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CONTENTS

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No. 3. September 1919.

No. 4. October 1919.

No. 5. November 1919.

begins hundreds of miles above that. I have more than once embarked at Stretensk in a tug steamer, gone all the way down the great river to its mouth, a journey of just 2000 miles. For quite half the distance the Amur forms the boundary of the Russian and Chinese Empires. But distance does not always depend upon the mere physical fact. In some respects I found that it was not such a very far cry from Amur to, say, an English village ; that, owing to the conditions of the hinterland on both sides, the banks of the Amur constituted, in fact, one large village, where at any particular point one heard gossip going on much as in a village in England. If a marriage, a birth, a scandal of any sort took place, say at Nicolaievsk, the next steamer brought the news to Khabarovsk ; five days later it was the talk of Blagovyeshchensk ; and so on, the whole of the news floating up and down the river just as though it were the street of one little village. I was at Blagovyeshchensk at the time of the massacre, and was told, truly enough, that to cross to the Chinese side was to have my throat cut. The same story was repeated on other occasions, but in 1910 I determined to take what risk there was and go. I got a Chinaman who had driven cattle from Mongolia and knew some Russian, to act as interpreter, and a Russian who owned a cart and three horses to drive me ; nobody attempted to cut my throat, and after a pleasant journey of eight days I reached the Manchurian railway at Tsitsihar. I was the first Western European to cover that route, but I found that the first person of note to travel over any part of it was one whose name will always be heard with respect at any meeting of this Society. I refer to Prince Kropotkin, who made an expedition there and published a paper on it as far back as in 1864. He was followed by one or two Russian scientists and military surveyors, but by no one from further west. I gather from the lecturer that even now there is no railway in these parts, although before the war one was projected, so that communication is still by road only. I do not think I need add anything more. As Sir Francis Younghusband has said, this lecture has filled my memory with all sorts of things, and it would be easy to go on, but I will end now by thanking the lecturer very much for one of the most admirable lectures, and one of the most beautifully illustrated, I have ever heard.

The PRESIDENT: It is just possible that in the audience there may be some lady or gentleman who has some knowledge of that part of the world. If so, we would be glad if they would kindly say a few words. If not, there is nothing further for me to do than to ask you to join in a very cordial vote of thanks to Captain Sowerby for a most interesting and admirable lecture, one of the best we have heard in this room this season.

MARCO POLO'S ACCOUNT OF A MONGOL INROAD INTO KASHMIR

Sir Aurel Stein, K.C.I.E.

IT has been my good fortune in the course of three Central Asian journeys to see and in most parts to survey the routes which Marco Polo had followed from the great bend of the Oxus right through to the "Great Province of Tangut" or Kan-su in westernmost China. In my 'Ancient Khotan,' recording the scientific results of my first journey, and

again in 'Desert Cathay,' the personal narrative of the second, I have had occasion to bear testimony to the accuracy of all data which the great Venetian has left us of what he himself observed on his way up the Oxus, across the Pamirs, and thence through the deserts and oases of the Tarim Basin to the western borderlands of Cathay. In *Serindia*, the detailed report on the explorations of my second expedition, which the end of the war will now, I hope, permit to issue before long from the Oxford University Press, opportunity offered to examine also some notes of Marco Polo bearing on regions adjacent to his route but not actually visited by him. Among these the Hindukush tracts lying between ancient Bactria in the north-west and Kashmir on the south-east have naturally a special fascination for me. Our information about their geography, historical as well as physical, has much expanded since Sir Henry Yule, the great elucidator of early Asiatic travel, wrote his comments on these chapters of Ser Marco's immortal book. The results of this fresh inquiry, limited as its scope is, bring out once again the remarkable care of the great traveller's record even where it relates to ground beyond his personal observation. They may hence be presented here as a modest contribution towards the supplementary volume Prof. Henri Cordier's indefatigable hand is preparing to his, the third, edition of Sir Henry Yule's *magnum opus*.

Marco Polo first takes us to that interesting region between the Oxus and Indus where in connection with his Persian travels he records an incidental account of the devastations carried on in his times by the *Caraonas*, predatory bands of Mongols and their half-breed descendants (see Yule, 'The Book of Ser Marco Polo,' 3rd edit., revised by H. Cordier, I, p. 98). "The king of these scoundrels is called *Nogodar*. This Nogodar had gone to the court of Chagatai, who was own brother to the Great Kaan, with some 10,000 horsemen of his, and abode with him; for Chagatai was his uncle. And whilst there this Nogodar devised a most audacious enterprise, and I will tell you what it was. He left his uncle, who was then in Greater Armenia, and fled with a great body of horsemen, cruel unscrupulous fellows, first through *Badashan*, and then through another province called *Pashai-Dir*, and then through another called *Ariora-Keshemur*. There he lost a great number of his people and of his horses, for the roads were very narrow and perilous. And when he had conquered all those provinces, he entered India at the extremity of a province called *Dalivar*. He established himself in that city and government, which he took from the king of the country, *Asedin Soldan* by name, a man of great power and wealth. And there abideth Nogodar with his army, afraid of nobody, and waging war with all the Tartars in his neighbourhood."

With the historical data bearing on this remarkable exploit we need not concern ourselves here in detail. Sir Henry Yule in his notes has examined them at length from such sources as were accessible to him in

translations or extracts, and has shown that Muhammadan records both of Persia and India know of Mongol inroads during the latter half of the thirteenth century which carried large bands of freebooters under a leader called *Nigudar* into the borderlands of Iran and India and even as far as Lahore (see Yule, *ibid.*, pp. 102 *sqq.*). These inroads appear to have commenced from about 1260 A.D., and to have continued right through the reign of Ghiasuddin, Sultan of Delhi (1266–86), whose identity with Marco's *Asedin Soldan* is certain. It appears very probable that Marco's story of Nogodar, the nephew of Chagatai, relates to one of the earliest of these incursions which was recent history when the Poli passed through Persia about 1272–73 A.D. There seems reason to hope that a critical examination of the available original sources may yet allow the chronology and historical circumstances of the expedition related by Marco to be determined with greater accuracy, and that this may clear up certain doubts and discrepancies duly noted by Sir Henry Yule in the records he had access to. But what alone concerns us here is to trace the route taken by Nogodar's host, and to identify the localities which Marco's account names along it.

Our task is much facilitated by the fact that the territories indicated by the first and by the last two names in Marco's topographical list can be fixed with certainty, as recognized by Yule and partly by earlier commentators also. There is no doubt that by *Badashan* is meant Badakhshan, the province north of the Hindukush, through which the Venetian passed on his way to the upper Oxus, and which he quite correctly describes in a subsequent chapter (see Yule, 'Marco Polo,' 1, pp. 157 *sqq.*). It is equally certain that Marco's *Keshemur* is Kashmir, of which he gives a very interesting and remarkably correct account before continuing to describe his own route from Badakhshan towards the Pamirs and beyond (see Yule, 'Marco Polo,' 1, pp. 166 *sq.*). *Dalivar*, also spelt *Dilivar*, the last name, had been, indeed, the subject of varying conjectures until Sir Henry Yule's sure critical sense led him to recognize the definite proof which the notice of a Muhammadan chronicler of India, relating the capture of Lahore by Mongol raiders in Ghiasuddin's time, furnishes that "Marsden was right, and that *Dilivar* is really a misunderstanding of '*Città* di Livar' for *Lahawar* or Lahore."

From Badakhshan to Kashmir it is a far cry, and though much of the intervening ground is rendered difficult by high ranges and deep-cut river gorges—the latter in the Hindukush, as in other alpine regions, often even more formidable obstacles than the passes—a variety of possible routes might come into consideration. As to which was the route which Ser Marco heard of as having witnessed Nogodar's daring exploit, no definite evidence has so far been available. Of the several localities which his account interposes between Badakhshan and Kashmir there is only one which as yet could be clearly placed on the map of this mountain region as we know it: I mean the second part of the copulate name *Pashai-Dir*.

In this Sir Henry Yule and before him Pauthier rightly recognized the present *Dir*, the mountain tract at the head of the western branch of the Panjkora River, through which leads the most frequented route from Peshawar and the lower Swat valley to Chitral.* As regards the location of *Pashai*, Sir Henry Yule encountered considerable difficulty, illuminating though his comments are, and no wonder; for limited was the information then available about the geography of a region which even now in parts is still practically unsurveyed. *Ariora* has remained altogether unexplained; for what conjectures regarding this name Sir Henry Yule thought worth mentioning—with due caution, I may add—are such as would not stand serious examination by critical students familiar with the historical topography of the Indian North-West Frontier, and with methods of scientific philological research.†

Taking the name *Pashai* first, the difficulty it raises must claim all the more attention because Marco Polo in another place, immediately after describing Badakhshan, devotes a separate little chapter to the 'Province of Pashai.' It may be well to quote it in full, though I do not propose here to discuss every detail it records (see Yule, 'Marco Polo,' I, p. 164). "You must know that ten days' journey to the south of Badashan there is a Province called *Pashai*, the people of which have a peculiar language, and are Idolaters, of a brown complexion. They are great adepts in sorceries and the diabolic arts. The men wear earrings and brooches of gold and silver set with stones and pearls. They are a pestilent people and a crafty; and they live upon flesh and rice. Their country is very hot.

"Now let us proceed and speak of another country which is seven days' journey from this one towards the south-east, and the name of which is *Keshimur*."

It is clear that a safe identification of the territory intended cannot be based upon such characteristics of its people as Marco Polo's account here notes (obviously from hearsay), but must reckon in the first place with the plainly stated bearing and distance. And Sir Henry Yule's difficulty arose just from the fact that what the information accessible to him seemed to show about the location of the name *Pashai* could not be satisfactorily reconciled with those plain topographical data. Marco's great commentator, thoroughly familiar as he was with whatever was known in his time about the geography of the western Hindukush and

* See Yule, *ibid.*, I, p. 104. Dir has played its part in the events connected with the Chitral campaign of 1895, and gives now its name to a Pathan chiefship comprising most of the Panjkora and Swat River headwaters. For a brief account of the main valley, cf., *e.g.*, my 'Desert Cathay,' I, pp. 18 *sqq.*

† See Yule, 'Marco Polo,' I, p. 104, where one solution suggested is that *Ariora* may be "some corrupt or Mongol form of *Aryavartta*," an ancient Sanskrit designation of the whole of India! The other, offered on General Cunningham's authority, that *Ariora* may be the Sanskrit *Harhaura*, an alleged early name of the Western Panjab, is quite as fanciful.

the regions between Oxus and Indus,* could not fail to recognize the obvious connection between our *Pashai* and the tribal name *Pashai* borne by Muhammadanized Kafirs who are repeatedly mentioned in medieval and modern accounts of Kabul territory.† But all these accounts seemed to place the Pashais in the vicinity of the great Panjshir valley, north-east of Kabul, through which passes one of the best known routes from the Afghan capital to the Hindukush watershed and thence to the Middle Oxus. ‡ Panjshir, like Kabul itself, lies to the *south-west* of Badakhshan, and it is just this discrepancy of bearing together with one in the distance reckoned to Kashmir which caused Sir Henry Yule to give expression to doubts when summing up his views about Nogodar's route. §

The valleys descending to the south from the Hindukush main range between Panjshir in the west and Chitral in the east are inhabited by Kafir tribes, now all subject to Afghan rule. They remain to the present day as inaccessible to European exploration as they were when Sir Henry Yule wrote. What knowledge we now have of their topography, apart from some high peaks triangulated over great distances, is still mainly derived from native route reports and the like. But fortunately for the question in which we are interested, important help is offered by the results of the great Linguistic Survey of India which Sir George Grierson has carried on under the orders of the Indian Government, and which for its vast scope and methodical thoroughness will for ever rank

* Among the writings of Sir Henry Yule which bear eloquent testimony to his familiarity with these regions and their historical past, it may suffice to mention his masterly "Essay on the Geography of the Valley of the Oxus," prefixed to the new edition (1872) of Captain John Wood's classic, 'A Journey to the Source of the River Oxus' (pp. xxi.–civ.). It still remains to this day a mine of valuable information, in spite of all later additions to our knowledge of Central-Asian geography and history.

