel Stein had skirted my ground in 1915—a close shave for me indeed (*G.J.*, 48, 3, 211 ff.). His article forms an excellent introduction to my report. By referring the reader to his descriptions and photographs I save myself much repetition. Arved Schultz's new book ('Landeskundliche Forschungen im Pamir,' Hamburg, 1916) provided me with an up-to-date compendium.

I have brought home a big trunk full of recent Russian literature on Turkistan. The government has taken up exploration as a national matter to be financed by the state. The Academy has a standing committee for organizing expeditions. Last year they sent out between one hundred and two hundred expeditions (I forget the exact number). Most of them are of course small, numbering only one, two, or three men. With funds that to us appear

ridiculously inadequate they face the sands of Qara Qum and the icy swamps of Siberia. I admire these Russian travellers in comparison with whom we are lamentable sybarites.

The main task was a map of as large an area of the Sel Tau as possible (Finsterwalder, Byelyaev, Dorofeev, Issakov, Biersack) overlaid by geological (Nöth) and meteorological (Zimmermann) observations. Around this solid centre was to be grouped the work of the linguist (Lentz), zoologists (Reichardt, Sokolov, Reinig), botanist (Gorbunov), and many other specialists in highly technical branches (geomagnetism, radiology, etc.). Professor Korjenevsky, to our great regret, had to turn back in the Alai valley owing to a weak heart. The well-known company Mejrabpomruss was represented by Messrs. Shneiderov and Tolchan, who produced a very fine film. Herr Wien took charge of the radio for time-signals.

The craving for a few special plums of adventurous discovery was to be satisfied by the crossing of mysterious passes and the ascent of the highest peak. The biggest discovery however, that of the inordinate length of the Fedchenko glacier, came as a complete surprise. The leader, the topographers, and the geologist were necessarily mountaineers. They were supported by a force of crack climbers (Borchers, Allwein, Wien, Kohlhaupt, Schneider) for reconnoitring.

On the Russian 10-verst map (1 : 420,000) the curiosity of the traveller is attracted by the words "Foot Pass" or "Former Pass" written across the crests of several high ranges. Upon inquiry the natives always answer, "O, Tura, our great-grandfathers have used this pass, but it has long ago become impassable owing to the ice." An increase of ice (covering easy slopes) or a retreat of the glacier (exposing steep rocks) is variously given as an explanation. In 1913, however, Professor von Ficker succeeded in finding and crossing one of these mysterious highways, the Sagran, which connects the head of a left tributary of the Muk Su with the Sagran river. At the village of Pashimgar the Sagran flows into the Garmo torrent, which from this point onward is known as the Khingab. Ficker had to feel his way towards the pass as none of the Muk Su Tajiks were willing to give information. Only when he had reached the low saddle separating two easy glaciers did his porters reluctantly admit that this was a well-known and much-used pass. To men on foot it offers no difficulties whatever, and one might at a pinch be able to get horses across. The secrecy surrounding such an easy pass showing traces of constant use can only be explained by the wish of the Tajiks (Galchas) to hide it from the Qirghiz, so that it can always be used for flight or for fetching reinforcements.

The old Aryan population of Darvaz sits astride the boundary ranges so that on the northern slopes of the mountains of Peter the Great (Qarategin) and on the eastern slopes of the Sel Tau (Pamirs) the Tajik are dovetailed into the Qirghiz. This zone of contact means a state of silent war between the two races, each trying to extend its pastures or fields. It is not a war between two nations as a whole, but a state of economic pressure giving rise to small local adjustments where families grow or dwindle. Here and there one finds groups of stone hovels representing relinquished outposts of the Galchas

Snout of Sildi glacier, Tupcheq

Kala-i-Shiran cave

Looking towards Mount Kaufmann from Tenghiz Bai Pass

driven back by the Qirghiz. It is not so easy to see where the nomads have retreated as they leave no permanent buildings behind. Real battles on a large scale do not seem to take place, at least not since the Russian conquest of Turkistan. Curiously enough the two even mix quite readily in some localities. They share the wide pastures of Tupcheq, while in Qarategin on the banks of the Surkhab we find villages where Tajik and Qirghiz till the soil in perfect harmony. Here the nomads prove that they are perfectly capable of settling on the land. The Qirghiz of Qarategin are excellent agriculturists. They are far more intelligent and progressive than the Tajiks. At the University of Tashkent they enjoy the reputation of being good mathematicians.

If the Sagran was merely kept secret, the higher passes across the central Sel Tau, notably the Kashal Ayak, were really abandoned long ago. Being fairly easy for hardy mountaineers, although very long and strenuous, they have not been closed by the forces of nature, but have become obsolete for historical reasons. When the Russians came into the country they did away with small boundaries, welding tribes and minor states into one whole of law and order. Short cuts or loopholes for fugitives, spies, and smugglers became unnecessary. I believe, however, that the Tajiks still use them in a small way and that their memory, notably that of the Kashal Ayak, is kept bright for future emergencies. Dr. Kohlhaupt found the droppings of horses near the second glacier of the Tanimas. We picked up an old corn-pestle below the Notgemeinschaft glacier, and near Dust Camp discovered a hunters' lair with a wind-screen, cinders, and ibex horns. All this would show that the upper Tanimas valley has never been quite deserted. Besides hunters and shepherds, prospectors for gold must be counted among its regular visitors. Indeed, our very presence may have been responsible for its look of utter desolation, a sort of camouflage by abstention.

In this connection I may mention that the route Pamirs—Zulum Art pass—Baland Kiik valley—Kaindi pass—Altin Mazar—Daraut Qurghan is still being used by smugglers from Chinese Turkistan. The frontier guards who accompanied us made a big haul of over a hundred sheep that were being driven down the Baland Kiik from Kashgar. The Russians do not seem to keep a very strict watch on the Pamir boundary, but to rely upon catching the contraband nearer its point of destination. The smugglers on the other hand must have great confidence in the secret sympathy of the population. This route may well have been an alternative to the old trade route from Eastern to Western Turkistan, for one can take camels along during the autumn months. But as it is bound to join the main road at Daraut Qurghan, there being absolutely no other way out from Altin Mazar, this alternative can only have been of use to avoid dangers lurking in the Alai valley between the Chinese frontier and Daraut Qurghan.

In my plans for an attack upon the central Sel Tau I had to consider two approaches, from the west and from the east. In this choice I was guided by the size of the party, by the wish to start work as early as possible in the season, and by the advantages of one central base-camp for all operations. The roads through the steep and narrow western valleys are more difficult for large caravans than the flat Pamirs. On this side which faces the sources

of precipitation the wet spring weather lasts longer than on the Pamirs, which are practically rainless. A glance at the map, furthermore, shows three big valleys descending from the western flanks of the Sel Tau range, namely the valleys of the Khingab, the Vanch, and the Yazgulam, whose high dividing ridges mean difficult lateral communications along the great mountain chain. Towards the Pamirs there is only one big valley, that of the Tanimas or upper Bartang. Now when one valley does the work of three opposite ones one may surmise that its branches join the heads of the three counterparts, thus giving access to the same length of main range. Hence one base-camp would do for three. This strategical theory proved itself correct although in quite an unexpected manner. In reality it is not the Tanimas river but the Fedchenko glacier which, as a drainage system, corresponds to the western valleys. We hoped to discover an enormous Tanimas glacier, instead of which we found a dry valley which only serves as an overflow to the Fedchenko during high glacial tides.

The only difficulty on the eastern side, and that a serious one, is the question of supplies. Apart from the Alai valley, where numerous rich Qirghiz pasture their flocks, our way from Osh to the base-camp was practically through uninhabited desert. Late in June the few inhabitants of the Alai mountains north of the Taldik pass had already left for the higher ground. From Bordoba to Tanimas past the Great Qara Köl and Kokjar we did not see more than about a dozen yurts or families. This also meant scarcity of fodder and fuel, for the number of Qirghiz is on the whole proportionate to the grazing surface. And scarcity of cattle means scarcity of dung for the kitchen fire. Teresken (wormwood), the only other fuel, is nowhere plentiful along the usual tracks or around the camping-grounds. Hence when one has a large caravan, decency forbids camping longer than one night on the green spots barely sufficient for the flocks of the nomads. In between these places our horses found next to nothing to supplement their barley rations. These conditions forced us to accumulate a big dump of flour, barley, and wood (archa, *i.e.* juniper) at the ruined rabat (rest-house) of Tukur Bai on the eastern shore of the Great Qara Köl. These stores were brought thither by camel caravan from Osh, the wood being picked up in the juniper forests of Oltin Lug on the north side of the Taldik pass. Here we also concentrated close upon three hundred sheep, most of which came from the Alichur Pamir, where they were more numerous and much cheaper. After the establishment of the base-camp our horses were kept busy fetching supplies from Tukur Bai.

To this must be added the difficulty of obtaining porters for transport on the higher mountains and glaciers. We drafted these men from the upper villages on the Bartang, 30 and 40 miles away. The distance made recruiting still more difficult, as it had to be done through emissaries. Moreover, these Tajiks (mountain Tajiks or Galchas) are a very unenterprising race, and during summer their minds are wholly occupied with their wretched barley crops. One cannot even tempt them by an offer to buy their poor harvest outright.

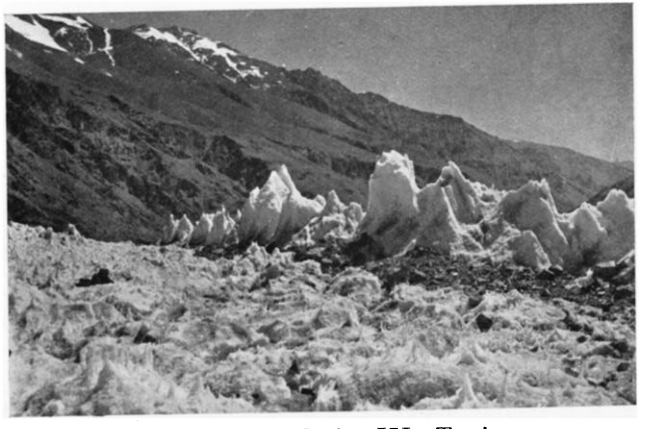
All this made the base-camp in the Tanimas valley very expensive. But it was then the only possible take-off for a frontal attack upon the long line of the Sel Tau. The head of the Khingab valley would have been far more agreeable. There one lives in the midst of a large population, while supplies

Looking from Dust Camp to narrows formed by dead ice snout of Notgemeinschaft glacier

Glacier II, Tanimas: alluvial cone from side gulley blocking main valley

Terraced shelf, Kanidi valley

Glaciers on south side of Tanimas valley below pass



Pinnacles on Glacier III, Tanimas

Sand-dunes in Tanimas valley above Notgemeinschaft glacier

can easily be obtained from Qarategin. Beautiful jungle grows right up to the snout of the Garmo glacier. But after that one lands in a cul-de-sac. To-day we know that the best base is Altin Mazar, whence the Fedchenko glacier forms a high-road from north to south. But then, who could have dreamt that the best base for exploring a long range was at its very end? Altin Mazar is only five days from Marghilan by easy roads, whereas it takes at least a fortnight from Osh to Tanimas across the Pamirs.

Not wishing to repeat myself, I must refer the reader to the preliminary report of the German Society in Aid of Science (Deutsche Forschung, 'Aus der Arbeit der Notgemeinschaft der Deutschen Wissenschaft,' Heft 8, "Die Alai-Pamir Expedition 1928," Berlin, 1929, 196 pp.). Here I shall only give a compressed itinerary and a mere abstract of results.

Main Line

Osh (left June 19)—Gulcha—Qizil Qurghan—Sufi Qurghan—Qizil Beles pass—Taldik pass—Saritash—Bordoba—Qizil Art pass—Kok Sai (Markan Su)—Tukur Bai (4000 m., July 2 to 8)—Ju Ui (Muz Qol river)—Lake Quruq Köl—Qirghiz camp Qara Chim (about 4200 m.) below Qizil Beles (about 4400 m.)—Kokjar—Urus Tugai (Sea Buckthorn Camp) on the lower Tanimas (3200 m.)—Dust Camp above snout of Notgemeinschaft glacier (3500 m.)—Tanimas pass (4400 m.)—back to Kokjar (September 10)—Takhta Qorum pass—Kaindi pass—Altin Mazar—Ters Agar pass—Daraut Qurghan—Tengiz Bai pass (3400 m.)—Qaraul (1100 m.)—Uch Qurghan Aravan—Osh (October 21).

Branch Lines

From the Great Qara Köl to a camp in the Qara Jilga valley and thence exploration of the glaciers on the south side of the Trans-Alai, partly with the object of finding a way up Pik Kaufmann (renamed by the Russians Pik Lenin).

From Dust Camp to nearly all the glaciers of the central Sel Tau. Ascent of many peaks. Then down the Fedchenko glacier to Altin Mazar.

Across the Kashal Ayak pass and back (Borchers and Wien). Long stay at Oroshor on the upper Bartang for ethnographical purposes (Dr. Lentz). Lentz and Kohlhaupt afterwards travelled to Qarategin across Darvaz and the Gardan-i-Kaftar pass. Lentz finally went home by way of Dushambe.

Daraut Qurghan—Katta Qaramuk—Achik Alma—Jailgan in the morainic landscape between Muk Su and Qizil Su. Ascents in the unexplored mountains between the two rivers. Back to Daraut Qurghan.

Great Qara Köl—Aq Baital—Shor Köl—Rang Köl—Aqsu—Pamirski Post—Yaman Tal—Naiza Tash—Alichur Pamir—Kumdi pass—Zor Köl—Pamir Darya—Madz pass—Shakh Dara—Turumtai Köl—Koitesek pass—Bulun Köl—Yashil Köl—Langar Davan pass—Sarez Köl (landslide lake)—Nusur on the Bartang—Kokjar (September 12). This is the route of our zoologist Dr. Reinig.

Bartang—Khorjin pass—Yazgulam pass—Fedchenko glacier (Gorbunov and party).

Rang Köl (Gorbunov and party).

Dr. Nöth, our geologist, traversed the ground in all directions. Professor Korjenevski explored glaciers on the north side of the Trans-Alai near

Bordoba (Burtope Mazar). Allwein, Wien, and Schneider ascended Pik Lenin (7130 m.) on September 25. This summary of itineraries does not claim completeness in every detail, but will be enough to give an idea of the work done.