† For such references to the Pashais, mostly recorded by travellers who followed the great route across the Hindukush north-east of Kabul, see Yule, 'Marco Polo,' I, p. 165. Their list extends from Ibn Batuta to officers whom the first British occupation of Kabul in 1839–40 brought to these parts.

‡ For handy reference on topographical points concerning the Hindukush region between Kabul and Chitral-Dir and discussed in these pages may be recommended the *Afghanistan Sheet* of the Survey of India's 'Southern Asia Series,' 1 : 2,000,000, also sheets Nos. 38, 43 of 'India and Adjacent Countries,' 1 : 1,000,000 (published under the direction of Colonel Sir S. G. Burrard, Surveyor-General in India, 1914–17). They embody, within the limitations imposed by the small scale, results of recent surveys not otherwise readily accessible to the student.

§ Cf. 'Marco Polo,' i. p. 165, last para. of note: "The route of which Marco had heard must almost certainly have been one of those leading by the high Valley of Zebak, and by the Dorah or Nuksan Pass, over the watershed of Hindu-Kush into Chitral, and so to Dir, as already noticed. The difficulty remains as to how he came to apply the name *Pashai* to the country south-east of Badakhshan. I cannot tell. But it is at least possible that the name of the Pashai tribe (of which the branches even now are spread over a considerable extent of country) may have once had a wide application over the southern spurs of the Hindu-Kush. Our Author, moreover, is speaking here from hearsay, and hearsay geography without maps is much given to generalizing. . . ."

among the chief glories of scientific enterprise due to British administration in India. The carefully collected materials of the Linguistic Survey cover ground far beyond the administrative limits of the Indian Empire, and on its north-west frontier in particular comprise the many languages spoken on both sides of the Hindukush. Sir George Grierson's Survey has established the important fact that to the south of the range the languages spoken from Kashmir in the east to Kafiristan in the west are neither of Indian nor of Iranian origin, but form a third branch of the Aryan stock of the great Indo-European language family.*

Among the languages of this branch now rightly designated as "Dardic," the Kafir group holds a very prominent place. In the Kafir group again we find the *Pashai* language spoken over a very considerable area. The map accompanying Sir George Grierson's monograph on 'The Pis'āca Languages of North-Western India,' † shows *Pashai* as the language spoken along the right bank of the Kunar river as far as the Asmar tract as well as in the side valleys which from the north descend towards it and the Kabul river further west. This important fact makes it certain that the tribal designation of Pashai to which this Kafir language owes its name, has to this day an application extending much further east than was indicated by the references which travellers, mediæval and modern, along the Panjshir route have made to the Pashais and from which alone this ethnic name was previously known.

Thus Sir Henry Yule's cautiously voiced suggestion that "the name of the Pashai tribe . . . may have once had a wide application over the southern spurs of the Hindu-Kush" has proved right. With the location of the Pashais extended to the south-east as far as the Kunar river and the tracts immediately adjoining Dir from the west, it becomes easy for us to account both for the bearing and distance which Marco indicates for the "Province of Pashai," and for the description he gives of its people. A look at the map shows that the Kunar Valley from Asmar to Jalalabad lies exactly south of that central portion of Badakhshan which contains the old capital of the territory marked by the present Khairabad and Baharak as well as the fertile tract of Jirm. Proceeding due south of Baharak and Jirm by the valley of the Kokcha the Kunar can con-

* For the main facts concerning the "Dardic" languages found now south of the Hindukush, and once spoken also along the Indus Valley much further away to the south, see Sir George Grierson's paper in the *Journal of the R. Asiatic Society*, 1900, pp. 501 sqq.; also his monograph 'The Pis'āca Languages of North-Western India' (Asiatic Society Monographs, VIII, 1906), pp. 4 *sqq*.

† See the preceding note. More exact details about the local distribution of the Pashai tribes will, no doubt, become available when the last volume of Sir G. Grierson's monumental work dealing with this language branch is published, along with its illustrative maps.

[Since this paper was sent to press Sir George Grierson has kindly pointed out to me that Gawar-bati, the Kafir language round the confluence of the Bashgal and Kunar (Chitral) rivers, is very closely connected with Pashai, and that "quite possibly in the thirteenth century Gawar-bati and Pashai formed one language spoken by one people."]

veniently be reached across either the Mandal or the Kamarbida Pass by ten marches, the total marching distance as roughly calculated from the map probably not exceeding 180 miles by either route. We shall presently see that it was in all probability the former and somewhat shorter route across the Mandal Pass to which Marco Polo's information gathered in connection with Nogodar's incursion refers.

His description of the Pashai people as "Idolaters, of a brown complexion," "a pestilent people and crafty," is just such as he might have heard applied to the heathen Kafirs by their Badakhshan neighbours in the north, already good Muhammadans at the time of his passage. The reference to the Pashai people's diet, on flesh and rice, and to their country being hot, well fits the tracts on the Kunar and the lower portions of the Kafir valleys where they debouch on that river. The mention of their being "great adepts in sorceries and the diabolic arts" is, as Yule has already pointed out, in full accord with what the great Chinese pilgrim Ḥsüan-tsang tells us of the old inhabitants of Swat, the large territory immediately to the east of the Kunar Valley, whose connection in language and ethnic origin with the Kafirs and Dards recent research clearly indicates.*

We may now return to what Marco tells us of the route which Nogodar with his host of Mongol freebooters followed on his great raid from Badakhshan to Kashmir. In the light of the explanations now furnished as regards the location of Pashai, and having regard to the direction indicated by the mention of Dir and to what the map plainly shows, I believe it may be considered as certain that the Mongols' route led across the Mandal Pass into the great Kafir valley of Bashgal and thus down to Arnawai on the Kunar. Thence Dir could be gained directly across the Zakhanna Pass, a single day's march. There were alternative routes, too, available to the same destination either by ascending the Kunar to Ashreth and taking the present "Chitral Road" across the Lowarai,† or descending the river to Asmar and crossing the Binshi Pass.

That the route here indicated is by far the most direct for those wishing from the Badakhshan side to gain Kashmir *viâ* Dir is evident on a look at the map.‡ That the Mandal Pass, estimated there at 15,200

* See Watters, 'On Yuan Chwang's Travels,' 1, p. 225. At the time of Hsüan-tsang's visit, *circ.* 631 A.D., the people of Swat (Udyana) were Buddhists. Muhammadanism, propagated by Pathan conquest, did not penetrate into Swat and the Kunar Valley until well after Marco Polo's time; in some of the less accessible mountain tracts towards Chitral and Gilgit it was fully established only in relatively modern days.

† For a description of the Lowarai Pass and its approaches, see my 'Desert Cathay,' 1, pp. 21 *sqq.*

‡ It is the map, too, which conclusively demonstrates that the route which Sir Henry Yule assumed to have been followed on Nogodar's inroad, through the Zebak Valley and by the Dorah or the Nuksan Pass into Chitral and so to Dir, would have meant a very great detour. The extremely confined nature of the Chitral gorges, and

feet, is practicable for laden animals during the summer and autumn, probably under conditions like those of the neighbouring and better-known Dorah Pass, leading to Chitral, may be safely concluded from the remarks of Sir George Robertson, who on his adventurous visit to Kafiristan ascended the Bashgal Valley to its head in 1892 (cf. Robertson, 'The Kafirs of the Hindu-kush,' p. 305). Even then a good deal of trade made its way thither from the Badakhshan side, and this may have undoubtedly increased since Afghan rule some years later was extended also over this portion of Kafiristan and the last independent Kafir tribes were reduced. It is interesting to find the route leading up the Bashgal Valley to the Mandal Pass quite accurately described already in the 'Surveys' of Moghul Beg, dating back to about 1789–90, from which the late Major Raverty has made extensive extracts accessible in his 'Notes on Afghanistan.'*

Here it may be convenient to note also that, as I have had occasion to show elsewhere, the route followed in 519 A.D. by the Chinese Buddhist pilgrim Sung Yün from Badakhshan *viâ* Zebak into the territory of *Shê-mi*, *i.e.* Kafiristan, must have led over the Mandal Pass (see Stein, 'Ancient Khotan,' I, p. 14; also 'Serindia,' I, pp. 9 *sqq.*). After reaching this territory, the description of which closely fits the Kunar Valley or Marco's Pashai, the pious traveller proceeded straight south to Udyana or Swat.

It still remains for us to trace the route by which Nogodar's host is likely to have made its way from "Pashai-Dir" to Kashmir. Here we are fortunately on ground which, in consequence of a succession of frontier expeditions, including the Chitral campaign of 1895 and those following the great tribal rising in Swat, etc., two years later, has seen a considerable amount of exact survey work, covering practically the whole of the area we have to consider here.† My journey to Chitral in 1906 and numerous preceding archæological tours, including the one made in 1898 with the Buner Field Force, and that which in 1904 brought me to a tract of independent tribal territory round Mount Mahaban not previously visited by any European,‡ allow me to speak from personal knowledge

the sterile nature of most of the ground would besides have made such a route practically impossible for a large body of *horsemen*. These objections could, of course, not be fully realized from such data as were available at the time when Sir Henry Yule wrote.

* The record of these surveys executed by Moghul Beg on behalf of Colonel Polier, of Benares, contains so much exact information still of interest for the geography, history, and ethnography of the Indian North-West Frontier, that its translation *in extenso* from the two Persian MSS. of it available in the India Office Library would appear very desirable. Moghul Beg, a native of Kabul, seems to have been a man possessed of excellent topographical sense. His powers of accurate observation and faithful record in general were certainly exceptional in a man of his origin and *milieu*.

† Convenient reference for this area may be made to Sheets No. 38, 43 of the Survey of India's 1 : 1,000,000 Map ; also to its 'Map of the Panjab, North-West Frontier Province and Kashmir,' 16 miles to 1 inch.

‡ Cf. for these tours, *e.g.*, 'Detailed Report on an Archæological Tour with the Buner Field Force,' Lahore, 1898; 'Report of Archæological Survey Work in the

of almost the whole of the line along which, I believe, the route meant by Marco Polo may be traced.

A look at the map shows that for a large body of horsemen wishing to make their way from Dir towards Kashmir the easiest and in matter of time nearest route must have led then, as now, down the Panjkora Valley and beyond through the open tracts of Lower Swat and Buner to the Indus about Amb. From there it was easy through the open northern part of the present Hazara District (the ancient Urasa) to gain the valley of the Jhelam River at its sharp bend near Muzaffarabad. Through all periods of history the line of the Jhelam from above this point has served as the only practicable route for trade or invasion leading up to the great valley of Kashmir proper.* The line just indicated from Dir to the Indus lies almost everywhere through wide fertile valleys, and the passes of Katgala and Mora-Bazdarra, by which the watersheds separating the drainage areas of the Panjkora, Swat and Buner rivers have to be crossed, are quite easy, with elevations well below 4000 feet.†

But it is not merely the configuration of the ground which supplies strong reasons for tracing Nogodar's route along the line I have briefly sketched. I think striking confirmation for it is furnished also by the name *Ariora*, which the itinerary as recorded by Marco interposes between Dir and Kashmir, and which has so far remained unexplained and puzzling. I believe we may in it safely recognize the present *Agror*, the well-known name of the hill tract on the Hazara border which faces Buner on the east from across the left bank of the Indus. The hills of Agror form a southern offshoot of the Black Mountains, and through them lead a number of easy routes connecting the Indus valley below the debouchure of the Barandu or Buner River with the fertile plains of northern Hazara and with the Jhelam valley.

Long ago, when commenting upon a passage of Kalhana's Sanskrit 'Chronicle of Kashmir,' I had occasion to prove in detail that the modern form *Agror* must be connected with the Sanskrit *Atyugrapura*, the name by which Kalhana mentions this hill tract, "strong in fighting men" (just as it has remained to the present day), in connection with a contem-

North-West Frontier Province' (Peshawar, 1905), pp. 19 *sqq.*; also 'Desert Cathay,' 1, pp. 13 *sqq.*

* For the history of the route along the Jhelam River (*Vitasta* in Sanskrit, the classical *Hydaspes*), see my "Memoir on the Ancient Geography of Kashmir" in Stein, 'Kalhana's Rajatarangini' (transl., 1900), 2, pp. 401 *sqq.*

† To any one familiar with the topography of this area between Kunar and Indus it seems scarcely necessary to explain that any other line taken further north and across Upper Swat, though shorter on the map, would have carried Nogodar's force across a succession of much higher passes and over far more difficult ground. An objection, even more serious perhaps, to such an attempt at a "short cut" would be presented by the very confined nature of the Indus Valley higher up, and the great obstacle presented to the east of it by the high and very rugged range of the Black Mountains.

porary expedition (A.D. 1149–50) to Urasa or Hazara.* This is not the place to discuss the exact details of the phonetic change which has led to the present form of the name and which may help also to account for Marco's *Ariora*. In any case it is certain that the name of the tract actually in use in Kalhana's time, and more than a century later when Nogodar's inroad took place, could not have been the archaic one of Sanskrit *Atyugrapura*, but must have more closely approached the modern form *Agror*. Whether *Ariora* is the only reading for this local name among the many manuscripts of Marco Polo's text and whether the divergence it shows from the modern form of the name is to be accounted for on phonetic grounds, palæographically or otherwise, are points which I must leave to others more competent in such matters to determine.†

The identification of *Ariora* = *Agror* thus presents itself as a conclusive argument in favour of Nogodar's track having lain through the Bashgal Valley, Dir, Swat, Buner, Agror, and up the Jhelam Valley—the line which at the present day, too, would be the most direct and practicable for a mobile column of horsemen forcing its way from Badakhshan to Kashmir. But this identification is of additional value because it helps to explain and justify what Marco Polo tells us about the relative position of Pashai and Kashmir. In his above-quoted chapter on Pashai he speaks of "Keshimur" as a country being "seven days' journey from this one (*i.e.* Pashai) towards the south-east," and the shortness of this estimate has perplexed Sir Henry Yule, strong as his belief in Marco's general accuracy justly was (see 'Marco Polo,' 1, p. 166, topmost paras.).

But if we take due account of the topography of the route above

* See my translation of 'Kalhana's Rajatarangini,' 2, p. 267, note on 8, 3402. There I have also pointed out that we have an early rendering of the original Sanskrit form of the name in Ἰθάγουρος mentioned by Ptolemy, 'Geography,' vii. 1, 45, besides Taxila as one of the "cities" in the Ἄρσα or Οὐάρσα territory. The latter has long ago been identified with *Urasa*, or Hazara, and Taxiala with the city of Taksasila or Taxila, famous both in early Indian literature and in Greek records of ancient India. Its site, at the southern border of the Hazara District, is marked by extensive remains near Sarai-kala, which are now being systematically excavated by the Indian Archæological Survey under Sir John Marshall. The identification of Ἰθάγουρος with *Atyugrapura : Agror* is strongly supported by the position which Ptolemy assigns to this locality relative to *Taxiala : Taxila*. The form Ἰθάγουρος is easily accounted for on philological grounds as an attempt to render an earlier Prakrit form of the name.

† [Since this paper was written Sir George Grierson has favoured me with a very valuable note on the phonetic relationship between *Atyugrapura : Agror ; Ariora*. He does not dispute the identity of *Atyugrapura* with *Agror*, but expresses doubts as to the existence of an intermediate Prakrit form **Ayugraura*, as conjecturally assumed by me in my note on the "Rajatarangini" passage above quoted. He adds, however, the important observation that under a well-established phonetic rule of the Dardic languages (*cf.* his "Pis'āca Languages," pp. 105 *sqq.*) **Atugraura* might be a Dardic form of the name *Atyugrapura*. In Khowar, the Dardic language of Chitral, "medial *t* regularly becomes *r*, so that this would give us **Arugyaura*, which is not far from *Ariora*. It is quite possible that the Khowar pronunciation would be that heard in Badakhshan." This suggestion well deserves consideration in view of the close historical connection between Chitral and Badakhshan.]

indicated and also of what the Kashmir Chronicle shows us about the political dependence of Urasa-Hazara, of which Agror forms part, it is easy to explain Marco's statement. A look at the map makes it clear that the whole of Kashmir lies, just as we are told there, to the south-east of Pashai, assuming that the bearing is taken from where the Bashgal Valley debouches on the Kunar. And it must be borne in mind that, as Yule rightly recognized, Marco Polo is merely reproducing information derived from a Mongol source and based on Nogodar's exploit. Now starting from a point like Arnawai, where the route down the Bashgal Valley strikes the Kunar river, and which certainly is well within Pashai, lightly equipped horsemen could by that route easily reach the border of Agror on the Indus within seven days. Speaking from personal knowledge of most of the ground, I should be prepared to do the ride myself by the following approximate stages: Dir, Warai, Sado, Chakdara, Kinkargalai, Bajkatta, Kai or Darband on the Indus.*

Once arrived in Agror, Nogodar and his Mongols might well claim to have reached the political, though not the geographical, border of Kashmir; for the northern portion of Hazara and the valley of the Jhelam may safely be assumed to have then been still dependent on the Kashmir kingdom, as they certainly were in Kalhana's time only a century earlier and already on Hsüan-tsang's visit, five centuries before.† But in reality the serious obstacles to the invasion of Kashmir proper still lay before the Mongols, even when they had forced their way through Agror and Hazara. The narrow, tortuous gorges through which the Jhelam River or Vitasta cuts its way from below the 'Gate' of Baramula (Varahamula) and the precipitous rugged spurs rising above them have served through all periods of history as the strongest natural defences of Kashmir against invasion from the west. In my 'Memoir on the Ancient Geography of Kashmir' I have had ample occasion to discuss them, and there is hence no need here to give details (see Stein, 'Rajatarangini,' 2, pp. 401 *sqq.*).

But it is of interest to note how clearly also this feature of the ground across which Nogodar's force effected its "most audacious enterprise," is reflected in Marco Polo's record. It is immediately after his mention of "Ariora-Keshimur" that he tells us: "There he lost a great number of his people and of his horses; for the roads were very narrow and perilous." How serious the barriers are which nature has raised in the defiles of the Jhelam Valley against any invader, must be obvious to whoever has

* During a great portion of the year it would be easy to save the stage at Sado by crossing the Laram Pass and thus cutting off the big detour down the Panjkora and through Talash.

† Cf. for the history of *Urasa* or Hazara, Stein, 'Rajatarangini,' 1, pp. 215 *sq.*, note on v. 217. The whole hill tract between Indus and Kashmir proper was known in Muhammadan times by the name of *Pakhli*. It deserves to be noted that the northern portions of the tract continued to be governed from Kashmir during the relatively modern period of Pathan and Sikh rule.

followed this route by the cart road now giving access to Kashmir, a triumph of modern engineering. It is equally easy to realize them on reading of this "road before it was made" in the accounts of early European travellers, like Moorcraft, Vigne, Baron Hügel, etc. In Marco Polo's special reference to the difficulties here encountered on roads "very narrow and perilous," we have further striking evidence that the account he has left us of Nogodar's great venture was derived from a trustworthy Mongol source and reproduced with remarkable faithfulness.

This cannot be the place for an attempt to trace a record of Nogodar's transient conquest of Kashmir in the later Chronicles of the Valley still awaiting critical edition and elucidation. Nor need I do more here than allude to the curious parallel presented by the equally hardy raid which, effected from the opposite direction across the high ranges of the Kun-lun and the inhospitable plateaux of the Kara-koram, carried Mirza Haidar Dughlat, a distant kinsman of Nogodar, into Kashmir two and a half centuries later, and made that cultured Moghul prince for a time master of the mountain-girt kingdom (see Mirza Haidar's 'Tarikh-i-Rashidi,' ed. and transl. by Elias and Ross, pp. 423 *sqq.*).

One concluding remark bearing on the value of Marco Polo's own record will suffice. We have seen how accurately it reproduces information about territories difficult of access at all times, and far away from his own route. It appears to me quite impossible to believe that such exact data learned at the very beginning of the great traveller's long wanderings could have been reproduced by him from memory alone close on thirty years later, when dictating his wonderful story to Rusticiano during his captivity at Genoa. Here, anyhow, we have definite proof of the use of those "notes and memoranda which he had brought with him," and which, as Ramusio's 'Preface' of 1553 tells us (see Yule, 'Marco Polo,' I, Introduction, p. 6), Messer Marco while prisoner of war was believed to have had sent to him by his father from Venice. How grateful must geographer and historical student alike feel that these precious materials reached the illustrious prisoner safely!

BOUNDARY DELIMITATIONS IN THE TREATY OF VERSAILLES

BY provisions in the Treaty of Peace signed with Germany at Versailles on 28 June 1919, several Commissions are to take the field within fifteen days of the Treaty coming into force to demarcate those boundaries delimited in the Treaty which are not old administrative boundaries already well marked. The technique of the boundary delimitation is, therefore, of immediate interest.