Dr. Finsterwalder, assisted by Herr Biersack and T. G. Dorofeev, photographed from 130 standpoints, measured various base-lines, and made a series of triangulations. A number of astronomical points were determined by Professor Byelyaev of Pulkovo, who also helped with the triangulations and other exact measurements. Finsterwalder brought home 600 half-plate negatives, all of which came out well. From his material he promises us the following maps: A stereoautographic map 1 : 50,000 covering 400 square miles of the Fedchenko and Tanimas glacier systems, almost without a single gap. Then a "ridge" map showing 6000 square miles of the Sel Tau, Trans-Alai, and Western Pamirs. In this the amount of detail will vary considerably. A few special maps, such as that of the lower Notgemeinschaft glacier, will supply glaciological data and enable us to judge future changes. A set of repeated photographs from the same standpoint makes it possible to compute the present rate of movement of some of the glaciers.

Dr. Nöth thinks that the folding up of the Alai-Pamirs began at the end of the Palaeozoic epoch, probably between the Carboniferous and Permian periods. Then all the ranges rose simultaneously. During the Jurassic period the region was partly covered by sea, with the exception of the northern portion which was probably lifted. This conclusion is derived from the continental character of the Jurassic sediments of the Trans-Alai. The Cretaceous sea encroached still farther, so that the Alai channel probably connected the Cretaceous basin of Bukhara with that of Tibet. The sediments of the inner Pamirs however retain their continental character. During the early Tertiary period we may assume the first upheavals along the Alai synclinal, judging from the enormous conglomerates of early Tertiary origin. In mid-Tertiary times mountain uplift was at its height. There was folding of the Mesozoic and early Tertiary strata of the Alai valley and an over-thrust of the Pamirian chains. The sea finally withdrew, leaving the region to the processes of denudation and accumulation. Dr. Nöth furthermore emphasizes the fact that the general strike of the folds runs east–west. A north–south strike is nowhere continued for long. Hence north–south ranges such as the Sel Tau are not tectonic ranges. Along the western flank of the Sel Tau runs a considerable fault which forces the glaciers to descend in gigantic ice-falls 1000 feet and more in height. Round the Great Qara Köl there is remarkable good evidence of three tiers of old land surfaces at about 4100, 4250, and 4450 metres above sea-level. All the glaciers are in retreat with the exception of a small tributary of the Tanimas.

The results of my Russian collaborators are not yet to hand. N. P. Gorbunov specialized in economic botany, and also attempted the artificial fertilization of ewes of the fat-tailed sheep from freshly killed rams of the Pamir sheep (*Ovis poli*). Dr. Zimmermann's meteorological observations should throw much light upon the climate of the Pamirs. After setting up observatories at Saritash and Tukur Bai, which were run by his assistants for three months, he accompanied us to Dust Camp and the Tanimas pass. The study of this weather-divide is important for glaciology. Messrs. Tabulski and Brimann

conducted radiotechnical investigations, while Mikhalkov devoted himself to geomagnetism. Shcherbakov and Labuntsov studied the minerals, Reichardt and Sokolov made large zoological collections. Nor should I forget our visitors who spent their holidays with us in order to do some mountaineering. They were Professor Schmidt, President of the Statistical Office, Public Prosecutor Krilenko, Mrs. Rozmirovich, and Dr. Rossels, a well-known surgeon. They helped in reconnoitring the glaciers and made the first crossing of the Yazgulam pass.

Dr. Reinig, the German zoologist, was not so much seeking new species as a rich harvest of facts concerning three biological questions : variation according to locality ; conditions of local races (biotopes) ; vertical distribution. In the Pamirs, as in all mountainous countries, high natural boundaries favour the development of local races. This can best be seen by paying attention to animals with a known tendency towards variation. Reinig therefore carefully tracked down bumble-bees (*Bombus*) and the big beetles of the genus *Carabus*. In the Central Pamirs bumble-bees are found nesting as high as 4800 m., although the soil is permanently frozen. The nests are therefore quite close to the surface warmed by the sun.

Dr. Lentz penetrated deeply into the mysteries of the Pamir dialects spoken by the mountain Tajiks or Galchas of Shugnan, Rushan, etc. These languages belong to the East Iranian branch. It is high time that science took stock of them, for they are in danger of being swamped by New Persian, Russian, or some nondescript caravan language. The political and economic opening up of the high valleys is making great strides, so that the original traits of national life and character will soon be blurred. Dr. Lentz was surprised by the wealth of oral literature in verse and prose which he found in the miserable villages of the Bartang. He has brought home a great collection of texts together with phonographic and musical records. His scientific report will show a great step forward in our knowledge of an ancient people.

Among the more conspicuous objects of Tajik handicraft are the woollen stockings and the ceremonial veils or chashband. The many-hued stockings on which the svastica often recurs remind one of Fair Isle work. The women go unveiled but wear a beautifully embroidered face-curtain for the marriage ceremony. The outstanding ornamental symbol is that of the red cock. Some of these chashbands are hundreds of years old.

Marco Polo's sheep are not yet threatened by extinction, and in some places are even plentiful. Vast stretches of the Pamirs are so thinly populated that even modern weapons in the hands of the natives do not mean a wholesale destruction of game. Nor can the dangerous occasional sportsman (official, trader, soldier) travel very far afield owing to the difficulty of obtaining food or shelter. Roughly the boundary between *Ovis poli* and ibex coincides with the geographical boundary between the Pamirs proper and the marginal or alpine ranges (central and peripheral districts). Polo's sheep prefer the vast undulations of sloping hills rising thousands of feet above the flat bottoms of the Pamirs. Ibex prefer rocky ridges. The sheep can climb very well but do not care to do so as a rule, probably owing to their great size and weight. Kokjar is one of the places where the habitats of the two meet, as can be seen from the horns lying on the ground. But whereas the sheep strictly

confine themselves to the Pamirs, the ibex penetrate into the interior wherever jagged crests and pinnacles offer them suitable conditions. Thus we find them on the southern peninsula of the Great Qara Köl among the blistered rocks of a mountain desert which might just as well be in the Sahara 12,000 feet lower down. Ibex are prone to form local varieties. The horns of the Sauk Dara seemed to me to be bent in a narrower circle than those from other valleys. Various valleys of the western ranges simply swarm with these noble animals, so that one often meets herds of a hundred head and more. During several days at tea-time I was able to watch a small herd from Dust Camp, feeding on a high ridge. The Qirghiz told me that at Kokjar, besides sheep and ibex, one finds markhor and a "goat with small, short horns."

The traveller who scans the mountain side for a likely camping-ground with shelter and fuel is quick to notice the presence or absence of the juniper tree, which is the most familiar boundary-post between the inner and outer climate. The Pamirs are quite treeless, with the exception of a few famous clumps of willows. The juniper also strictly avoids all the slopes and valleys facing the Pamirs as for instance the south side of the Alai range. But as soon as one has crossed the Taldik or Tengiz Bai northward bound, the slopes resume their characteristic spotted appearance. There is no juniper in the Tanimas valley, but plenty of it in the Kaindi valley. Below Daraut Qurghan the mountains on the left bank of the Qizil Su (facing north) are thickly sprinkled with juniper while those on the right bank remain bare. The difference between the inner and outer Pamirs is here carried on, as it were, for some time longer by the contrast between north and south exposure. Still farther west the juniper does not show quite so marked a preference for the shady side.

As to the orographical and glacial features of our field of exploration, I was struck by many curious facts which to my great regret I was unable to examine systematically, my time being taken up by general staff work. I did not climb more than a few insignificant hills, the highest of which was 5500 m.

The most prominent curiosity is, of course, the Fedchenko glacier stretching for 40 miles along the eastern flank of the Sel Tau chain. Its embryonic bed was probably sketched out by a fault which need not have been very big as long as it was continuous, a small crack being sufficient to guide erosion. This fault may correspond to the one running along the western declivity. The climatic watershed of the Sel Tau did the rest. It absorbs nearly the whole of the precipitation coming from the west. The whole of the rainfall need not necessarily be caught by the side turned towards the area of evaporation. On the contrary, only after passing the crest, the clouds, now thoroughly cooled, will be ready to shed the larger portion of their load. But they do seem to shed it very quickly, as is shown by the astonishingly low rainfall of the Pamirs, 62 mm. or barely 2 inches yearly. From Dust Camp I often saw bad weather on the Tanimas pass, but the clouds never passed me on their way eastwards. Nearing the meridian of Dust Camp they dissolved, leaving a blue sky above me. Bad weather on the Pamirs such as I met during my ride from the Great Qara Köl to Kokjar at the beginning of July consisted of short, sharp showers lasting five or ten minutes. It was "bad weather with little rain." To the question "What is the Fedchenko glacier?" one may therefore answer, "It is the snow which has not reached the Pamirs."

In a general way the glaciers of the Sel Tau are longer and more alpine in character than those of the range of Peter the Great, although their ends also show the usual snout of dead ice covered with rubble. But this dead ice is less honeycombed than that of the Garmo or Zarafshan glaciers. The front of the Notgemeinschaft glacier forms an enormous fan-shaped landscape of high ice-cones hidden under blocks precariously balanced, but with only a few of those deep funnels with lakes at their bottoms so typical of the Garmo or Zarafshan. On the other hand, the Sel Tau glaciers boast of white-ice pinnacles the like of which I had never seen before in Turkistan, the white ice of the western glaciers being comparatively smooth. Towards the lower ends of the long glaciers these pinnacles often reach a height of 50 or 60 feet. They are arranged in rows corresponding to the junctions of tributary glaciers, so that their origin may partly be due to greater density owing to pressure, and partly to protection by medial moraine. The sun chiselled these ridges into shapes which at first bear a close resemblance to penitentes. Glacier penitentes and *névé* penitentes are of course the same, as far as the sun comes into play. Glacier penitentes run in rows corresponding to medial moraines, while *névé* penitentes follow the melting furrows of old snow.

As summer advances the surface of the snowfields turns into crackly foam, reminding one of the porcelain lace which one sees on figures of Dresden china. It makes going exceedingly disagreeable. From this there are innumerable transitions to the original and genuine penitentes of the Andes, namely isolated pillars, single or in rows, riding on screes. Those I saw favoured a south-eastern exposure. The climatic contrasts leading to these conditions—the heat desert of the lowlands sharply dovetailed into the cold desert of the highlands—are best illustrated by a curious combination which I found near the third glacier of the Tanimas valley. There an expanse of grey sand-dunes lay on the top of a floe of dead ice. It is these contrasts which make me believe in the great importance of the Alai-Pamirs to students of glaciology.

Round the Great Qara Köl and in the neighbourhood of the Tanimas pass one cannot fail to notice a certain resemblance to Arctic landscapes, say those of Greenland or Spitsbergen. Here one also finds the type of glacier known as the carapace as opposed to the snout-glacier. Enormous lobes of *névé*, instead of tending towards some depression and there forming a tongue, end abruptly in a vertical ice-edge about 10 feet high and often a mile or more in length. Snowfields of the Alpine type are usually frayed, a belt of snow-patches leading over to the dry slopes below. All the glaciers near the Tanimas pass come out of short corries and at their mouth suddenly spread out into large flat cakes. Where not impeded by old moraines and dead ice, these pancakes join together, notably on the top of the pass, where they also merge into the bay or overflow of the Fedchenko glacier, forming a vast Arctic expanse with ice-swamps.

Thus the top of the Tanimas pass is level with the surface of the Fedchenko glacier which pushes a slight bulge into the gap, causing a moderate overflow. A glacial tide in the Fedchenko basin will therefore give rise to a bifurcation and to a big Tanimas glacier. This then would explain the present width of the Tanimas valley. which to-day may be compared to a withered branch. The old Tanimas glacier must have pushed on into the Kokjar valley, there

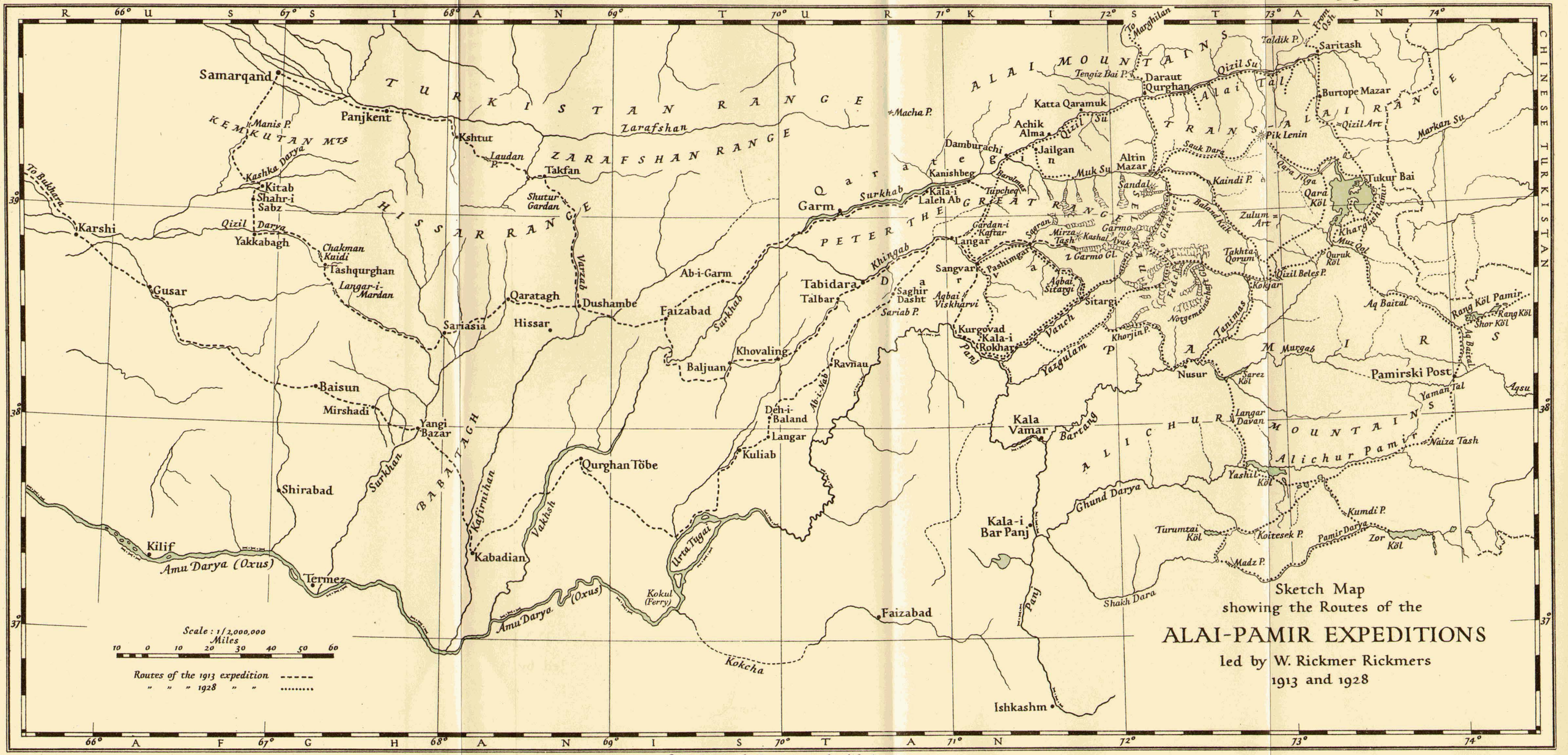
being no other explanation for the landscape of terminal moraines in the flat basin east of Kokjar and the conglomerates which choke the gorge below Kokjar. To-day, with a few insignificant exceptions, the lateral glaciers of the Tanimas valley are all on the right or southern bank. Their ends form bars across the valley, leaving dry stretches in between. Any one conversant with the habits of glaciers will guess at once that this state of affairs must be the cause of catastrophes. This agrees with the native tradition of frequent and disastrous floods in the Bartang valley.

The Tanimas is the only big river which flows eastward at right angles from the Sel Tau for a considerable distance before it turns round and escapes by running along the range as the Bartang. The Pamirs as a whole form a kind of shelf slightly inclined towards the west, the watershed being that long line of low hills along which runs the Russo-Chinese boundary. The inner sides of the marginal ranges—Alai, Tagarma, Hindu Kush, Sel Tau —are drained by rivers sidling along the ranges, pressed against them, so to speak, by the compact block of the Pamirs. The Muk Su forms no exception to this rule, only that its upper reaches are not a river but a glacier, the Fedchenko. North of the Tanimas all glaciers and rivers are right tributaries of the Fedchenko–Muk Su system. The Nalivkin glacier, the immediate neighbour of the upper Tanimas river, flows in the opposite direction to the Tanimas. Owing to these topographical peculiarities the Kashal Ayak pass gives access to the north and to the south. Whoever crosses it from the Vanch valley has the choice of two routes, one leading down the Fedchenko glacier to Altin Mazar, the other over the Tanimas pass to the Bartang valley or to the Pamirs *via* Kokjar.

The Sauk Dara glacier repeats the tendency of the Fedchenko on a smaller scale. Hugging the southern flank of the Trans-Alai it does not curl round to the watershed until well past Pik Lenin. Our mountaineers coming from the west accomplished the final ascent from a saddle (5700 m.) on the eastern side of the peak.

DISCUSSION

Before the paper the PRESIDENT (Colonel Sir CHARLES CLOSE) said: Mr. Rickmers is to address us to-night on two journeys in Central Asia. The last journey in particular was begun on the western edge of the Pamirs. At an early age Mr. Rickmers took an interest in Central Asia and made some excellent journeys there. He is well known to us as the author of a book on 'The Duab of Turkestan,' which was published by the Cambridge University Press. Just before the war he had arranged, with a distinguished past-President of this Society, to go out to the Caucasus on an expedition; but about that time he was obliged to go to Vienna to be operated on for appendicitis. He was told by an expert that he could be made fit to travel in a fortnight, and so he was. But just when he was all right, the war broke out. Now, it was really very fortunate that our past-President and Mr. Rickmers were not together in those parts of the world, because they might have had to wage a private war of their own. I might add that Mr. Rickmers' father was a native of Heligoland. At one time I thought Mr. Rickmers himself had been born there, but he tells me that is not the case. Of course, we all know that in the '90's the nationality of that island was changed. Mr. Rickmers is a member of the Alpine Club, and he comes back to us as an old friend, for he lectured to the Society thirty years ago.



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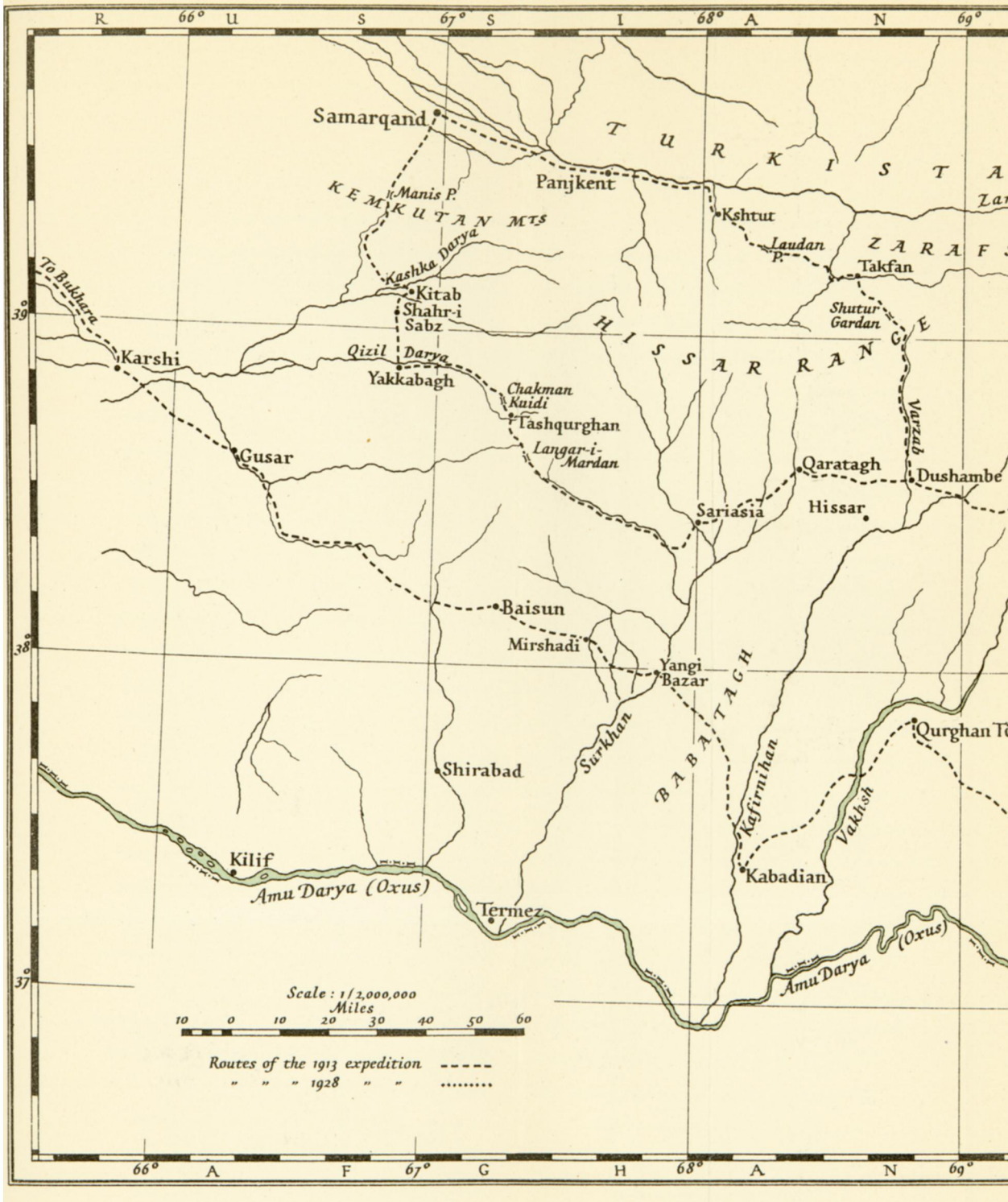
ALAI-PAMIRS
Rickmers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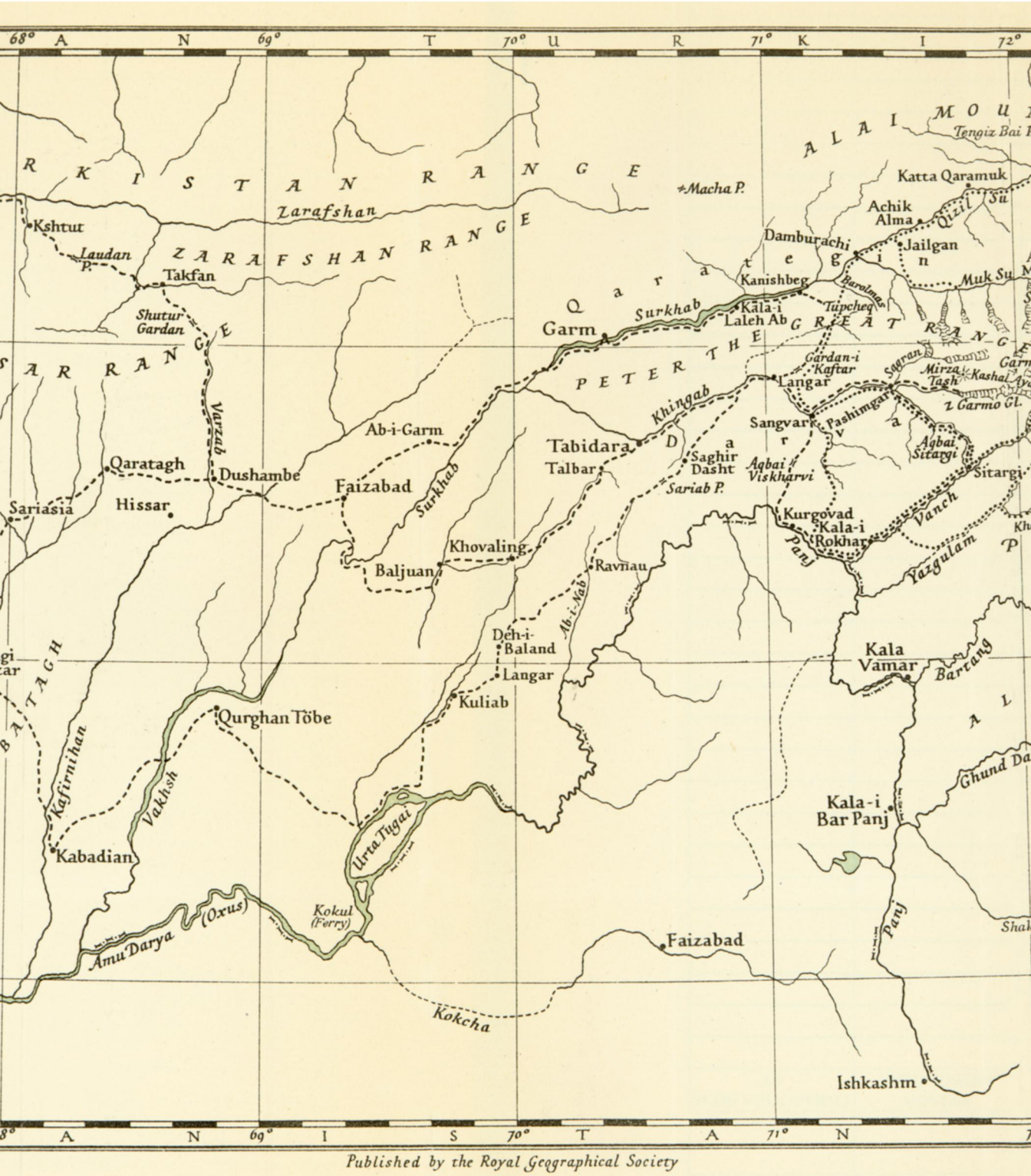

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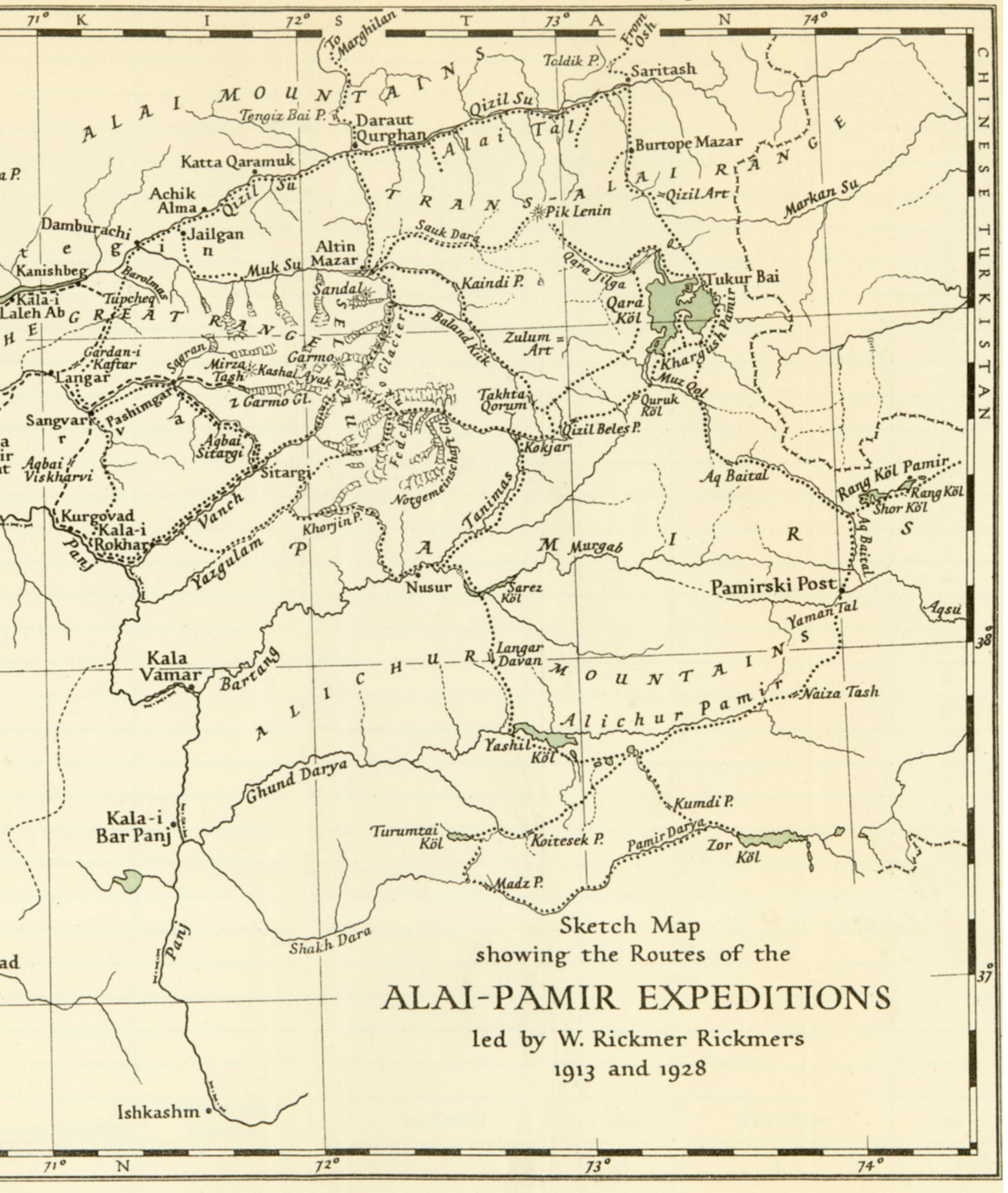


Sketch Map
showing the Routes of the

ALAI-PAMIR EXPEDITIONS

led by W. Rickmer Rickmers
1913 and 1928

Mr. Rickmers then delivered his lecture, and a discussion followed.