The Treaty of Peace between the Allied and Associated Powers and Germany, published as Treaty Series No. 4 (1919), is furnished with four

pressing demand, and at the present rate of taking up these lands by settlers, ten years will elapse before the irrigable lands already awaiting occupancy are completely occupied. The Reclamation Service has already expended about $100,000,000 received from the sale of public lands; it has borrowed $20,000,000 more, and may shortly be compelled to seek further Government aid to maintain and complete the projects already under way.

To many Americans, it appears that the Government entered upon its extensive irrigation enterprises too soon and on too costly a scale. Millions of acres of farm lands in the humid part of the United States are unused; millions more are producing but a fraction of their possibilities. There was no lack of good land that required no irrigation and would produce nearly as much as the irrigated land after great sums had been expended, merely to bring water to it. This irrigation experiment may cost the U.S. Treasury from a hundred million to two hundred million dollars, but it will not all be lost; a good deal of benefit will come from the undertakings. Besides, two hundred million dollars nowadays may scarcely seem worth worrying about!

ON THE POSSIBLE PROLONGATION OF THE HIMALAYAN AXIS BEYOND THE DIHANG

F. Kingdon Ward

THE marked resemblance between the Himalayan flora * and that of Western China might be due to a former direct geographical connection between the eastern Himalaya and the mountain system reaching out across China from the Tibetan plateau to the maritime plains (forming the watershed between the Yellow River and the Yangtze). It has therefore appeared to me worth while to investigate the following points:

(1) Do any vestiges of such a connection still remain amongst the parallel ranges, trending north-west to south-east, which intervene between the eastern end of the Himalaya and the western end of the Tsin-ling?

(2) Can any such direct connection be shown, by geographical and geological exploration alone, to have existed at some period?

(3) In the event of no direct proof of former connection being forthcoming, can it be shown that no such direct connection could indeed ever have existed—that the parallel ranges of Yun-nan and Szechwan are all, in fact, features of original structure?

Since in the latter event it would be necessary to discard the theory of a Sino-Himalayan connecting range and start afresh, I will first of all briefly state the *indirect* evidence in its favour. Secondly, I will consider the general distribution of the flora over this region, as at present known,

* Throughout this paper "flora" means "alpine flora" unless otherwise stated.

and its relationships. Thirdly, I will point out what results might be expected to follow, in the flora, from the breaching of such a range as the Sino-Himalayan, with the subsequent gradual uplift of a series of parallel ranges separated by deep and narrow gorges passing through the breach. The line of investigation to be pursued will then become clearer; in a complicated task of this nature, full of perplexing side issues, it will be necessary to keep strictly in view exactly what we are seeking.

The alpine flora of Western China shows a remarkable relationship with that of the eastern Himalaya,* while the sub-alpine and forest flora of China, as was pointed out by Prof. Asa Gray, finds its affinity with the flora of the eastern United States! This is an extraordinary fact which requires explanation.

The similarity between this Himalayan flora and that of the parallel ranges of Yun-nan is even more striking, and we must recognize the fact that the similarity is most marked in the case of high alpine plants which, generally speaking, have the poorest means of seed-dispersal and the least opportunity of being widely dispersed. Yet these plants have either been distributed by natural means under present conditions, with the mountain ranges as they now stand, or there was at some previous time direct communication for the plants to follow.

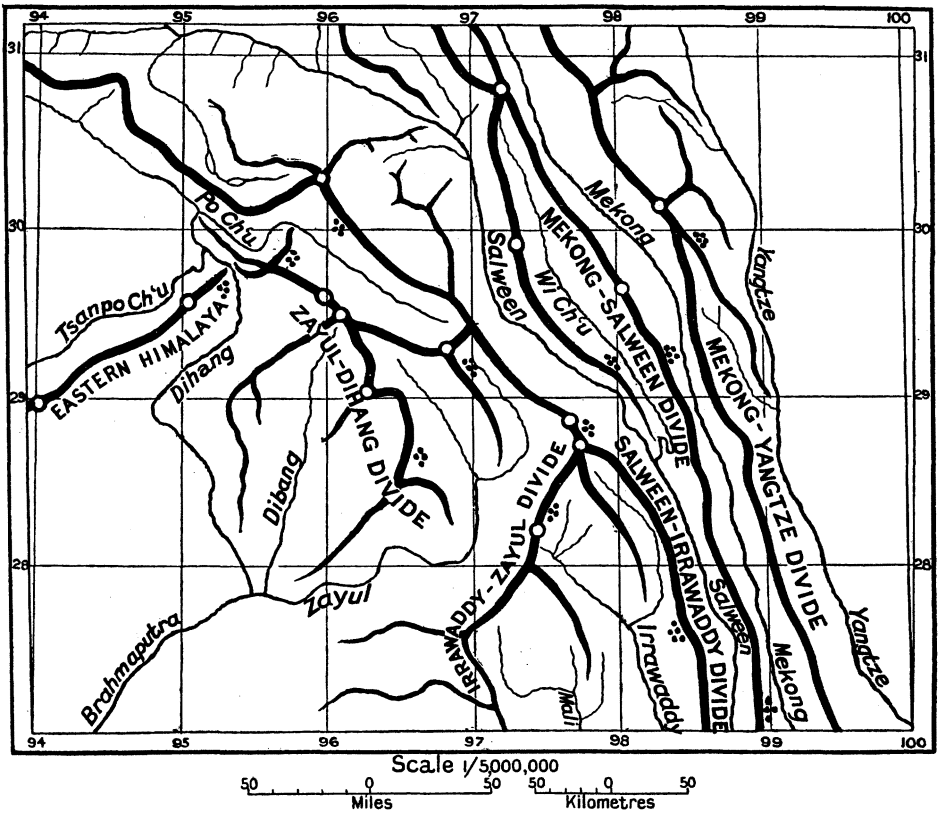
Now the flora of the eastern Himalaya could not cross the wide hot plains of Assam, the comparatively low mountain ranges to the east, and the hot valley of the Mali-kha, to reappear on the Salween–Irrawaddy divide. It must have travelled north-east, towards the knee bend of the Dihang, right round the head of the Assam valley, thence south-east, following the trend of the mountains separating the Zayul, Irrawaddy, and Salween rivers (see map). But it is as difficult to imagine an alpine flora crossing the gorges of the Dihang or upper Salween as it is to imagine it crossing the Assam plains.

Supposing, however, for the purposes of argument, that it had jumped the Dihang gorge, and achieved the great snowy range stretching down south-east between the Dihang and Zayul rivers; whence it might reach the mountainous divide between the Zayul and Salween rivers, from the southern ends of which rise the headwaters of the Irrawaddy. It is now stopped by the deep arid gorge of the Tibetan Salween, and beyond that again by the equally arid gorges of the Mekong and Yangtze rivers—it can indeed only have crossed these rivers much further north, that is, to the north-east of the Dihang bend. About this region we know little geographically, still less botanically; what we do know does not suggest a rich alpine flora; it would seem to be steppe country, though there are certainly forests.

If now we draw a line north-east from the Dihang bend, it will divide

* It was, I believe, Sir Joseph Hooker who first drew attention to the similarity between the alpine floras of the Himalaya and Western China.

this region into two climatic areas, more or less correctly. To the north-west lies plateau country, steppe, and desert; to the south-east forested mountains separated by deep arid gorges. The Himalayan flora could not have reached the trans-Himalayan ranges and the mountains of Yun-nan by crossing the Tsanpo, any more than it could have by crossing the Dihang. The northern slope of the Himalaya is much drier than the southern, and supports a somewhat different flora; there is the same difficulty about crossing the arid gorge; and north of the Tsan-po is the



The Eastern Himalaya and the Burma-Yunnan Ranges

dry Tibetan steppe-land. It would therefore appear that the only probable route by which the flora of the eastern Himalaya could reach western China would be, under present conditions, north-east of the Dihang bend, jumping the Dihang gorge.

It is profitless to speculate on the possibility of the flora having come down the Yun-nan ranges from the north-west and spread thence east and west to China and the Himalaya, for Tibet is now a desert, and we know nothing of what its flora may have been in the past. In order to escape

the same difficulty of crossing the river gorges, we should have to think of the whole of Tibet as far west as Ladak, and as far north as the Kuen Lun, supporting an alpine flora every trace of which has since disappeared.

Had the flora, on the other hand, travelled south-west from China to the Himalaya, we ought to find plants in the eastern Himalaya whose nearest relatives are Chinese, instead of plants on the Tsin-ling whose nearest relatives are Himalayan. The Tsin-ling flora, in fact, does not seem to have reached the Himalaya at all, and we are justified in assuming that the original home of this flora was the Himalaya. However we look at the matter, we see that to reach even as far east as the Szechwan mountains this flora has, under present conditions, to cross the Dihang, Salween, Mekong, and Yangtze gorges.

Yet this flora includes such genera as *Primula, Gentiana, Saxifraga, Isopyrum, Meconopsis, Arenaria, Diapensia, Lloydia, Aconitum, Cassiope, Corydalis, Cardamine, Polygonum, Androsace, Trollius, Pedicularis*, whose small seeds are simply shaken out of their capsules by the wind and scattered amongst the rocks. Moreover, many of them appear to retain their germinating power for only a short time, while for others the protection afforded by a snow blanket throughout the winter seems essential. One can conceive of no means by which such seeds could pass either directly from range to range, or gradually across the deep arid valleys intervening; though there is nothing to prevent them spreading many hundreds of miles along a mountain range. An alpine flora, in fact, marches slowly and compactly forward. The poverty of alpine floras on even the highest mountain ranges and peaks situated on islands proves that alpines are not widely distributed fortuitously. Yet identical or almost identical species of the above genera are found at least as far apart as the eastern Himalaya and the Mekong–Yangtze divide, as the following table shows:

Himalaya.	*Mekong–Yangtze Divide.*
Gentiana ornata	Gentiana sino-ornata
Primula sikkimensis	Primula pseudo-sikkimensis
Primula pusilla	Primula bella
Campanula colorata	Campanula colorata
Iris kumaonensis	Iris kumaonensis
Diapensia himalaica	Diapensia himalaica
Androsace chamaejasme	Androsace chamaejasme
Isopyrum grandiflorum	Isopyrum grandiflorum
Aconitum Hookeri	Aconitum Hookeri
Pinguicula alpina	Pinguicula alpina
Phlomis rotata	Phlomis rotata
Meconopsis racemosa	Meconopsis Wardii

On the other hand, plants whose seeds are capable of being transported long distances by wind are not more widely distributed than the genera mentioned. Species of *Clematis, Cremanthodium, Lactuca, Lilium, Rhodo-*

dendron, *Crepis*, *Saussurea*, are, generally speaking, quite different in the Himalaya and in Yun-nan; they even differ on different ranges in Yun-nan.

We might also expect to find plants with edible berries, eaten by birds, widely distributed on these ranges; but such is not the case. Species of *Lonicera*, *Euonymus*, *Cotoneaster*, *Actinidia*, *Viburnum* generally differ even on ranges as close to each other as are the Mekong–Yangtze and Salween–Irrawaddy divides.