Sir FRANCIS YOUNGHUSBAND: Mr. Rickmers said at the beginning of his lecture that the Pamirs was a word not to be mentioned on account of its political significance. Well, I was there when it was an exceedingly burning question, because in the year 1889 when I was first on the Taghdumbash Pamir, and in 1880 and 1890 on the Great Pamir and the Great Qara Köl lake, it was a question whether the inhabitants of that part were under the aegis of the Chinese or Afghans. They were all nomadic Qirghiz who were accustomed to bring their flocks up to graze on whatever they could find on those open valleys. They then owed allegiance, sometimes to the Chinese, sometimes to the Afghans, and it was exceedingly important for us in India to know whether the Russians would come and take them, or whether they would come under the Chinese. In the year 1891 the Russians did come down. They came across from the Altai valley over the Qara Köl lake that Mr. Rickmers has shown; they came down to the Great Pamir and Little Pamir and actually crossed the Hindu Kush range on to the Indian side of the great watershed. They came by the Baroghil pass and went back by a pass whose name I have forgotten. As I say, it was then a burning question.

As to the character of those Pamirs, I think from what Mr. Rickmers has described in words and from the beautiful pictures which he has shown, you will have gathered a thoroughly accurate impression. They are great wide open valleys, sometimes 5, 6, 8 or 10 miles in width, almost flat at the bottom and with mountain ranges on either side. Unfortunately the photographs give a wrong impression because they give altogether too low an idea of the height of the mountains. That is the fault of all photographs. I saw a photograph of the Qara Köl lake and there was a comparatively small range of mountains encircling it. As a matter of fact, it is a most beautiful range of snowy mountains, as I have it in my mind now nearly forty years after first seeing it. On those valleys there is very little to find in the way of fodder, but somehow the Qirghiz flocks, like those in Tibet, find something to graze on. Thus one finds little encampments of nomadic Qirghiz in their tents who seemed, certainly in my time, very well to do, and who had not then given up the custom—and I do not think they have yet—of wearing beautifully coloured dresses. Also in their tents they had beautiful carpets on the floor and round the walls. I was given a tent belonging to a Qirghiz chief to sleep in one night; it was really magnificently carpeted both on the floor and round the walls. I bought it from him in exchange for a carbine.

Mr. Rickmers noted the difference between expeditions then and now. In my time it was almost a necessity that one should go alone or with one companion. Now all that pioneer work has been done; expeditions are able to lay out beforehand a plan of operations, and we thus have such beautifully organized expeditions as Mr. Rickmers has described, with a leader who does all the organizing work. Although Mr. Rickmers has not said so, you can see how he has organized it all, leaving the various experts—zoologist, botanist, geologist, etc.—free to go about their particular jobs. That seems to be the method of exploration at the present moment, and of that method I gather the expedition that Mr. Rickmers has described this evening is a very notable example. I congratulate him very much indeed upon the excellent work hs has done and the lecture he has given, which conveys to us a splendid idea of the type of country that he has examined.

The PRESIDENT: Dr. Longstaff is with us to-night. He has been within 150 miles of the country Mr. Rickmers has described, and, therefore is fairly well qualified to take part in the discussion. Will he add a few words?

Dr. LONGSTAFF: My principal reason for responding to the President's invitation is the pleasure it gives me to speak on this occasion. I have had the privilege of the friendship of Mr. and Mrs. Rickmers for thirty years. Those of you who are interested in mountaineering will remember that in 1903 Mr. Rickmers led a party of celebrated German-Austrian mountaineers to the Caucasus. At the same time Rolleston and I independently went to the Caucasus. Both parties were of that happy age when personal rivalry is sweetest. We were racing each other for the last big batch of Caucasian peaks which remained unclimbed. Rickmers and his party were already in Suanetia. Rolleston and I had a very elementary knowledge of Russian, and we only had one Georgian servant. There is one awkward little bit of the journey after leaving the railway and civilization at Kutais to get into " Free" Suanetia, which was then unadministered territory. When Rolleston and I arrived at Kutais, eager to beat the German-Austrian climbers who were already established in Suanetia, we found Rickmers had sent his dragoman to meet us at Kutais in order that we might lose no time in commencing the competition! I think that is typical of Rickmers: he is well known as a thoroughgoing sportsman. Probably that is the reason why he is able to manage these large mixed parties on such expeditions as that of which we have heard to-night.

Now you will not want to hear much from me. I have not been within 100 miles of Qara Köl, but on the fringe of the Afghan Pamir; that is, on its mountain fringe. I advise all those who are in any way interested in the subject to make a point of reading Mr. Rickmers' paper when it appears in the *Journal*, for he has not read it to-night. You have heard his very interesting description of the cold desert meeting the hot or dry desert, and you get there an interesting interplay of many things which I must not now go into. Then there is the great Fedchenko glacier, which is probably 40 miles long; in fact, it is the second longest glacier in the world, outside the Polar regions and Alaska. The biggest glacier is the Siachen in upper Nubra, which is exactly 45 miles long and was discovered in 1909. The Fedchenko glacier, as far as I can make out from Rickmers' maps, is 40 miles long; the only other possible competitor is the Inilchek glacier, explored by Merzbacher in the Central Tian Shan. The Fedchenko glacier was discovered in the year 1928, so exploring is not yet by any means played out; its discovery was due to Rickmers' topographical insight.

Then there is Mount Kaufmann. I have not any patience with those who want to change the name Mount Kaufmann—the name of the great Governor-General of Russian Turkistan—to commemorate a politician. We must have an authoritative account for the *Alpine Journal* of this great ascent. Rickmers and I are both members of the Alpine Club and we are not supposed to talk about records, I know. You either get to the top of a mountain or you do not; and if you don't quite get to the top it isn't strictly an "ascent." Well, the record for twenty-one years has been Trisul, which is about 23,400 feet, a well-known peak in the Himalaya that was climbed to celebrate the Jubilee of the Alpine Club in 1907. We selected it for that purpose, because we knew that it was higher than any other mountain that had incontestably been climbed to the very top. Now, it is quite probable that Mount Kaufmann is as much as 50 metres higher; I think it is probably 7150 metres high. All the authorities give it as either 23,000 feet or 7000 metres, but I think this is an approximate value only. No doubt it will be in time accurately fixed, and I should not be surprised if it is a few metres higher than Trisul. Then Rickmers will have had also this to the credit of his expedition, that it is the highest mountain that anybody has ever succeeded in getting to the top of. Therefore from the point of view of a mere mountaineer I consider that that is very likely to prove a record,

and I am very happy indeed to be the first to congratulate my old friend on establishing what I believe to be a new record in the annals of mountaineering. I ask him to convey my heartiest congratulations to the climbing party on the accomplishment of a great ascent.

The PRESIDENT: When dealing with these great peaks we cannot be certain, within 100 feet or so, as to what the exact height is. I will not go into the technical reasons for that, but all who have studied the question of heights of mountains will know very well that we are, relatively, uncertain. We can call Everest 29,002, with a variation of 100 feet or so, and we shall not be very far wrong. There are special reasons why we do not know the exact height or how to define the exact height of these mountains. But whether the higher be Trisul or Kaufmann, we are quite sure that the climbing of each was a very fine feat, and we congratulate both Dr. Longstaff and Mr. Rickmers' party on their achievements.

Mr. Rickmers has clearly showed to us the advantage of a well-organized expedition. The sort of expedition he has described reminds us of what would be a well-organized boundary commission nowadays with its various experts and with a leader who has not only the duty of plunging his head into boxes containing food, as Mr. Rickmers observed, but other duties besides. On the purely technical questions and the use of photography, I was very glad to find that such a large area had been surveyed by Mr. Rickmers' party. He has given us a clear instance of the advantage of good organization for work over a relatively limited space, and the world is not yet fully explored : very far from it. Mr Rickmers mentioned that there were still some native tribes, totally unknown, which expected any day to be discovered. We may, perhaps, hope that they won't be discovered yet a-while. I thank Mr. Rickmers, in the name of the Society, for an admirable lecture, and congratulate him on the excellent work that his party carried out.

[*We are indebted to Mr. Rickmers for the opportunity which he has given us of obtaining for the Society's collection prints of a large number of photographs taken on the 1913 and 1928 expeditions. Among these are photographs of the snouts of the following glaciers: Garmo, Sildi, Fedchenko, Notgemeinschaft and Glacier III, Tanimas. These may prove useful records in future studies of the glaciers of the region.*—ED. *G.J.*]

MOUNTAIN NAMES ON THE INDIAN BORDER

THE seventh chapter of Major Mason's report on the exploration of the Shaksgam Valley and the Aghil Ranges ('Records of the Survey of India,' Volume XXII) discusses the nomenclature of the Karakoram, and makes certain suggestions which are criticized by Sir Sidney Burrard in the article which follows this note. Major Mason not only proposes that the Karakoram shall be called the Karakoram-Himalaya, the Karakoram Range the Muztagh-Karakoram, the Aghil Range the Aghil-Karakoram, and the Kailas Range the Kailas-Karakoram, but he uses these names in his report, which seemed to imply that they had been accepted by the Survey of India, hitherto regarded by us as the ultimate authority on questions of nomenclature along the Indian border. If in rare cases we ventured to adopt the spelling of a high

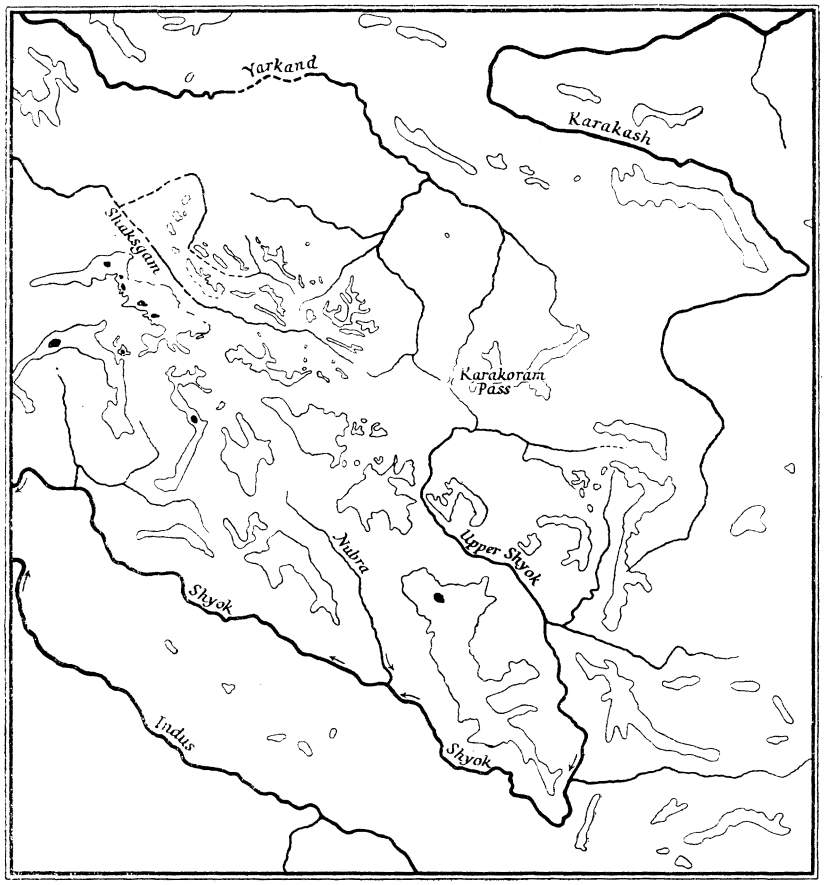


Fig. 1. The Karakoram, from Survey of India 1/Million "India and Adjacent Countries," Sheets 52 Leh, 1916, and 51 Yarkand, 1923, with additions from Major Mason's map of the Shaksgam and Upper Yarkand Valleys 1/253,440, 1928. The contour shown is at 20,000 ft., and the small areas above 25,000 ft. are in solid black

authority rather than of the highest, as in writing Kangchenjunga rather than Kinchinjunga, it was always with some virtuous apprehension.

In his preface to this volume of the Records, dated 17 November 1928, the then Surveyor-General, Brigadier E. A. Tandy, finds it quite clear that "the Karakoram Range" is really a misnomer which has arisen through a series of misunderstandings at a time when the geography of the range was practically unknown, which is Major Mason's main contention; he refers to the "minor questions" of names for the ranges, Aghil-Karakoram, etc., and proceeds:

> "I do not consider that this department should decide questions which depend so much on international usage. We can only assist by publishing the suggestions of our best experts, and then hope the Royal Geographical Society, which includes all the principal geographers and explorers interested, will find an early opportunity of discussing these suggestions and arriving at decisions, in which case we shall be happy to accept them and incorporate them on our future maps."

Fig. 2. The Range Lines and Names proposed by Major Mason in his Shaksgam Report, Records of the Survey of India, vol. 22, superposed on the outline of Fig. 1, for comparison of the ranges defined by their geology, with the visible relief of the country

This high and unexpected compliment comes at a season when nothing can be done at once to initiate any formal discussion. But the delay gives a welcome opportunity of inviting preliminary expressions of opinion in the *Journal;* and the contribution of Sir Sidney Burrard, offered and accepted before the important rôle proposed for the Society had been realized by the Editor, makes an authoritative statement of the case against the changes proposed by Major Mason. We shall welcome argument on either side.