Yet the alpine flora, which under present conditions has the least chance of crossing from range to range, is more closely related than is the forest flora. Moreover, if seeds could reach the Mekong–Yangtze divide, say, direct from the Himalaya in the past, there is no valid reason why they should not do so now, and continue to do so. Hence the flora should become more and more Himalayan in character west of the Yangtze, till by the time the Zayul–Dihang divide was reached, an entirely Himalayan flora should prevail. On this point it is impossible to speak with certainty, but considering the striking differences of flora between ranges so close as the Mekong–Yangtze and Mekong–Salween divides, it would not appear very probable that the flora of the Zayul–Dihang divide is completely, or even preponderantly, Himalayan. It is possible, however, that the differences in the flora of the Mekong–Yangtze and Mekong–Salween divides may be due to, or emphasized by, other causes than mere failure in the transference of seeds from range to range: of which more anon. Finally, there is the significant fact that some of the plants found in the arid Mekong and Yangtze valleys are Himalayan: *Amphicome arguta* and the Himalayan asphodel, for example. Thus it would seem we are fully justified in rejecting the idea that the flora, alpine, forest, and arid, can have spread over all this country by natural means, under present conditions, and we are driven to inquire whether present conditions have always prevailed, or whether there might not at some period have been direct means of communication between the Indian and Chinese ranges.

Holding to our argument that the flora has probably travelled in a north-easterly direction from the Dihang bend, we find that a line drawn north-east from that bend passes across the Salween and Mekong rivers in the neighbourhood of their bends, which may be more abrupt than is shown on present maps, eventually reaching Kansu and the western end of the Tsin-ling Mountains. Major F. M. Bailey has discovered a peak just across the Dihang bend, which is on the main axis of the Himalaya; that is to say, the Dihang has cut through the main Himalayan axis, and it is not impossible that the Salween has done the same.*

Now both the Indus and the Dihang, as Sir Sidney Burrard points out, when crossing the main axis of the Himalaya, bend sharply. The Salween and the Mekong also change their direction, though more gradually, from east, or south-east, to south, so that they too may likewise

* I regret I have not had access to Prince Kropotkin's views on this region.

cross the axis of some great range. The direction of our supposed Sino-Himalayan range corresponds with the change of direction of these two rivers, and is parallel to the Ninchin-thang-la range of Tibet. It is to the south and east of the line that we find the Sino-Himalayan flora; to north and west the country passes rapidly into steppe and desert.

The inference then is that there was formerly some direct connecting range between the eastern end of the Himalaya and the western end of the Tsin-ling; and though there is lacking any direct evidence for the existence of this Sino-Himalayan range, what evidence there is points to this being the most profitable direction in which to seek it. Lastly, the Tsin-ling is the only east-and-west range extending across China which could carry Himalayan plants into the heart of China.

We come now to the question of distribution. It is not necessary at this stage of the inquiry to go into details, and I will confine myself to a broad review of the area.

First of all we have the general resemblance of the alpine flora from the eastern Himalaya to north-west China; no such resemblance is to be noted in the forest flora. Taking as a type some characteristic alpine genus such as *Primula*, we find that species increase as we go eastwards, the Himalayan groups of *Primula* attaining the greatest development in Yun-nan, as pointed out by Sir George Watt. This is equally true of other genera, such as *Rhododendron*, *Meconopsis* and *Pedicularis*. The same genera are well represented on the Tsin-ling, but the Himalayan relationship grows more distant as we go eastwards. On the Tsin-ling itself there are no Himalayan species.

Now turning to the mountain ranges of Yun-nan separating the Irrawaddy, Salween, Mekong and Yangtze rivers, we find that while their flora is very similar, it is richest in the south and west, that is, on the Salween–Irrawaddy divide, and each range possesses species not possessed by the others. North of lat. 28° the flora of the Mekong–Salween and Mekong–Yangtze divides is almost identical, but south of that there are striking differences. For example, *Primula Franchetii*, *Meconopsis Delavayi*, *Cassiope palebrata* and *Gaultheria sp.* found on the Mekong–Salween divide are absent from the Mekong–Yangtze divide. *Larix sp.* and *Meconopsis integrifolia* found on the Mekong–Yangtze divide are absent at least from the southern part of the Mekong–Salween divide, south of lat. 28°, and absent altogether from the Salween–Irrawaddy divide.

The Tsin-ling relationship of this flora is illustrated by the occurrence of species of the following *Primula* sections in both areas: *Mollis*, *Denticulata*, *Petiolaris*, *Candelabra*, *Omphalogramma*, *Soldanelloides* and *Malvacea*, though all of them, with the exception of the last named, have Himalayan representatives as well. As in the case of the Himalayan *Primulas*, these sections are all represented by more species in Yun-nan than they are on the Tsin-ling.

In the south the flora of these ranges is richer than in the north, as might be expected. Following them northwards, we find them presently turning north-west and diverging widely from each other, forest rapidly giving way to steppe and steppe to desert.

Taking the area between the eastern Himalaya and the Tsin-ling as a whole, we can recognize several distinct floral areas. For instance there is the Irrawaddy basin, whose flora is Indo-Malayan in the valleys, related to that of Assam, Arracan and Tenasserim; the alpine or Sino-Himalayan area; the south-eastern Tibetan area, with its arid flora, traversed by great mountain ranges carrying the Sino-Himalayan flora far to the south; and the Chinese area of central Szechwan and Yun-nan. The flora of the Irrawaddy basin from lat. 25° northwards is characterized by remarkable variety of *Impatiens*, *Rubus*, *Ficus*, *Begonia*, *Gesneriaceae* (*Aeschynanthus*, *Chirita*), *Acanthaceae* (*Thunbergia*, *Strobilanthes*), *Zingiberaceae* (*Hedychium*), *Aroideae* (*Arisaema*, *Amorphophallus*), together with species of *Pandanus*, *Musa*, *Pterospermum*, many palms (*Caryota*), bamboos, *Leguminosae* and *Dipterocarpaceae*. Even here, however, three peculiarly Chinese species occur, namely, *Wistaria chinensis*, *Rhododendron indicum* and *Rawolfia chinensis*, besides a number of plants known only from the eastern Himalaya, namely, *Hydrangea robusta*, var. *Griffithii*, *Æschynanthus maculata*, *Thunbergia lutea*, *Calanthe brevicornu*, *Polygonatum nervulosum*, *Arisaema concinnum* ('Records of the Botanical Survey of India,' vol. 1, No. ii.).

The alpine area seems to be divisible into three sub-areas: (i.) the Eastern Himalayan, with no Tsin-ling species; (ii.) the Burma–Yun-nan, both Himalayan and Tsin-ling species; (iii.) the Tsin-ling, with no Himalayan species. The Burma–Yun-nan area, which includes also western Szechwan, is probably the richest of all. The Salween–Irrawaddy divide, even as far south as 26° lat., where the highest peaks rise little above 13,000 feet, is extraordinarily rich. Species of *Primula*, *Buddleia*, *Rhododendron*, *Viburnum*, *Rubus*, *Thalictrum*, *Codonopsis*, *Lonicera*, *Begonia*, *Impatiens*, *Magnolia*, *Clematis*, *Arisaema*, *Quercus*, *Cremanthodium*, *Polygonum*, abound; there are many *Zingiberaceae*, *Hamamelidaceae*, *Liliaceae*, *Orchidaceae*, *Aroideae*, *Lardizabalaceae*, *Araliaceae*, *Coniferae*; on the highest ranges are found *Meconopsis sp.*, *Cassiope myosuroides*, *Ypsilandra yunnanensis*.

It will be sufficient to observe here that the Tsin-ling flora includes many species of *Primula*, *Meconopsis*, *Rhododendron*, *Gentiana*, *Saxifraga*, which fully establish its relationship to the Yun-nan, and through that to the Himalaya flora. Of seventeen sections of Primula found in north-western China, eight have representatives in both the Himalaya and Burma–Yun-nan areas; one (§ *Malvacea*) has representatives in Yun-nan but not in the Himalaya; one (§ *Farinosa*) has representatives in the Himalaya, but not in Yun-nan; while the remaining seven sections are peculiar to this region.

The arid gorges of south-eastern Tibet along the Yangtze, Mekong, Salween, and Wi-ch'u support a special flora of their own about which little is known, at least as regards its relationships. It includes species of *Arisaema*, *Selaginella*, *Didissandra*, *Clematis*, *Berberis*, *Pertya*, *Stemona*, *Spiraea*, *Sophora viciifolia*, *Cheilanthes farinosa*, *Asphodelus;* but appears to vary in different valleys. Here again it is almost impossible that there should be transfer of species from valley to valley over the dividing ranges, except perhaps in the case of the Cryptogams.

To explain the presence of a flora showing Himalayan and north China affinities as far south as lat. 26° in Burma and 25° in Yun-nan, and the close relationship of the Himalayan and Tsin-ling flora, though these ranges are now separated by deep impassable river gorges; to explain also the similarity between the floras of the Salween–Irrawaddy, Mekong–Salween and Mekong–Yangtze divides, and their not less striking differences—these ranges being now separated from each other by deep river gorges—I have supposed an original connecting range between the Himalaya and the Tsin-ling, subsequently breached with the formation of a series of parallel north-and-south trending ranges which have cut right through this main axis, separating its broken ends. Further, that plants from both ends of the broken ranges were driven south through the breach down the new parallel divides by advancing ice during the glacial epoch.

The final result of such a sequence of changes might be somewhat as follows: To begin with, we have a single range, or rather series of close parallel ranges, stretching from Sikkim to China; it will carry an alpine flora, which will vary in different parts. After it has been breached, this alpine flora will be divided into three, a flora at each end of the broken range, and one in the middle, this latter being driven south by advancing ice. For the future these three areas are isolated from one another; but though their floras must differ, yet owing to their origin and the conditions under which they live, they will always bear the impress of a common relationship.*

The three areas may be represented diagrammatically as follows:

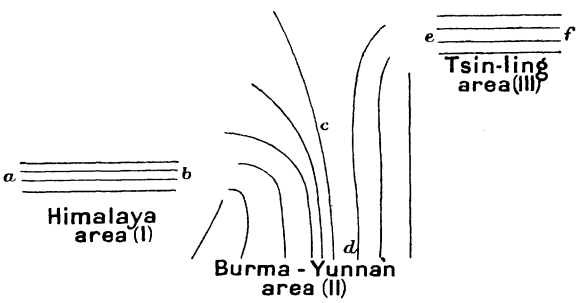


Diagram of Ranges, Sikkim to China

* I have given reasons, based on an analysis of *Primula* sections, for this division into three alpine plant areas (see *Transactions and Proceedings of the Botanical Society of Edinburgh*, vol. **27**, Part I.).

It is clear that over an area so great and so complex as that with which we are dealing, the flora must differ in different parts of the same range—we know, in fact, that it does so. We may therefore note the following points: (*a*) The most westerly range of area (ii.) should show closer affinity with the Himalayan flora, the most easterly closer affinity with the Tsin-ling flora. (*b*) On any single range in area (ii.) the affinity of the flora with areas (i.) and (iii.) will be closer in the north, near the breach and in the line of the original connection, than it is in the south, where the floras have had time to become more mixed. Therefore also the floras of the parallel divides in area (ii.) should be more similar in the north, at *c*, than they are in the south, at *d*. (*c*) We should find a closer relationship in the flora occupying the internal lines, *b*, *c*, *e*, than we do in that occupying the external lines *a*, *d*, *f*. (*d*) If it was ice which drove the mixed flora through the breach, we ought to find some central China plants, with American affinities, as well as Tsin-ling plants, in area (ii.). The forests of these three regions would naturally not show the same affinities as the alpine flora, since they are subjected to more varying conditions. A mixture of Indo-Malayan forms will be found in many of the forests, especially in the more western valleys, while Chinese forms will be found especially in the east, from the Yangtze to the T'ung-ho.