The fundamental question appears to be whether a mountain system shall be described in ranges or in regions. There is now general agreement that the Alps are conveniently divided into regions bounded by rivers and passes; and a scheme put forward by a Commission of the Italian Geographical Society was favourably reviewed by Mr. Freshfield in the *Journal* for January 1928. The natural name of a region is then composed of a generic name *Alps* and a descriptive adjective, as *Bernese*. The system has obvious advantages in that the foothills and outlying features find natural places in the border regions, and there is no need for discussion whether geographical or geological considerations shall rule the division into ranges, or whether indeed it is possible to divide the mountain complex into ranges, in the geographical sense: which is, we suppose, a series of mountains arranged more or less in a line, not necessarily straight, standing out from their surroundings, and having a sort of unity as a structure.

At the meeting of the British Association at Southport in 1883 Colonel Godwin-Austen delivered the Presidential Address to the Geographical Section, and devoted a part of it to the Mountain Systems of the Himalaya and neighbouring Ranges of India (*Proc. R.G.S.* 1883, p. 610). In the following year he published a short paper with the above title (*Proc.* 1884, p. 83) to amplify his argument, with a map that is, we may hope, the most illegible map ever published by this Society. The legend under its title reads thus: "An attempt to make the orography more accordant with the Geological structure, and thus lead to the introduction and use of a common nomenclature in Geography and Geology."

The geological structure is indicated by long lines overprinted in red, of which the principal are numbered from north to south, and labelled I. Kuen Lun; II. Mustakh; III. Ladak; IV. Himalaya; V. Outer Himalaya; and VI. Sub-Himalaya. The orography, represented in the old hairy-caterpillar style, has pretty successfully resisted the attempt to make it accordant with the geological structure shown by the red lines; yet the "common nomenclature" requires the geographer to recognize the *Ladak* range as covering 18° of longitude, from somewhere west of Chitral to a point north of Tinki Dzong familiar to the Mount Everest expedition.

To the *Mustakh* Colonel Godwin-Austen gives less extension, but only because at that time nothing was known of the geology eastward. He takes it to 79½° E. in solid symbol, and to nearly 83° in dotted; and it is clear enough from the map that he would have been happy to go on eastwards if he had had any material to support him.

These ideas of Godwin-Austen dominated the Survey of India for the next forty years. The diagram of ranges in Burrard and Hayden's 'Geography and Geology of the Himalaya' is on the same general lines. They take the Kara-

koram range east to 79° definitely, and after a slight break continue it eastwards.

In the map of *Tibet and Adjacent Countries*, on the scale 1/2½ M, published in 1914 by the Survey of India, the name Karakoram Range is actually written between 72° and 92° E.; that is to say, it extends east of Lhasa. But on the same map published in 1920 in a second edition with a new name *Map of the Himalaya Mountains and the surrounding Region*, the name Karakoram range is removed, as are some other range names. But in the margin is a diagram of the ranges based on that in Burrard and Hayden, in which the Kailas and Ladakh ranges extend eastward as before to 92°, but the Karakoram is cut short at 80° E.

It may appear from all this that there is a much larger question to be discussed than whether the Karakoram Pass is on the Karakoram range. To geographers, and still more to climbers, the *Karakoram* has a pretty definite and limited meaning. They would not allow it, we think, to extend east of the Upper Shyok. Should they be obliged to allow the name *Karakoram Range* to be carried right away east of Mount Everest because geologists are ready to identify the sequence of rocks observed in Eastern Tibet with that observed in Ladakh?

These are matters on which opinion may differ widely, and will not easily be reconciled. The Editor of the *Geographical Journal* will be happy to receive the judgments of those interested.

THE MOUNTAINS OF THE KARAKORAM: A DEFENCE OF THE EXISTING NOMENCLATURE

By COLONEL SIR SIDNEY BURRARD, F.R.S.

THE Survey of India has recently published a report by Major Kenneth Mason, R.E., on his exploration of the Shaksgam Valley, a valley situated to the north-east of the Karakoram Range. Incorporated with his report are proposals to make fundamental changes in the nomenclature of the Karakoram region. I ask to be allowed to explain my reasons for preferring our old inherited nomenclature to that now proposed.

The area triangulated by the Survey of India has included the two highest mountain ranges of the world. By good fortune two names of distinction have been handed down to us, a Sanskrit name Himalaya for the Indian range, and a Mongol (Turki) name for the range of Western Tibet. To appreciate this good fortune we have only to consider how many mountains in Asia are without names, and how many are named only snow mountain. Geographers had to name the range on the east of the Pamirs the Kashgar Range from a city in the plains, because it had no name of its own. The two different ranges of mountains that follow the two coasts of India have the same name, the undistinctive one of Ghats. If moreover we look at maps of continents where mountain names have had to be invented, we realize the value of two such names as Himalaya and Karakoram.

The following table will show the names now in use for the mountains of Western Tibet and Mason's new proposals:

	Existing Names.	*Names now proposed.*
The Main Range	Karakoram	Muztagh-Karakoram
The Mountain Region ..	Karakoram	Karakoram-Himalaya
Outer subsidiary range ..	Aghil	Aghil-Karakoram
Inner subsidiary range ..	Kailas	Kailas-Karakoram

Mason's proposed names are too long for the purposes of science or of schools. Amid the confusion of his double names one serious proposal is partially hidden. The name of the second highest range upon the Earth has for fifty years been Karakoram: its primary name is now to be made Muztagh. The preface to Mason's book states that the second name of the proposed compound "is merely a concession." The change of this important geographical name from Karakoram to Muztagh would be most regrettable.

The Geographical History of the name Karakoram

Sixty years ago there was a question concerning the better name for the great range, whether it should be Karakoram or Muztagh. The name Karakoram was chosen by men well qualified to judge. Mason is now raising the same question again, and is basing his proposal to change the accepted name upon inferences he has drawn from history. Mason's explanation of the entrance of the name Karakoram into historical geography is, in his own words, as follows: "It is first of all Moorcroft's misapprehension and then a misunderstanding of Hayward's intention, and of the observations of Montgomerie, of the Survey of India, that has led European geographers to use the term Karakoram Range as it is at present applied."

This statement astonished me. To the best of my belief the European geographers rely upon the maps of the Survey of India for the geographical data of Western Tibet. The surveys of Kashmir and Karakoram under Major Montgomerie, R.E. (1855–1865), opened a new geographical era in those countries. These surveys were carried out under the Great Trigonometrical Survey of India, and the maps were drawn in the Headquarters Office at Dehra Dun. When the drawing had been completed, the maps were sent to London to be engraved at the India Office.

General Walker was the Superintendent of the Survey at Dehra Dun, and Sir Clements Markham was the geographer at the India Office. Major Montgomerie's survey party used to winter at Dehra Dun, so that Montgomerie was in touch with Walker. The Dehra Dun Office worked harmoniously with the map office in London: General Walker and Sir C. Markham were cousins and in constant correspondence.

The dates of the principal events in the history of the Karakoram maps were approximately as follows:

Before 1820	Moorcroft's explorations.
1853–1854 ..	Explorations in Ladakh of Major Alec Cunningham, R.E.
1855–1865 ..	The triangulation of Kashmir and West Tibet by Montgomerie, and the topographical surveys of Godwin-Austen.

1866–1869 .. Fair drawing of Montgomerie's and Godwin-Austen's maps at Dehra Dun under Walker.
1868–1872 .. Publication of the maps at the India Office by Markham.
1876–1878 .. Preparation of Montgomerie's triangulation charts in the computing office at Dehra Dun.
1879 .. Publication at Dehra Dun by Walker of Montgomerie's triangulation.

Moorcroft was the first explorer to apply the name Karakoram to the great range of mountains which separates the Indus and the Tarim basins.

In 1854 Major Alec Cunningham, R.E., gained a remarkable insight into the mountain systems of Western Tibet. His analysis of the ranges is described by Markham in his 'History of the Indian Surveys.' He traced the Karakoram Range with surprising accuracy from the sources of the Gilgit River to the source of the Shyok. Cunningham applied the name in 1854, just as we are applying it to-day. It was Cunningham's exploration that led Montgomerie to use the letter K in his angle book for the distant peaks on his Karakoram horizon, when he was observing them from Kashmir. His use of the letter K is well known in history from his discovery of the second highest peak in the world, which still bears his symbol K_2.

In 1870 Hayward the explorer prepared a map which he headed "The Karakoram Range." I have not seen his report, which Mason thinks has been misunderstood, but I know his map; he depicts the Karakoram Mountains and writes clearly across them "Muztagh or Karakoram."

When in 1872 Montgomerie's new maps were eventually published by the India Office, no name had been given upon them to the great mountain system. The omission was intentional, and it shows that there was some uncertainty and hesitation. That Montgomerie was aware of the name Muztagh is certain, for Godwin-Austen, his assistant, had published papers, "On the Glaciers of the Muztagh Range," in 1861 and 1864. Why did they not adopt this name Muztagh? I can only think of one possible reason, the same reason that led Colonel Wauhope to reject it forty years later, namely, that in the opinion of linguists the word Muztagh is not a name but an ordinary noun of the Baltistan vocabulary denoting "snow-mountain."

In the Himalayas on an autumn morning the hill-man will greet us: "The snow mountains are clear to-day." He will not say, "The Himalayas are clear." And when we meet a European, he will also say, "Are not the snows beautiful?" He will not say that the Himalayas are beautiful. And so the Karakoram villager will say just as others do, but in his own tongue, "Muztagh."

But while Montgomerie and General Walker at Dehra Dun were rejecting Muztagh, they were hesitating to adopt Karakoram. In his survey report of 1860 Montgomerie had referred to the "Karakoram Ridge" and to the "Karakoram Mountains," and in 1861 he had mentioned "the great Range which is called both Muztagh and Karakoram." When was the name Karakoram finally and definitely accepted by the Survey? About 1876 the computing office began to prepare Montgomerie's charts of triangulation, whilst he himself was in Dehra training the explorers for Tibet. The computing office seems to have pressed Walker for a decision, for the name Karakoram was finally adopted upon these charts. These charts, which formed the basis

of future mapping, were published in 1877, and the name Karakoram was written across them. From the triangulation charts the name passed gradually through the drawing-offices to the geographical maps, and since 1880 the maps of the Government of India have been telling the geographers of Europe and America that the great range is named Karakoram. At the India Office Sir Clements Markham showed less hesitation than his colleagues at Dehra Dun, for he adopted the name in his 'History of the Indian Surveys' (1871 and 1878), and on his map in this book he showed the Karakoram Mountains as we do now. And so it will be seen, if my interpretation of history is at all correct, that so far from the name Karakoram having slipped into geography through series of mistakes, it was accepted only after years of deliberation by men who were amongst the foremost geographers of the age, and who possessed an intimate knowledge of the mountain system under discussion.

The questions however still arise: Why had Montgomerie and Walker been hesitating so long? If the name Karakoram was accepted for the charts in 1876, why was it not accepted in 1870 in time for entry upon Montgomerie's maps?*

Before I consider these questions, I should like to refer briefly to the further objections to the name Karakoram which have been raised by Mason.

Mason refers to the use made by Montgomerie of the symbol K for the Karakoram peaks. He thinks that "though Montgomerie did not believe for a moment that the peaks he labelled K were all on a single range," as K_1 and K_6 are not on the main alignment, the system has led to a misunderstanding. Mason adds, "I certainly believe that the naming of K_2 has influenced geographers in retaining the name Karakoram for the single range." In my opinion geographers take their geography of Baltistan from the maps of the Survey, and the Survey has been under no misapprehension about the symbol K. It has been the usual practice for our observers to employ a single letter as a symbol. Montgomerie followed the same course as had proved successful in the Himalaya. His observations were interpreted by the same expert computing office as had calculated the height of Mount Everest.

As I have referred frequently to Colonel Montgomerie, I feel it a duty to record that he did not live to succeed General Walker as Superintendent. His original strength had been sapped by eleven successive seasons of mountain-climbing, and he died in 1878, at the age of forty-seven.

The question of the Karakoram Pass

Another objection raised by Mason to the name Karakoram is that there is a pass known as the Karakoram Pass, and that this pass is not on the main range. The existence of this pass was well known to Montgomerie, to Walker, and to Markham. It has been well known in the drawing office since the 'sixties. Mason does not like the repetition of the same name on both a range and a pass, and he believes (in his own words) "that on maps the Karakoram

*The name Karakoram Mts. does however appear on the map "Turkestan with the adjoining portions of British, Russian, and Native Territories" on the scale 32 miles to the inch, published by General Walker at Dehra Dun in May 1873. The name lies between longitudes 77° 30′ and 79° 40′ E., that is, mostly to the east of the Karakoram Pass. This is the 2nd Edition: the first is not in our collection. The name was removed in subsequent editions, 1875 onwards.—Ed. *G.J.*

Range has been made to bend out of its normal alignment, almost to due east, in order to include the pass" (p. 79), because the pass bears the name Karakoram.

May I explain why the range has been made to bend out of its normal alignment? It is simply this: the drawing office took the main watershed of the Indus to be the range. The highest peaks are on this watershed, but farther to the south-east the watershed bends back and curves round through the Karakoram Pass. The watershed would have done this, whatever name had been given to the pass.

When a mountain map is only showing the drainage lines, the watersheds appear to be the main ranges. I have heard the drawing office stoutly maintain that the only ranges which matter are the main watersheds. The difficulties of hill-shading when the drainage has cut back behind ranges have been very great. It is probable that the inhabitants and the Central Asian traders have the same idea of the main range as our drawing office had, namely that it is the watershed. If they have ever considered the question at all, they would probably argue that the Karakoram pass is on the Karakoram range, because they have to climb over that pass to get from one side of the range to the other. Cannot we regard this Karakoram Pass as the entrance door from Yarkand into the Karakoram region? The objection to its name would then disappear.

Moreover, before we can reject the name Karakoram because of its duplication on a pass, we must remember that the proposed alternative Muztagh is repeated in many places. The late Colonel Wauhope, who explored the Pamirs and the Hindu Kush, wrote in 1906, "Muztaghs are as common all over Central Asia as Safed Kohs (white mountains) are on our north-west frontier. The name Karakoram is quite established now for the mountain ranges separating the Indus and the Zarafshan and is the most suitable."*

The high peak described by Sven Hedin is named Muztagh Ata (father of snow mountains) and is not on the Karakoram but on a range farther north which Hedin calls the Muztagh range. Sir Aurel Stein found the name Muztagh in the Kuen Lun range, and Semenoff found it in the Tian Shan.

The derivation of the word Karakoram

In the opening paragraph of Mason's book he writes:

"The name Karakoram means 'black gravel,' and this inappropriate name has been restricted by geographers to the whitest, iciest range of mountains outside the polar regions. It seems a pity; for to call black white and white black impresses nobody with our sense of sagacity."

May I say a few words on behalf of our predecessors? There is a belt of perpetual snow broken only by gorges stretching from Sikkim to the Pamirs, and within this belt it is desirable to avoid the name "snow mountain." Mason compares Tibet with the polar regions, but the name "snow mountain" would not be distinctive in the polar regions. Like Mason I have believed, and our predecessors believed, that the Turki word "Karakoram" meant "black gravel." But now that this meaning has been put forward as a reason

*'Geography and Geology of Himalaya Mountains and Tibet,' by Burrard and Hayden (1907), page 97.

for changing nomenclature, I have thought it advisable to verify it. In Shaw's Turki dictionary the following meaning is given:

Kara ..	..	Black.
Koram	..	Ground covered by large blocks of stone fallen from mountains.

I cannot fairly use this latter meaning against Mason, as it is quite new to me. But what Mason has disliked is the word "black," and this word must remain in any translation. The word "black," however, is common in geography, and generally means angry, or stormy, or dangerous. There is the Black Sea and the Black Forest, and in India the people call the ocean the Black Water. In all such cases our forerunners who initiated the names were looking deeper than the surface colour. To call a white mountain black is only absurd if we cannot look deeper than its snow; but if we look into its character and think of its thunderstorms and avalanches, we understand the mind of the people who called it black.

And before this old name Karakoram is set aside on account of its derivation, we should consider whether it may not have originated in quite another way. Peoples sometimes borrow names from outside; in London we have borrowed Waterloo and Trafalgar. The English carried their names Boston and Hampshire to America; the Scotch took Perth to Australia. In the thirteenth century the Asiatic empire of Gengkis Khan reached from Peking to Warsaw; its capital city was Karakoram in Mongolia. The name Karakoram was known everywhere. The immense armies of Gengkis Khan, always living on the country they traversed, were in possession of the Yarkand area for a century. They reached India through the Kuram valley, and finding the heat of Lahore unbearable, they tried to get back to their home at Karakoram by way of Kashmir. Their armies were however too large, their horses too numerous, and they found their way "blocked by the massifs of impenetrable ranges."* Is it not possible that Gengkis Khan's army to whom Karakoram was the centre of the world brought this name into Western Tibet? Is it not possible that some of his soldiers, wearied with years of war, took the opportunity of escaping from military service and stayed behind in Tibet, when the army had to retire from the mountains in confusion?

Gengkis Khan of Karakoram was an ancestor of the Mogul emperors of Delhi. The Karakoram mountains standing between India and Mongolia thus form a monument to the two Mogul empires of Asia. And at the summit of the Mogul monument we see Montgomerie's flag, the mystic symbol K_2, more popular now throughout the continents than any name; it is the symbol of geographical triumph, and it memorizes the alliance of many races of men, British and Indian, Pathan and Kashmiri, Ladakhi, Balti and Tibetan, in a long-united endeavour (1855 to 1865) to lay bare the secrets of the formidable mountain barrier.

The name of the Mountain Region

It is now proposed to change the name of the mountain region. Hitherto the names of the region and of the great range have been the same, namely,

*Lamb's 'Life of Gengkis Khan,' page 186.

Karakoram. It is now proposed to name the region Karakoram-Himalaya and the range Muztagh-Karakoram. It has, I think, been a common practice in geography to apply one and the same name to a mountain region and to its main range. We speak of "the Himalayan region" and of "the main Himalayan range." We also use the plurals Himalayas and Himalaya mountains to denote the whole region. The region and the plural include the whole complex mass of main and subsidiary ranges, outliers, spurs, and foothills. We do not, I think, require different names for the mountains and for the highest range.

From a scientific point of view also it is, I think, inadvisable to emphasize too strongly the difference between the range and the mountains. Although the range may be crowned by a crest-line of high peaks, its walls and buttresses and foundations are part of the mountain mass. As for the newly proposed name Karakoram-Himalaya, it is distressing to see the Sanskrit name Himalaya applied to the Mongol region. The name Himalaya is reserved for the mountain ranges forming the southern wall and buttresses of the Tibet plateau; it is not taken by surveyors into Tibet across the Tsangpo or Indus. On Mason's map the Yarkand river is shown in a Himalayan region; and the incongruity is striking.

The Kailas Range

This range is a secondary range of the Karakoram system on the south-western flank. Mason proposes to change its name from Kailas to Kailas-Karakoram.

Major Alec Cunningham was the first explorer to describe this range, and when he explored it, in 1854, it was nameless. Cunningham thought that as the sacred peak of Kailas was standing on the prolongation of this range it would fix the range in geography to name it the Kailas Range. Mason puts forward a different view. He regards this range as being more in "unity" with the "parallel Karakoram Range" than it is with Kailas peak (p. 75). He proposes to add the name Karakoram to the old name Kailas and to call it the Kailas-Karakoram range, as this "would bind the individual ranges together in a lateral sense," and make clear "their essential unity." The difference between Cunningham and Mason depends on the word "unity." Cunningham did not use the word, but he evidently regarded the unity of a range to lie in its succession of high points marking its alignment, for he called it Kailas, because the Kailas peak was on its distant prolongation. Mason writes of "its unity with the ranges to the north." Cunningham was thinking of geographical unity and Mason is implying geological unity. In my opinion the former is the sounder basis for a geographical name than the latter. Similarly the simple name Aghil seems preferable to the proposed compound Aghil-Karakoram: the former is clear, the latter obscure.

The problems of nomenclature in a desolate country are different from those of populated areas. In the outer Himalaya the local names are numerous, but as we enter the mountains the names become scarcer, until on the Tibet border the passes are the only features named. In the lower hills the inhabitants have furnished all the names that geography requires, but at higher altitudes the requirements of geography are not satisfied by the few local

designations in use. In recent times explorers have told me that they have taken vague names off the land in Tibet and have applied them to unnamed prominent peaks, a course I believe to be wise.

The inhabitants of Baltistan had always been content with a scanty nomenclature, but when the peak of K_2 was discovered in their midst, their country became a focus of geographical interest. Throughout their mountainous region only one proper mountain name (apart from a few snow peaks) had been forthcoming, and that was Karakoram. This name was probably not a precise designation amongst the Baltis; otherwise there would have been no uncertainty. But indefinite as it was, it had been found floating over the hills for fifty years; Moorcroft heard it in 1820, Cunningham in 1854, Hayward in 1870. Eventually Montgomerie took this local name and attached it to the highest mountains of the country.

Montgomerie's orders had been "to survey the territories of the Maharajah of Kashmir," and he had consequently had to stop his work at the crest-line of the great range. He knew nothing of what was beyond. He may have thought that peaks higher than K_2 might be standing behind. Furthermore, he may not have wished to define the valuable name Karakoram, until he knew to what extent it was employed on the farther side of the crest-line. It seems to me possible that Montgomerie may have hesitated until he had obtained information concerning the hinterland. The final responsibility for introducing the name Karakoram into geography rests, however, upon Montgomerie's two chiefs, General Walker and Sir Clements Markham. It is only fair to their memory to admit that their decision to adopt the name has been a benefit to science and has caused no inconvenience to the Baltis.

In the *Encyclopædia Britannica*, 1883 (Tibet), Sir Richard Strachey wrote that the name Kuen Lun was introduced by Humboldt, and that "this designation is not locally known." In 1929 the name Kuen Lun is firmly established in geography, and the claims of Karakoram are even stronger. The name Kuen Lun is an international possession, but that of Karakoram is in British keeping. It is easy to change and to modify an old name, but we cannot create an old tradition. The value of traditions to a Survey and to geography is inestimable; their growth has been due to the continued cooperation of successive generations of men, and if we can preserve the traditions that come down to us, we shall leave them to our successors with their values enhanced.

of the *Rarh*, and their relation to its history in peace and war; also the types of dwelling-house, Hindu and Muhammadan, and the villages, with plans of Hindu and Muhammadan villages in the special area of his study. And he traces the decline of the region to the gradual eastward shift of the live delta, and, in a less degree, to the destruction of forest on the higher lands to the west, and the resultant soil erosion and silting up of drainage channels. All this prepared the way for the malaria which has so disastrously affected the region for the last hundred years. The cultivators, naturally fatalistic, became apathetic. They could not see the causes of effects which only made themselves apparent in the course of generations. The work of rural renovation begun by zealous workers at Santiniketan and Sri-niketan has shown that the cultivators are ready to adopt ameliorative measures whose practical utility has been demonstrated to them by their successful operation under their own eyes, and Boy Scouts have done useful work by getting into touch with the cultivators and proving to them the advantage of mutual help and common effort.

Mr. Geddes has made abundant use of information collected from Government publications and other sources, and the bibliography at the end of the volume covers five pages. Work of the kind done by Mr. Geddes is of the greatest value, and India offers endless opportunities for similar studies. It is to be hoped that his example will be widely followed, and that the results will be published in English. W. H. A. W.

EXPLORATION OF THE SHAKSGAM VALLEY AND AGHIL RANGES, 1926: Records of the Survey of India, Vol. XXII. By Major KENNETH MASON, M.C., R.E., Superintendent, Survey of India. *Geodetic Branch Office, Survey of India, Dehra Dun* 1928. 10×6 *inches;* xii+182 *pages; illustrations and map.* 3 *rupees, or* 5*s* 3*d*

The substance of this report is familiar to us from the lectures given by Major Mason on his return from the Shaksgam (Evening Meeting, 24 January 1927, *Journal*, 69, 280) and after his visit to Flums to plot the stereo-survey on the Autograph (Afternoon Meeting, 9 May 1927, *Journal*, 70, 342). The present publication supplements these two important papers with more complete details of the outfit and the route, discussion of the transport problems, care and health of the porters and baggage animals, supplies and rates of payment. A candid statement of occasional mistakes or errors of judgment adds much to the value of the book for those who may contemplate travelling in these difficult and inhospitable regions.

Forty years ago Sir Francis Younghusband came first into the Shaksgam Valley by the Aghil Pass from the north, with a minimum of baggage and no instrument but a sextant. From Durbin Jangal he discovered and ascended the Urdok glacier, determining latitudes which have proved excellent, but unable to fix his longitude. The precise place of the glacier and the identity of the col at its head remained uncertain until Major Mason's stereographic survey solved the problem. But the phototheodolite with its accessories of heavy plates and travelling dark-room required transport on a scale altogether different, which in the end defeated his object of actually reaching Durbin Jangal from the east or surveying the Urdok. We have now from his surveys so precise a knowledge of the peaks and ridges that uncertainties of position in the valleys and gorges are confined within very narrow limits, and a resolute traveller moving as light as Sir Francis moved, could probably fill in the largish blanks still remaining on the map with fair accuracy and complete certainty. The power of defining crests from a distance is perhaps the strongest point in favour of the stereotopographic method; and we may hope that this first considerable success in long

range stereogrammetry will encourage the chiefs of the Survey of India to push such surveys forward as far as possible on all their borders. Crest-lines are far more comprehensive than isolated peaks.

The important chapter on geographical conclusions, and proposals for a revised nomenclature of the Karakoram ranges are dealt with elsewhere in this number (pp. 274 and 277). Chapters ix to xii deal with the geology, animal life, flora, and meteorology of the Shaksgam. Three appendices on rations and supplies, clothing and equipment, and transport, will be invaluable to subsequent expeditions; and a fourth appendix on geographical names may serve as a model for the conduct of explorers. Starting with Burrard's principle: "The nomenclature of a mountain region should not be forced: it should grow spontaneously, and we should never invent a name until its absence has become inconvenient," Major Mason and his companions encouraged their men to name places, but they never named a single mountain, and the names they gave to passes and valleys had to be dragged out of them. At Leh all the names were overhauled by the Moravian Mission and their meanings investigated; the result is a careful and scholarly appendix of great value as a guide and example. Shaksgam means "a box of pebbles" or possibly "dry pebbles." Kyagar Thso is the "grey-white lake," and the *h* is aspirated. The Ladakhi does not discriminate much between a ravine and an open valley, but is greatly concerned with euphony, using feminine forms such as *lungmo* for *lungpa* (valley) whenever he thinks it sounds better. We are assured again that the glacier should be Rimo and not Remo; but there is no comment on the spelling Shyok, which should surely be Shaiok.

It is superfluous for us to congratulate Major Mason on the success of his Shaksgam expedition: he has received the Founder's Medal for it; but we may remark that this account is very well arranged and written, as befits the honorary editor of the *Himalayan Journal.* A. R. H.

THE PEOPLING OF AUSTRALIA. Edited by P. D. PHILLIPS and G. L. WOOD. (Pacific Relations Series No. 1.) *Melbourne: Macmillan & Co. Ltd., and Melbourne University Press* 1928. 8×5 *inches;* xii+300 *pages, and maps.* 6*s*

This symposium, by eleven members of the staffs of Australian Universities and members of the Government Service, includes the most carefully prepared studies of the Australian population problem yet made. The general introduction by Phillips and Wood, both Lecturers at Melbourne University, is followed by a study of Australian population by the Government Statistician, C. H. Wickens, of the legal aspects of emigration by Professor Charteris of Sydney, of the eugenic aspects by Professor Agar, and of the optimum population by Dr. Benham of Sydney University. The essays on the racial position, urbanization, climatic factors and tropical settlement are by Jens Lyng, MacPhee, Barkley and Cilento, all Government officials. The papers have been prepared for the Pacific Relations Conference and are all the work of the best available Australian authorities; they are marked by full knowledge of the evidence and sympathetic consideration of opposing views. The authors are not fully in agreement. Thus the editors consider the articles by Professor Agar and Jens Lyng as too much influenced by the "nordic myth." Benham regards the maximum desirable population of Australia as between ten and fifteen millions, which others regard as too low. According to some the tropical north is impracticable for white settlement, while Dr. Cilento emphatically claims that white labour in Queensland has proved a complete success, and he rejects the views to the contrary as based either on erroneous assertions or on vague generalizations. He concludes (p. 240), "The figures presented above leave no loophole for the

examples yet found in Malta. They have been discovered on only two sites, Borg en Nadur and Bahria. Miss Murray suggests that as the absence of good landing-places on the south coast renders it very dangerous to mariners in stormy weather, they might express their gratitude after safely weathering a storm by offering an anchor in the temple of the god. Some ingenious suggestions are offered with regard to dating based on the arrangement of the buildings, pitting of stone, and on the shape of the sacred pillars in the megalithic temples.