We are now in a position to consider what line of investigation to take up, what to seek and where to seek it. The problem may be attacked in two ways: directly by geographical exploration, indirectly by botanical exploration. We might indeed look for some remnant of our Sino-Himalayan range in the direction indicated—that is, north-east of the Dihang bend. This implies an accurate survey of the country between the Dihang, where that river crosses the main Himalayan axis, and the Kansu–Szechwan frontier where the Tsin-ling emerges as a coherent range from the knotted mass of mountains fringing the Tibetan plateau; since it is only from large-scale maps that the lines of great peaks, indicating the probable main ranges, can be followed.

Such remnants, if they have survived the obliterating changes which must have overtaken this region, are more likely to be found at the Himalayan end of the breach than further north-east; and since many years must elapse before the whole of this area can be properly surveyed, it is there that I propose to seek them.

We may now consider the indirect method, botanical exploration the main line of investigation. Briefly, we require to seek whether the results already stated as likely to follow, if the sequence of changes suggested really took place, have in fact followed.

Taking these in order, we must first define the limits of our three areas, and compare their floras as fully as possible—a task to be undertaken in the herbarium. Next we must compare the flora of the western irruption ranges, say that of the Salween–Irrawaddy and Irrawaddy–Zayul divides,

with that of the Himalaya; and as we know nothing of the flora of the second, and very little of the first, there is scope for plenty of botanical exploration on these ranges. Similarly, we must compare the flora of the easternmost ranges, say those lying north and east of Batang and round Tatsienlu, with that of the Tsin-ling. Of the former area next to nothing is known botanically.

Taking now the best-known ranges of the Burma–Yun-nan area, say the Mekong–Yangtze and Mekong–Salween divides (though the latter is untouched in the south for a hundred miles), we must compare their floras in the north and in the south, say lat. 30° for the north and lat. 26° for the south. According to our theory, there should be a closer relationship brought out in the north than there is in the south. We know nothing about the flora of these divides north of lat. 29°, and practically nothing about them in the neighbourhood of 26°. Collections made on the Mekong–Salween divide in the neighbourhood of Menkong (lat. 28° 30′) would be invaluable; we know something about the flora of the Mekong–Yangtze divide in this latitude, from collections made at A-tun-tzu.

A corollary to the above is, that the flora on the northern part of the Mekong–Yangtze or Mekong–Salween divide will differ from the flora on the southern part—probably more than it does over the same length of Himalayan range. This difference might be less marked on the Salween–Irrawaddy divide than on the others, for reasons which will be stated presently.

Again, we can test our third deduction, namely, that the floras of the internal area *b*, *c*, *e* will show nearer relationship than those of the external areas *a*, *d*, *f*. Here indeed is scope for an immense amount of botanical exploration, for while the flora of Sikkim may be taken to represent *a*, that of the A-tun-tzu region as *c*, that of the Hpimaw and T'eng-yueh regions as *d*, and that of the Shensi-Kansu border as *f*, nothing whatever is known of *b* (the extreme eastern limit of the Himalaya), and practically nothing of *e*, where the Tsin-ling stretches far into Tibet. Moreover, area *c* is very imperfectly known, since it includes the almost unknown Salween–Irrawaddy divide and the quite unknown Irrawaddy–Zayul divide.

Finally, experience shows that the parallel divides in area (ii.) grow richer in species as we travel westwards, the Salween–Irrawaddy divide being apparently the richest of all—as it is the least known. We may well ask ourselves what happens on the great ranges which thrust down their snowy peaks between the Irrawaddy and Zayul rivers and between the Zayul and Dihang rivers. Is their flora even richer than that of the Salween–Irrawaddy divide, as appears not improbable? Has it still closer Himalayan affinities—is it, in fact, a direct link between the Eastern Himalayan flora of area (i.) and the Burma–Yun-nan flora of area (ii.)? Have any Chinese forms from area (iii.) and central China reached as far west as this? All these questions require answering.

It is clear that all we can do at present is to select certain spots and

make collections of plants from them for later comparison. And since many of the plants with which we are concerned are showy, and can be raised from seed in England, it is always an advantage to collect seed as well as herbarium material, and grow the plants themselves in England.

The ranges which specially call for exploration, then, are the Salween–Irrawaddy divide in the north, the Irrawaddy–Zayul and Zayul–Dihang divides, neither of which have been touched; the extreme eastern end of the Himalaya, the mountains north of Batang, and the Tsin-ling west of Tao-chow in Kansu. Much botanical exploration has been carried out in this region during the last twenty years by the French Catholic priests, by Mr. E. H. Wilson, Mr. G. Forrest, Mr. Purdom, and Mr. R. Farrer; but much more remains to be done, and the more one explores the country the more one finds to explore.

In a general way also we require to know where the alpine flora of the area (ii.) ceases and passes into the barren ranges of Tibet; where is the northern boundary of the Indo-Malayan flora which spreads up the valleys of the Brahmaputra tributary rivers, the Irrawaddy tributary rivers, and the Salween; how far east Indo-Malayan plants are found, and how far west Chinese plants.

When we come to area (ii.), where most of the exploration indicated has to be carried out, we find yet further matter for investigation. On the parallel ranges in the neighbourhood of A-tun-tzu there are indications of a very considerable retreat of the glaciers, which however seem to have retreated much further on the Mekong–Yangtze divide than they have on the Mekong–Salween divide; and it would appear that precipitation has been screened off the easternmost ranges one by one, by the gradual and consecutive uplift of ranges in the west.

How far, if at all, the ice has retreated on the Salween–Irrawaddy divide is matter for investigation. At present this range seems to divide the Indo-Malayan flora in the west from the Chinese flora in the east. The extensive retreat of the glaciers all over western China may date from the glacial epoch; it was during the advance of the ice at that time that the Atlantic American flora was driven far south into China, spreading, no doubt, from the Arctic circle, where it flourished in Tertiary times, down the Atlantic coast of America, on the one hand, and south-west into China, *viâ* the Aleutian Islands, on the other. For the reason that conditions seem more stable on the Salween–Irrawaddy divide than on either the Mekong–Salween or Mekong–Yangtze divides, it may be that the flora is more uniform along this range than along any other. But the desiccation of the Yun-nan ranges by the uplift of newer and higher ranges in the west, which capture the bulk of the rain coming over from Burma and Assam in the south-west, has certainly disturbed the alpine flora on the ranges in area (ii.).

Here I must end, with the task barely outlined. It is a pretty problem to be solved on this ground where Himalayan, Malayan and Chinese floras meet. Let us see what light the next assaults on it will throw.

ECONOMIC NOTES ON EASTERN TIBET

Oliver Coales, H.B.M. Consular Service

Map following p. 264.

THE following notes are supplementary to an account of a journey in Eastern Tibet that appeared in the April number of the *Journal*, and accompany the map which is now published.

In 1917 the Chinese had control of a district of approximately 80,000 square miles in area (exclusive of Koko Nor). From a calculation I made then, on the basis of the number of families in the districts into which the Chinese had divided the country, I estimated the population to be about 450,000 persons, an average of less than six to the square mile. Probably more than one-tenth belonged to the celibate lama priesthood. Chinese settlers and half-castes living as Chinese were not more than 25,000 and lived almost entirely at Tachienlu, in the districts near that town and at Batang. There were also about 7000 Chinese soldiers in garrison. During 1918 the Dalai Lama recaptured Ruvoch'e, Ch'amdo and Draya west of the Yangtze.

The three principal frontier marts on the Chinese or eastern side of Tibet are Tangkar (Donkyr) in Kansu to the west of Sining, Tachienlu and Atuntzu in the north-west of Yunnan. The first, Tangkar, is outside the subject of these notes, but a few words may be of interest. This busy little town has been vividly described by Abbé Huc in his 'Travels in Tartary.' The road from Tangkar to Tibet joins the north road from Tachienlu at Jyekundo. Towards the east one road leads to Lanchow, the capital of Kansu, and another branches off east of Sining and goes through Liangchow across Mongolia to Kweihwacheng, where merchandise is transported to Tientsin. Through Tangkar passes the greater part of the trade between Tibet and North China. The staple commodity is wool, of which some 2,700,000 lbs. are exported annually to Tientsin. In this trade Tangkar completely overshadows Tachienlu, a fact which is partly accounted for by the cheapness of camel transport across Mongolia. As a matter of history it may be mentioned that up to the establishment of the Manchu dynasty in China and the conquest of Tibet, intercourse between the two countries was mainly carried on by this and other roads through Koko Nor and not through Tachienlu. Other exports through Tangkar besides wool are lambskins and salt, and the principal import is barley, a necessity owing to Koko Nor being a pastoral country.

Atuntzu, a small town in the extreme north-west of Yunnan and due south of Batang, is important because it lies on a road leading from the principal towns of Yunnan to Batang and to the districts south-west of Ch'amdo. Its trade is comparatively small, because Yunnan supplies neither tea nor silk and the Tibetan country beyond it is not a pastoral region. The chief export is musk.

Tachienlu owes its importance to the tea and silk which are produced in Szechwan for the Tibetan market. The means of access from the east and west are far less favourable than those of Tangkar. The latter is approached by good mule roads from Kansu, and on the west, though the road to Tibet passes through a very elevated country, there are no passes of great difficulty. On the other hand, the road from Chengtu to Tachienlu crosses a rugged mountainous country involving two steep passes of over 9000 feet altitude, a descent to the Tung River and a climb of 5000 feet to Tachienlu. The road has been improved by the Chinese, much of it being paved with stone slabs, and the ascents of the passes are flights of steps just passable by pack-animals. The Tung River is spanned at Lutingchiao by an iron suspension bridge constructed in the eighteenth century. I mentioned above that Chinese intercourse with Tibet prior to the Manchu dynasty generally passed through Koko Nor. In the earlier histories the route from Szechwan to Tibet always spoken of is a road leading westward from Sungpan, and Tachienlu is not mentioned till the seventeenth century. Locally one hears that the tea carriers formerly used a road along the Tung River westwards to its great bend at Tzutati, and thence into the Tibetan country west of the Cheto pass, finally joining the north road near Dau. The traces of their ironshod poles in the stones are still visible. It may be added that in former days the capital of the King of Chala was not Tachienlu, but a place further to the south-west.