Appended are analyses, chemical and microscopical, of the earths from the excavations by Mr. Ainsworth Mitchell and Mr. T. J. Ward; plans of Borg en Nadur, Tarxien, Mnaidra, and Corradino; and an index. The author, by the publication of this third volume, rounds off in a most satisfactory way her interesting researches in Malta. E. A. P.

THE LAND OF THE LAMA. By DAVID MACDONALD. *London: Seeley Service & Co.* 1929. 9×6 *inches; 283 pages; illustrations and a map.* 21*s*

The author, from sixteen years' residence in the land which he describes, and through his personal friendship with the present Dalai Lama, has every reason to claim our confidence in his presentation of an interesting and well-described subject. Many of us can remember him as an *attaché* to the political staff of Sir Francis Younghusband during the 1904 Mission, when his intimate knowledge of the people and their language was fully utilized. He has here arranged his subject into logical sub-heads, in clear and unambitious language which carries us on from one interest to another and leaves us, in the end, hardly less impressed with the author's intimate knowledge than with the peculiar facts which he describes. The remoter history of Tibet should be an engrossing subject, and should fill in for us a lacuna in the records of a land surrounded by other countries whose histories are verifiable and exhaustive. Unfortunately, it seems to follow the usual school-book practice of relating the doings of kings and queens, which the author has found himself compelled to record; and, when treating of the importation and spread of Buddhism, he hardly makes enough of the fact, which he takes in his stride, that Buddhism, in ousting the Bon Shamanism of great antiquity, paralyzed the fighting powers of a race which had, till then, been the terror of its neighbours; very much as the Mongolia of Genghiz Khan and Kublai has been emasculated in more recent times. But, in his descriptions of the doings of the people at the present day, he is on surer and more interesting ground. Perhaps the most engrossing portion of the book is chapter v, wherein the whole lamaist pantheon is laid out for us to investigate and appraise. The extraordinary multiplicity of godlings, and those specialities of lamaism, the "canonized demons" or evil spirits which, by magical incantations, have been suborned in the interests of the human race and made to turn traitor to their fellow-demons; these are classified and sub-classified according to rank, potency, characteristics, and even locality, till the head swirls. Here, if nowhere else in the book, do we get the full advantage of that "certain measure of consanguinity" of the author with his people, of which Lord Ronaldshay so appreciatively speaks in his foreword. The plain Scottish chronicler could never have drawn for us so vivid a picture; nor would he have been capable of the expounding of the Wheel of Life which, in such intelligible detail, we now read for the first time.

Chapters xi and xvi, dealing with the macabre, are the only unpleasant portions of a book which would otherwise have left us with the impression of a friendly and blameless people. This, and the statement that the *Ovis poli* is to be found in Tibet, are the only two details in which we quarrel with the author, whose book may be taken as a final brushing aside of the veil surrounding a mysteriously

exclusive land—a veil first lifted for us by Sir Francis Younghusband. Though one of the last surviving enigmas of the world has vanished, we may forgive the author for having removed it by the account which he has given us. Illustrations, map, and index complete a thoroughly satisfying book. L. A. B.

VOYAGES OF GREAT PIONEERS. Edited by VINCENT T. HARLOW. *Oxford University Press* 1929. 7×5 *inches;* lv×380 *pages; illustrations.* 6*s; in two parts,* 3*s* 6*d each*

Mr. Harlow is known as a student of the history of Elizabethan discovery and early colonization, and the contents of this volume of extracts illustrates his predilections. Five out of the ten voyagers whose adventures are described are Englishmen, and four of these are Elizabethans. In his introduction he gives a good general sketch of the advancement of world-knowledge, making plain how it came about that the precursors of the great voyagers were the travellers represented here by Marco Polo and William of Rubruck. Of all these "great pioneers," William reveals himself in his narrative of his sojourn among the Tartars as the most engaging personality. The accounts of Columbus's first voyage and Da Gama's first voyage to India follow. Mr. Harlow's plan throughout is to concentrate upon accounts of countries and peoples rather than upon adventurous incidents. Thus the Elizabethan section contains, in addition to voyages of Frobisher, Drake, Raleigh, and Lancaster, extracts from Sir Humphrey Gilbert's 'Discourse' on the North-West passage, and an account of the Massacre at Amboyna, which seems to have small claim to inclusion. The book is completed by Tasman and Captain Cook. The latter is represented by his accounts of New Zealand and Australia; the adventures of the *Endeavour* off the Great Barrier Reef are not related. Several statements in the Introduction, particularly in the later paragraphs, might be questioned. The phrase "with all his guess work" applied to Ptolemy is misleading. There is no reference to the pioneer work of the French, a realization of which would have modified the statement that "England was the first to challenge the monopoly claimed by the Spanish Colossus." The concluding portions of the Introduction would have been made clearer by a brief explanation of the conception of a great Antarctic continent. This was not, as Mr. Harlow states, evolved for the first time by sixteenth-century geographers, but was in part inherited from classical times. He also comments that "Even Tasman failed to prove that the latter (Australia) was an island"—surely a slip for New Guinea? Just as Drake proved that Tierra del Fuego was not part of this hypothetical continent, so Tasman showed that Australia also was detached from it. Cook later did the same for New Zealand, and reduced the conception within much more modest limits by his voyage below the Antarctic Circle.

These are however small points, but there are several slips in the short bibliography, the most troublesome of which is probably the misprint of "K. G. Gayne" for "K. G. Jayne." A legend beneath an illustration implies that Marco Polo left Venice in 1338. G. R. C.

THE PAGANS OF NORTH BORNEO. By OWEN RUTTER, F.R.I.A. With an Introduction by C. G. SELIGMAN, F.R.S. *London: Hutchinson & Co.* 1929. 7×10 *inches;* 288 *pages; illustrations, diagrams and two maps.* 30*s*

Mr. Owen Rutter possesses two qualities that do not always coexist in writers on primitive peoples of the remote corners of the Earth. One is an intimate and sympathetic knowledge of his subject, and the other a turn of literary sense and style that enables him to impart pleasure to his readers at the same time with instruction. He has written much of British North Borneo, and in this, his latest

1/100,000 map, again points to the 22 m. not the 28 m. level as representing the longest pause.

Apart from the fact that we found in the north Mousterian implements associated with beaches at a low level, from the geological point of view I would suggest that the interval between the end of the Palaeolithic (indicated by the 22 m. level according to Messrs. Sandford and Arkell) and the beginning of the Neolithic—dated by Miss Caton-Thompson to about 6000 B.C.—is extremely short for the work accomplished, which consisted in (1) the cutting of the Nile Valley from 22 m. to below sea-level, presumably to at least −50 m. (164 feet), since the Faiyum "tributary" must have graded into the Nile; (2) the filling of this great trench with alluvium, and the formation of the Neolithic lake in the Faiyum; (3) the isolation of this lake by the silting up of the Hauwaret Channel when the 18 m. (59 feet) level had been reached, and its fall to about 10 m. (33 feet) before the advent of the Neolithic people. All this would have to be accomplished in a time of increasing desiccation, which would not hasten either the degrading or aggrading processes.

For all the above reasons Miss Caton-Thompson and I would regard the later stages of the 22 m. lake as Middle Palaeolithic in age, and are led to take a fundamentally different view of the course of events in the later history of the Faiyum Oasis.

While recognizing the value of Messrs. Sandford's and Arkell's contribution to the subject, we could have wished that their statements on such questions of widespread interest as Palaeolithic climates, etc., had been supported by at least an outline of the evidence on which they were based, and we look forward with much interest to the publication of the facts on which such a fundamentally new view of the origin of the Faiyum has been framed.

THE GLACIERS OF THE UPPER SHYOK IN 1928

CAPTAIN MALCOLM C. SINCLAIR

IN the autumn of 1926 a very large flood suddenly swept down the Shyok Valley, carrying away the suspension bridge at Satti just above the Shyok–Nubra confluence, and doing great damage both at the actual confluence, where the waters backed up the Nubra for 8 or 10 miles, and also downstream. The bridge at Satti was a link of very great importance on the Central Asian Trade Route, which was established as the result of the Treaty of 1870 with the Maharajah of Kashmir. The Shyok at Satti is a deep and fairly swift river, and some idea of the magnitude of this flood can be obtained from the fact that even though the river-bed at this point is about 1000 yards in width the water rose to a point about 30 feet higher than the highest normal summer flood-level.

The cause of this flood was more or less definitely known to be the bursting of a glacial dam in the upper courses of the Shyok, but the extent of the lake so formed was unknown, and it was not even certain which glacier had caused the actual stoppage. During the late spring of 1927 reports from Saser

Brangsa, where the trade route again crosses the Shyok, showed that a fresh stoppage had occurred above the ford, and a sub-overseer of the Kashmir Engineering Department was deputed to visit the spot. His report showed that the stoppage was due to the advance of the Chong Kumdun glacier, the most northerly of four glaciers which lie to the north of Saser Brangsa. He stated—I write from memory—that the dam was 300 yards long, 400 yards wide, and about 450 feet high. The length of the resultant lake he put at about 4 miles, with an average width of 300 yards.

Formerly the trade route followed the Shyok valley north of Saser Brangsa as far as Yapchan, and then east-north-east across the Depsang plains to the Karakoram Pass. Owing to the frequent advance of those glaciers to the north of Saser Brangsa and consequent stoppages, this route fell into disuse, and caravans now travel via Murgo and Kizil Lunga. This route, though longer, is free of snow and offers no difficulties other than the utterly barren nature of the country. It will therefore easily be understood that reports as to the state of affairs on the Upper Shyok were rare and unreliable. As the Kashmir authorities were naturally opposed to the idea of rebuilding the bridge at Satti in case of a repetition of the events of 1926, I, as British Joint Commissioner, decided to visit the site of the lake and dam, and collect information.

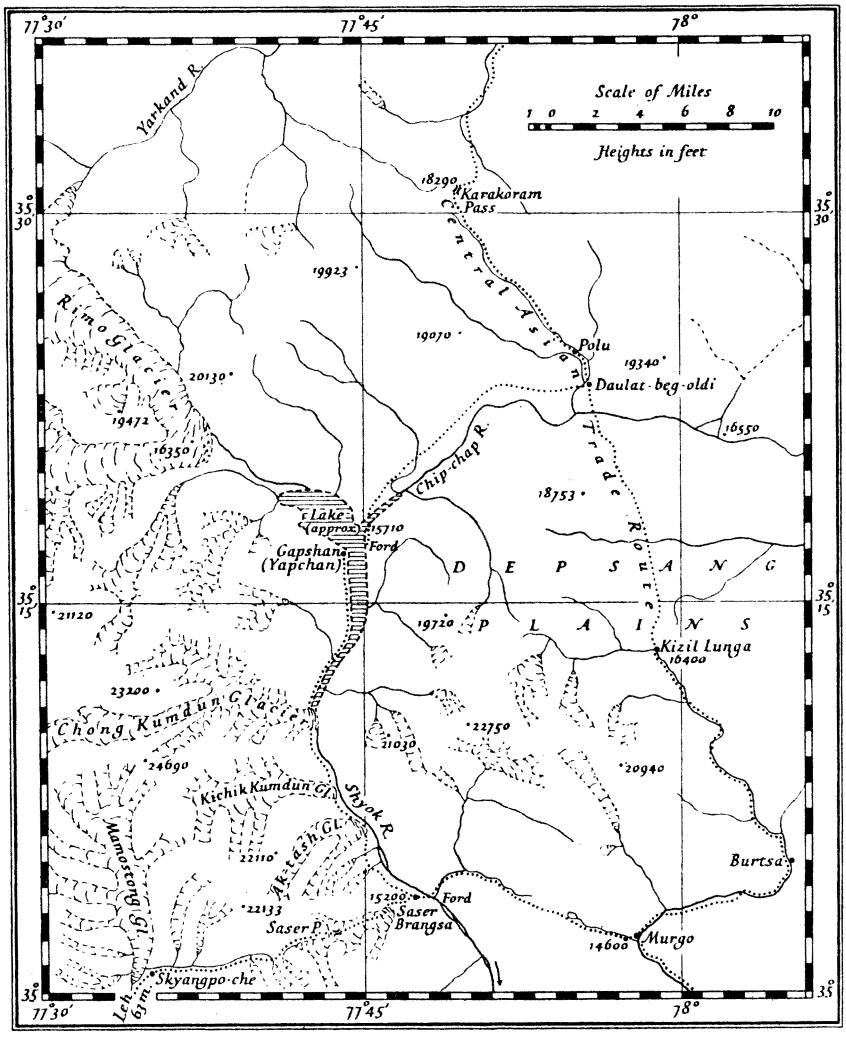
The expedition left Leh on 5 July 1928 and proceeded via the Khardung and Saser passes as far as Daulat-beg-oldi on the Depsang plains, and thence west to Yapchan. This detour on the Depsang plains was made in the hope of securing a Tibetan Antelope head, but in spite of an abundance of does and fawns not a single male was seen. A wild yak was seen on the foothills above Yapchan, which was reached on July 18. The Ladakhi pony-men stated that formerly yak abounded near the Rimo glacier, but none had been seen in that neighbourhood for years.

As soon as the expedition arrived near Yapchan it became obvious that the lake was very much larger than any of the reports had indicated. Observations showed that its level was rising rapidly, and the average daily rise during the three days' halt at the lake proved to be 27 inches. This rise appeared constant, and there was no noticeable variation between the rate of rise by day or night. During these three days a rough survey was carried out of the lake, which proved to be about 8 miles long, wide at the northern end and narrowing rapidly at the south, the average width being estimated at about 1000 yards. No boat was available, and though an attempt was made to obtain soundings from a skin raft, weather conditions made such navigation too dangerous, and it was only possible to obtain one set of soundings at a point about halfway up the lake, which gave a maximum depth of 80 feet in that section.

Traces of four different flood-levels were clearly marked along the eastern shore of the lake. The lowest, presumably that of the 1926 flood, was 4 feet above lake-level on the evening of July 19, the others being 18 feet 6 inches, 47 feet, and 63 feet above lake-level.

It was not found possible to reach the dam from the north, and accordingly the main camp was moved back to Saser Brangsa, and a very light camp sent up by coolies along the river-bed to a point on the west bank of the Shyok about half a mile below the dam, where a fair camping-ground exists. We ourselves

kept considerably higher, crossing both the Ak-tash and the Kichik Kumdun. It is known that both these glaciers have blocked the river-bed at intervals even in the last twenty years, but so far as is known the river has always eaten its way through, and no lake has been formed. Our observations showed that the



The glaciers of the Upper Shyok and the trade routes to Central Asia

Ak-tash was well across the river-bed and was still advancing; the Kichik Kumdun, on the other hand, was in retreat, and its snout shows signs of having suffered considerably during the 1926 flood. Personally I doubt whether the fourth and most southern glacier has been across the river for very many years; at any rate it is now about 3 miles away. Unfortunately the effect of the 1926 flood on the Chong Kumdun is not known. This flood took place unusually

late in the year (October 21), and no one ever saw the site until the glacier was again right across the river-bed in the spring of 1927.