The principal imports into Tibet from China are tea, silks, tobacco, cottons, foreign and native sundries, and rice. The latter is imported for the consumption of the local Chinese and army. Had the Szechwanese, like their countrymen of Kansu, been wheat instead of rice eaters, their attempts at colonization might have been more successful than they have actually proved. The sundries and cotton goods are also generally required by the Chinese, the Tibetans, in place of the latter, preferring woollens, locally woven or from Lhasa, or, if wealthy, silk. Tobacco is a luxury which every Tibetan now requires

Tea and silk are the bulk of the import trade. As far as the production and transport of tea to Tachienlu are concerned, the tea trade has been exhaustively described by Sir A. Hosie in his 'Journey to the Eastern Frontier of Tibet, 1905,' and by other travellers. The trade has suffered greatly from the continued hostilities between China and Tibet, and imports have fallen off in recent years. To the Tibetans however tea is a necessity of life, and they have put no artificial restrictions on its importation. Judging by inquiries made at Tachienlu, Chinese tea holds its own in spite of political difficulties and is not being ousted by Indian products. The competition of India tea is not alleged as a reason for the decreased use of China tea, and probably the Tibetan trade is too small to make it worth the while of Indian planters to specialize in it.

Silk goods imported through Tachienlu are silk piece-goods, katas or ceremonial scarves, coloured scarves, and cords. They are made in

Chengtu specially for the Tibetan market. In China the favourite colour in dress is blue, but the Tibetan prefers maroon, dark red, or yellow, and these colours predominate in the silks which are imported. In figured cloths all the Chinese designs are popular, but the weavers also manufacture many Tibetan styles, bearing figures of Buddhas, pagodas, or religious emblems. The best qualities, amongst them brocades in gold thread, are fine examples of the weaver's art. The value imported in 1915 was about £20,000, and that of tea £170,000.

Tibet exports to China musk, gold, wool, skins, and medicines. Musk is the produce of a small deer which is found all over Tibet. It is easily adulterated, and experts are required to purchase it. About half a dozen firms specialize in the trade, which amounted in 1915 to £160,000. It is of sufficient importance in the European scent industry to cause two French firms to maintain themselves at Tachienlu and Atuntzu solely for this commodity. Gold is next in importance to musk. Though much is mined in the country, a large quantity is brought from India through Lhasa to pay for tea and silk. As regards wool, the scarcity caused by the Great War and the higher prices prevailing tempted merchants in recent years to bring down much larger quantities than ever before, but the boom is not likely to continue if prices fall. In former years the wool trade of Tachienlu was a mere fraction of that of Tangkar. The medicines exported are mainly rhubarb and other vegetable drugs for the Chinese market. The most interesting is the curious Chungtsao or insect grass, a dried caterpillar about 2 inches long, which has been killed by a fungus of about the same length growing out of one of its segments. It is supposed to be an excellent restorative to weak constitutions.

At Tachienlu imports and exports change hands from Chinese to Tibetans and *vice versâ*. Till recently the handling of trade in Tibet was done by Tibetans, and though the Chinese are more and more engrossing trade in the occupied districts, that with independent Tibet is still done by Tibetans. In general it is monopolized by merchants of the eastern province, Kham, either private people trading on their own account or on behalf of monasteries, or monasteries themselves. The wealthiest merchants belong to the Horpa States.

The ordinary course of trade is this. A merchant, say at Lhasa, wishing to purchase tea and silk, assembles a caravan of ponies and mules and lades them with Tibetan goods, such as woollen cloth, rugs, incense, foreign sundries from India, and gold and silver in bullion or coin. He proceeds to Tachienlu by the north road through Jyekundo and Kandze, selling his stock as he goes along, so that little reaches Tachienlu. Here he puts up at one of the Tsang or Kwochwang. These are the houses of the local Tibetan gentry, who undertake to entertain the merchants on condition of being their go-betweens and interpreters in dealing with the Chinese. There are commonly said to be forty-nine of these Kwochwang, but there are really only about half that number.

When business is to be arranged, the Kwochwang owner takes the merchant round to the Chinese merchants he wishes to see. In the old days the tea business was a close monopoly of a few Chinese, and the Tibetan, who usually traded with an old-established connection, was practically obliged to take what the seller offered at the latter's price. Circumstances have changed with the decrease of trade and the opening of many new Chinese firms, so that the touting is now on the Chinese side.

The Tibetan now begins to arrange his contracts. The general custom is for the buyer to pay one-half of the price on the spot in cash and to give a promissory note for the remainder. He engages to remit this balance when he next comes to Tachienlu. In the meanwhile he has been paying off old debts and purchasing sundries and silks. Cash in full is generally paid for these. The arrangement of the tea contracts is a long business which may keep the merchant some months in Tachienlu. During this time he is able if he wishes to have silk piece-goods made to his order at Chengtu.

Everything having been settled and his purchases made, the merchant collects the caravan, which has been let out to graze in the mountains, lades it with his silks and sundries, and sets out for the return journey. The tea will not have arrived before he leaves, and he will have to arrange with the Kwochwang landlord for its packing and transport after he has departed.

The tea is brought in day by day from China, and as it comes is repacked and stored till sufficient is collected for a caravan. As delivered in Tachienlu the tea is in packages $3\frac{1}{2}$ feet long, 8 inches wide, and 4 thick, wrapped in bamboo matting. To reform for animal transport three packages are cut in half, the halves placed side by side and wrapped in raw hides, which are tightly stretched and sewn while fresh and damp. A stiff, unbreakable bale, 22 inches square by 8 thick, is thus made. It weighs about 66 lbs., and two or 133 lbs. form one animal's load. Generally all kinds of merchandise for Tibet, whether in boxes or not, are packed in a similar fashion in raw hides.

By the time the tea is ready a caravan of yaks has been hired from one of the firms who specialize in this business, and the tea is loaded on the animals and despatched. Such caravans do not make the whole journey to Lhasa, but are changed every half a dozen stages or so. They are almost always of yaks, and their slow rate of travel and the delays in changing over make the journey to Lhasa a very long one. Mules and ponies are hardly ever used for this purpose, being preferred for more valuable merchandise, such as silk and sundries. The merchant will have arrived in Lhasa long before his tea, and it may be a couple of years from the time he first set out to Tachienlu till the last consignment arrives. As regards the payment of the balance, he will settle this on his next visit to Tachienlu, and Chinese say that defalcation is a very rare occurrence.

In respect of its mineral wealth Tibet is probably the least known

country of the habited world. No scientific geological expedition has ever touched more than the fringe, and over the greater part the geological features are sketched on mere conjecture. Richthofen's Geological Atlas of China gives some general features in South-Eastern Tibet, but only a small portion of his data is taken from direct observation.

The wide distribution of alluvial gold deposits may indicate great wealth of this metal. Gold is found in every part of the country east of the Yangtze River, but not, as far as I have heard, between the Yangtze and the Mekong. The Tibetans have a superstitious objection to removing precious metals from the earth, believing that they contribute to its fertility. The Chinese however are less scrupulous, and their activities have often led to conflicts with the natives, more especially when the gold-bearing sands lie beneath the Tibetan fields. The yield of gold is generally poor, and a Chinese would consider himself unusually fortunate if he made £150 to £200 a year. The usual method of cradle washing is employed, the concentrates being finished off with quicksilver. The discovery of a new field leads to the usual gold rush, but after a year or two the cream of the mine is skimmed off and a few stragglers remain to clear up the leavings. None of the mines I have heard of have lasted for any length of time. At the present time the most flourishing is at a place 50 miles north-east of Dau, where several thousand Chinese are engaged. It appears to be in a rich mineral district, as other ores are to be found, including native silver.

Silver is found at the place just mentioned and also near Tachienlu. In this latter mine, where gold has also been found in alluvial gravel in a fissure of the limestone, some veins of silver-bearing galena are exposed. A Chinese company worked the mine for silver for a short time, but stopped after losing money in the enterprise.

Copper has been mined for a long time at Kungkaling, to the south of Litang and west of the river Yalung. It is from these mines that the coppersmiths of Dege obtain their metal. Copper ore has also been found in Dege at Wara Gompa on the river north of T'ungpu. A mine was opened in 1910 or thereabouts, but has since been closed.

Tin is apparently not found in Eastern Tibet, for no mention of it is ever made. The white alloy of tin used in Dege in metalwork is imported from China.

Iron ore mines may exist in South-east Tibet, but none has come to my knowledge. It is probable, however, that the swordsmiths of Dege obtain their iron locally. Most of the iron utensils used by the Tibetans come from Szechwan. At Ch'amdo they are said to come from Shobando, in Tibet west of the Salween.

There is no evidence of extensive coalfields, the only mine I have heard of being a small working on the Ba River 30 miles north of Batang, which is now closed. There are however some mines east of the Tung River near Lutingch'iao.

One useful mineral recently discovered which should be available for the foreign market is white mica, which has been found on the upper course of the Tung River 100 miles from Tachienlu near Romidrango. An enterprising Chinese was able to contract with a Hankow firm for the supply of mica sheets on marketable terms, but the war had put a stop to the works when I left Tachienlu in 1918.

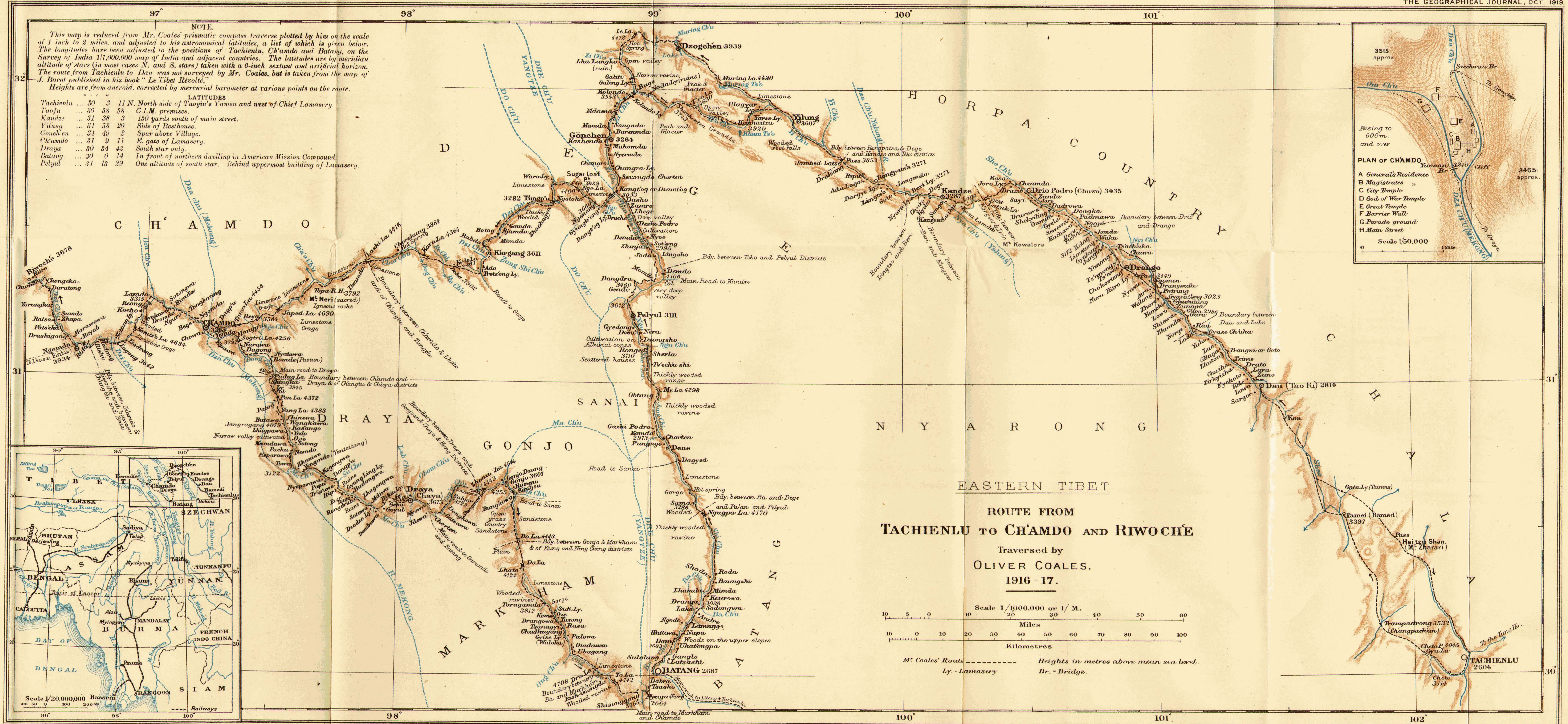
The principal obstacles to modern mining enterprise in this country, apart from Chinese official obstruction, would be lack of labour and difficulty of transport. The former could no doubt be overcome by importing Chinese labour from Szechwan, but it would be quite impossible to feed them on local resources. All food would have to be brought from Szechwan. Machinery of moderate size might be brought by water as far as Chiating in Szechwan on the Yangtze, but beyond that it would have to be brought overland. The difficulties of the road to Tachienlu, which have been pointed out above, make this impossible. It is quite unlikely that any railway will be built even to Tachienlu—there is none yet in Szechwan itself—for the volume of traffic would never justify the enormous expenditure. Therefore any mining company that proposed to undertake large operations would have to build its own railway for purely mining purposes, such as the internal railways of Western Australia.