Weather during the three days spent at the dam was extremely bad, and snow fell practically continuously. Partly for this reason, and partly through the lack of any climbing equipment, it was not found possible to cross the dam, and in consequence we were unable to obtain any soundings near it, and such observations as we were able to make were very general. The river valley north of the dam runs north-east, and the Chong Kumdun comes in from the north-west, the valley south of this point being about 600 yards wide, and to the north little more than half this width. The glacier at the point where it enters the river valley is about 400 yards wide, with very steep slopes on both sides; farther to the north-west there appeared to be a considerable basin, but the visibility was very poor. The actual dam was 330 yards long and 400 yards wide, with a minimum height of from 400 to 450 feet. The glacier abutted on a precipitous face of red sandstone, and at this point was at its lowest in a small dip about 20 yards wide and 40 feet deep. The level of the lake appeared to be about 70 feet below this point. Probably the reason for the existence of this dip was the radiation of heat from the rock face which catches the sun throughout the greater part of the day. There were no signs of percolation near the actual dam; a small stream flowed from the eastern corner, but this was almost certainly due to melting. About 600 or 800 yards downstream there were, however, some very strong springs which presumably owe their origin to the lake above.

It is not known whether the lake-level ever reached the top of the dam last year. The winter of 1928 set in unusually early in Ladakh, and it is possible that it did not. Another expedition consisting of an officer from the Punjab Irrigation Department and Mr. F. Ludlow are at the time of writing *en route* to the site of the lake, and as they have boats and proper climbing equipment, should have little difficulty in making a detailed survey of the lake and dam if it still exists.

The above account may be usefully compared with Mr. F. Ludlow's narrative in the first number of the *Himalayan Journal* of his visit to the Shyok dam only about a fortnight later. Mr. Ludlow had originally planned a visit to the Karakoram Pass, but when public interest in the condition of the dam became great, he decided to make a detour to the Upper Shyok valley. He was able to make no accurate survey, but his observations, mainly based on rough estimates, are interesting for the sake of comparison, as his visit followed so closely on that of Captain Sinclair.

Leaving Panamik in the Nubra Valley on July 24, Mr. Ludlow travelled by the trade route over the Depsang plains to Daulat-beg-oldi, which he reached on July 30. Descending the Chip-chap river next day, he encamped on the eastern shore of the Gapshan lake, a little north of the Chip-chap confluence. He estimates that the lake, which narrowed southwards to a breadth of only a few hundred yards, was then 1½ to 2 miles across at its widest part. The length he thought to be about 10 miles, and the average depth, by a rough calculation based on a 30-feet-per-mile fall in the river Shyok, about 150 feet. Like Captain Sinclair, he noticed terraces, indicating former lake-levels, on

the eastern shore, though he does not specify their number. Further, he states that one such terrace was then about 100 feet above the surface of the lake. The highest of the four terraces mentioned by Captain Sinclair was estimated to be 63 feet above the water on July 19.

Mr. Ludlow also comments on the rapid rise of the lake during his stay of two days, but the rate, according to his calculation for August 2, was then 18 inches in 24 hours, as compared with Captain Sinclair's estimate a fortnight earlier of 27 inches a day on a three-day average. It will be seen that snow fell practically continuously during Captain Sinclair's visit, and that there appeared to be no noticeable variation in the rate of the rise of the water between day and night. During the two days that Mr. Ludlow was there, on the other hand, the weather was particularly warm and sunny, so that the glaciers feeding the lake, he believes, were probably melting at their maximum rate. He suggests that on a cold cloudy day the rise observed on August 2 might have been halved or quartered.

Mr. Ludlow tried to make his way to the dam round the north and west shores of the lake, across the snout of the central and southern Rimo glaciers, which was about 7 miles from the Chip-chap confluence. The route to the snout, though crossed by a number of ravines, was not difficult, but seracs over 100 feet high at the snout made further progress impossible. The streams below the glacier also were too deep to ford. He therefore abandoned the attempt, and, after visiting the Karakoram Pass, returned via the trade route to Saser Brangsa, resolved to ascend to the dam from there.

On August 9 he started on foot up the valley with one Ladakhi pony-man and his Kashmiri tiffin coolie. He first encountered the Ak-tash glacier. It is particularly interesting to compare the accounts of this glacier given by the two observers. Mr. Ludlow states that its ice-pinnacles were for the most part 200 yards from the Shyok bed, and that only in one place did they actually reach the right bank. Further, he states that the glacier was in retreat. The Kichik Kumdun, which he reached next, appeared from a distance to descend and stretch right across the Shyok to cliffs on the left bank. When, however, the glacier was crossed, the tongue was found to terminate some 80 yards from the left bank of the Shyok.

Following the river, the party reached the north lateral moraine of the Kichik Kumdun, and from there saw the great dam about 2 miles ahead. They continued to within about half a mile of it, when, finding themselves in a cul-de-sac, they had to abandon the attempt to reach the dam, as it was then late in the afternoon and they had made no provision for a night in the open. Mr. Ludlow's study of the dam was therefore unfortunately limited to observation through glasses from the south, at a range of half a mile. So far as he could see from this distance, the Chong Kumdun glacier appeared to have turned down the Shyok river-bed for from 500 to 600 yards. The length of the dam he estimated at between 350 and 400 yards, and the height 200 feet at the snout, whence it rose steeply towards the lake behind. He remarked that the weakest part of the dam appeared to be that immediately adjoining the left bank, the point where Captain Sinclair had found it to be lowest. Like Captain Sinclair, also, Mr. Ludlow considers that there was little percolation from the lake through the glacier, the water issuing from the snout appearing to be mainly due to the melting of the glacier itself.

A number of villagers insisted that this calamity of a change of course and the birth of a new river was due to canals being cut to irrigate the grazing-grounds north of the Chong Köl, and the villagers wished to revenge themselves on the big "bais" who had done so. This explanation, however, can carry no weight. The situation seems to be that there has been an accumulation of water in the area south-west of Kurla which is now (November 1928) quite impassable except by boat. The channel of the Yarkand River has, in course of time, become choked. There is thus a barrier of sand which has diverted the drainage of the Chong Köl farther east. This immense flow of water, meeting the Konche Darya, has taken along with it most of the water of that river. The result of this is that the Konche Darya below its junction with the Chong Köl water only receives some surplus water, just as the Yarkand Darya does. The surplus water occurs in October and is due to the irrigation water being turned off the land at the end of the season in the areas north and west of Chong Köl. What is remarkable, however, is that the Chong Köl water should have gone beyond the Konche Darya. It would seem more natural to combine with the latter river, and make a larger channel of the already existing one. The end of the Yangi or Qum Darya is said to be a large swamp west and north-west of the Loulan area, so that the ancient site is now only accessible from the east and south, *i.e.* from the Lop Nor direction.

This account may seem fantastic to those accustomed to rivers flowing in regular beds, with perhaps a rare and local divergence of a few yards. As a matter of fact, there is nothing unnatural about what has occurred. The rivers that drain into the area between the Tien Shan and the Kunlun pour themselves into a vast plain of sand, broken only by dunes or ridges themselves the result of fluvial action, or by equally unstable undulations produced by the wind. There is really nothing to control the course of a river once it has entered on this welter of sand. The channel that it carves for itself cannot, from its nature, have any permanence. Indeed, it is rather a source of wonder that there are not more changes in the beds of the rivers which discharge their vast volume of water into the fickle sands of the Taklamakan desert.

THE DUKE OF SPOLETO'S EXPEDITION TO THE KARAKORAM

Communicated by Major Kenneth Mason, Survey of India

NEWS has been received from Kashmir of the return of the Duke of Spoleto's Italian expedition from the Karakoram. The party was organized as follows: H.R.H. the Duke of Spoleto (leader), Commander Mario Cugia (second in command), Signor U. Balestreri (in charge of climbing and caravan), Colonel Gino Allegri (doctor), G. Chiardola (topographer), Professors V. Ponti, A. Desio, L. Di Caporiacco. There were also a cinematographer, a wireless operator, and two experienced Courmayeur guides, Evaristo Croux and Leone Bron. The expedition arrived in India in February and March, and left Srinagar in three parties on March 27 and 30 and April 3.

By the middle of May this strong party was concentrated at Ordokas, at an altitude of 13,900 feet, 17 miles up the Baltoro glacier from its snout. The Duke of Spoleto here established his base camp on the site of the depot formed in 1909 by his uncle, the Duke of the Abruzzi. After a brief period of bad weather a preliminary reconnaissance was made to the summit of the Muztagh pass, crossed with so much difficulty from the north by Sir Francis Younghusband in September 1887 on his famous journey from Peking to India. This reconnaissance proved the Muztagh pass to be practicable, and a party of three climbers and a geologist was formed for the survey of the Middle Shaksgam. Success attended this journey. The Muztagh pass, 19,030 feet, was crossed and the Sarpo Laggo glacier and valley descended to the junction with the Shaksgam river. From here the main valley of the Shaksgam was followed up, past the snouts of the Gasherbrum and Urdok glaciers, discovered in 1889 by Sir Francis Younghusband. The valley beyond the Urdok glacier was now traversed for some 20 miles, to the west bank of the Kyagar glacier, discovered and surveyed by Major Kenneth Mason, of the Survey of India, in 1926. His cairns, placed for the stereographic survey of the Shaksgam on the high ridge east of the Kyagar glacier, were identified. Owing to shortage of supplies no attempt was made to force a crossing of this glacier, which completely blocked the main valley, as in 1926; and the party returned down the Shaksgam.

Meanwhile another party ascended the main Baltoro glacier to Concordia, the junction of the Godwin Austen glacier descending from K_2, with the main trunk from between Gasherbrum and the Golden Throne of Sir Martin Conway's 1892 expedition. The Duke with two climbers reached a height of about 22,000 feet, from which point they could recognize Conway's "probable saddle," showing that there is a possible way over the watershed here to the Urdok glacier and Shaksgam valley.

At the end of July the expedition left the Baltoro glacier. A geological party explored the Trahonge glacier with the object of trying to make another pass to the Sarpo Laggo glacier, but this object was not attained. They also explored and made a topographical sketch of the Punmah glacier, which was first explored by Godwin Austen in 1861.

Besides the main objectives of the expedition, namely the crossing of the Muztagh pass, the exploration of the Middle Shaksgam, and the examination of the head of the Baltoro glacier, much valuable scientific work has been accomplished. A complete stereographic survey has been made of the Baltoro glacier, and topographical sketches have been made of the middle Shaksgam valley and of the Punmah glacier. Magnetic observations were made at Ordokas, Concordia, Paiju, Askole and Dassu. Gravity pendulums were swung at Ordokas and Askole. The naturalist made valuable collections of insects in the Biaho valley, on the Baltoro glacier, and in the Sarpo Laggo, while the surgeon, whose specific duties seem to have been light owing to the general good health of the party, carried out important anthropological work in Baltistan.

The expedition returned to Srinagar by the Deosai route, and was to sail from Bombay early in October.

book, full of human interest. The German publishers are to be congratulated on the general production of the volume. There is one drawback: the type is Gothic. Any book of such widespread interest as this should surely be printed in Roman type. The book is illustrated by many photographs, has an excellent map, and a full index. It is to be hoped that some enterprising English publisher will bring out an English translation of this work. B. K. F.

DIE ALAI- (PAMIR-) EXPEDITION 1928. Deutsche Forschung. Aus dem Arbeit der Notgemeinschaft der Deutschen Wissenschaft. Heft 10. 1929. 196 *pages;* 2 *maps. R.M.*10.

This is a preliminary report of the work of the Alai-Pamir Expedition of 1928, a general account of which was given by its leader, Mr. W. Rickmer Rickmers, at an evening meeting of the Society last spring (see *G.J.*, 74, 1929, pp. 209–231). The expedition was organized by the Notgemeinschaft der Deutschen Wissenschaft and received the support of the U.S.S.R. Academy of Sciences. The present account shows that important additions were made to the knowledge of the area. For example, the geologist, L. Noth, shows that the country consists of a base of crystalline schists and phyllites, above which are beds with a few Middle Devonian fossils. They are succeeded by Jurassic sandstones and conglomerates with plants, and Herr Noth did not find in them any of the marine fossils previously discovered. Marine Upper Cretaceous and some Eocene and glacial beds complete the succession. The geographical bearing of the geological work is that the author shows that the Devonian beds have been overthrust on to the Upper Cretaceous, which in some places rest directly on the Devonian without any evidence of disturbance, while the overthrusting seen in the eastern and western parts of the Trans-Alai Range is not present in the central part of the area. He concludes, therefore, that the Alai and Pamir Mountains belong to the same system. The main glaciers are all in retreat, but a few minor glaciers are readvancing down some of the side valleys. The volume has been promptly prepared as a preliminary report, and the lines of the sections are not stated, so that they are not readily intelligible. The fuller account of the expedition may be expected to make a material contribution to knowledge of the mountains of this part of Turkistan. J. W. G.

THE EFFECT OF WESTERN INFLUENCE ON NATIVE CIVILISATIONS IN THE MALAY ARCHIPELAGO. Edited by Dr. B. SCHRIEKE. The Royal Batavia Society of Arts and Sciences. *Batavia: G. Kloff & Co.* 11 × 7 *inches;* viii + 248 *pages*

At the Congress of the Pan-Pacific Association at Tokyo in 1926, a Committee for the study of Anthropology was decided upon, and Dr. B. Schrieke, Professor of Sociology of the Faculty of Law, Batavia, was invited to accept the position of Chairman, to marshal and co-ordinate the knowledge of experts and to submit the same for discussion by the Association at future Congresses. Dr. Schrieke's nearest available field of operations being the Netherlands Indies, he set to work there, and the first result of his labours is this valuable treatise made up of contributions from erudite individuals of long experience amongst the peoples of Dutch East India.

In order the better to show the effects of Western influence on the civilizations of the Oriental races dealt with, the writers dwell upon the origin and degree of such civilizations at the time of the first coming of Europeans into the Archipelago. They then describe, each in his own department, the nature of the foreign influence, the methods of its introduction and gradual extension, and the manifestations at present resulting therefrom. And finally some of them