The map which is published at the end of this number of the *Journal* gives a detailed reduction of a route traverse I made with prismatic compass and sextant in 1916. The journey was described in the April number of the *Journal*. The original sheets, which are fourteen in number, are plotted on a scale of 2 miles to the inch, and record every town, village, and solitary house, and every monastery passed on the road. The average number of compass sights taken was at least two to the mile, often as much as three. The road from Gönchen to Ch'amdo had been travelled by Europeans before but not mapped; that from Ch'amdo to Batang is almost entirely new, while that from Batang to Gönchen had also never been mapped in detail. In the original sheets the shape of the country has been indicated by form lines as accurately as possible in a hurried compass traverse.

LIGHT RAILWAYS IN NEW COUNTRIES

Major W. Waters Van Ness, R.E.

I HAVE been tempted into giving the results of my experience and expressing my views on light railways through reading Colonel Napier's very interesting and instructive paper published in the January issue of the *Geographical Journal* on "The Road from Baghdad to Baku." I note that both Colonel Napier and Sir Valentine Chirol advocate motor transport in preference to railways for solving transport difficulties in Persia.


NOTE.
This map is reduced from Mr. Coales' prismatic compass traverse plotted by him on the scale of 1 inch to 2 miles, and adjusted to his astronomical latitudes, a list of which is given below. The longitudes have been adjusted to the positions of Tachienlu, Ch'amdo and Batang, on the Survey of India 1/1,000,000 map of India and adjacent countries. The latitudes are by meridian altitude of stars (in most cases N. and S. stars) taken with a 6-inch sextant and artificial horizon. The route from Tachienlu to Dau was not surveyed by Mr. Coales, but is taken from the map of J. Bacot published in his book "Le Tibet Révolté."
Heights are from aneroid, corrected by mercurial barometer at various points on the route.
LATITUDES
Tachienlu ... 30 3 11 N. North side of Taoyin's Yamen and west of Chief Lamasery.
Taofu ... 30 58 58 C.I.M. premises.
Kandze ... 31 38 3 150 yards south of main street.
Yilung ... 31 53 20 Side of Resthouse.
Gonch'en ... 31 49 2 Spur above Village.
Ch'amdo ... 31 9 11 E. gate of Lamasery.
Draya ... 30 34 43 South star only.
Batang ... 30 0 14 In front of northern dwelling in American Mission Compound.
Pelyul ... 31 13 29 One altitude of south star. Behind uppermost building of Lamasery.
EASTERN TIBET
ROUTE FROM
TACHIENLU TO CH'AMDO AND RIWOCH'E
Traversed by
OLIVER COALES.
1916 - 17.
Scale 1/1000,000 or 1/ M.
Miles
Kilometres
Mr. Coales' Route
Ly. - Lamasery
Heights in metres above mean sea level.
Br. - Bridge
CH'AMDO
DEGE
HORPA COUNTRY
NYARONG
CHALA
DRAYA
GONJO
SANAI
MARKHAM
BATANG
Riwoche 3678
CH'AMDO
Dzogchen 3939
Gönchen 3264
Pelyul 3111
Kandze 3287
Yilung 3607
Drango
Dau (Tao Fu) 2814
Draya (Chaya)
BATANG 2687
TACHIENLU 2604
PLAN OF CH'AMDO
A General's Residence
B Magistrates "
C City Temple
D God of War Temple
E Great Temple
F Barrier Wall
G Parade ground
H Main Street
Scale 1/50,000
TIBET
LHASA
SZECHWAN
BHUTAN
ASSAM
BENGAL
YUNNAN
BURMA
FRENCH INDO CHINA
SIAM
BAY OF BENGAL
Scale 1/20,000,000
Railways
Published by the Royal Geographical Society


97°
98°
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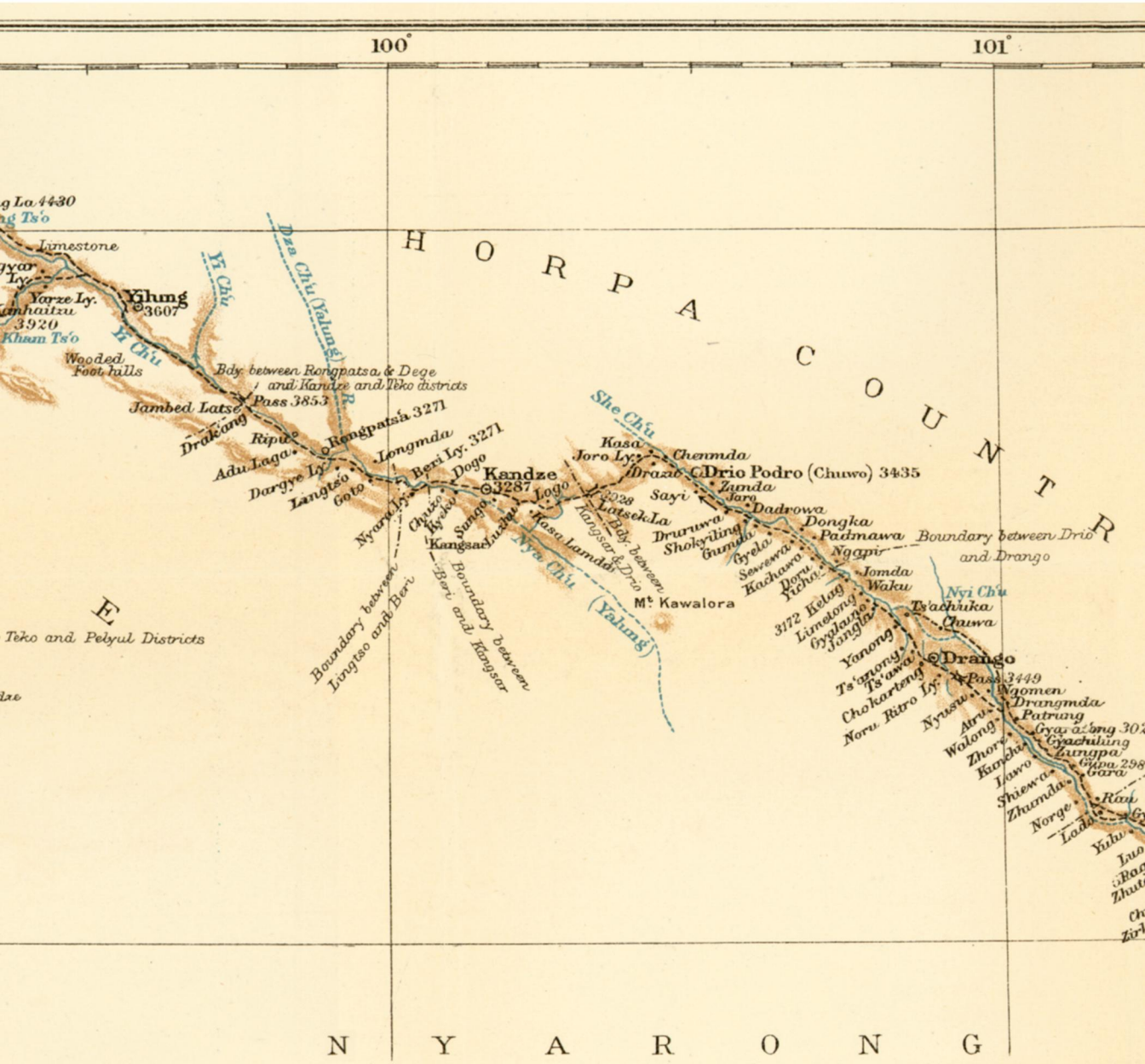
Pelyul ... 31 13 29 One altitude of south star. Behind uppermost building of Lamasery.
32°
31
C H' A M D O
D R A Y A
Dza chu (Mekong)
Om Chu
Riwoche 3678
Chongeka
Daratong
Yarungka
Sumdo
Ratsa
Zhapa
Drashigong
Marawowa
Reyab
Ngemda (Enta) 3934
To Lhasa
Lamda 3315
Reong
Kocho
Satongwa
Rimda
Tongkating
Dromda
Nguro
Bege
Chowa
CHAMDO 3243
Yemda
Nams'o La 4634
Limestone Crags
Lagong 3642
Dzi Chu
Bdy. between Ch'amdo & Riwoche and between Ch'angtu and Enta
Tama La 4458
Reya
Mangp'u
Ngo Chu
Sogtri La 4256
Narawa
Dagong
Nyalawa
Bomde (Paotun)
Dza Chu (Mekong)
Main road to Draya
Pudug La
Boundary between Ch'amdo and Draya & of Ch'angtu & Ch'aya districts
Shingka
3945
Pen La 4372
Yang La 4383
Patog
Butawa
Chinewa
Wongk'awa
Kasango
Jangragang 4079
Lhagpawa
Yedo
Narrow valley cultivated
Opo
Kamdawa
Sotong
Pachu
Nemdo
Keparawa
Towa
Zhaniwo
Yengmdo (Yentaitang)
3122
Me Chu
Kegongwa
Dongp'u
Su Chu
Nyeparawa
Papa
Tripuwa
Ripa
Ruins
Gyangling Ly.
Budongwa
Lhagongwa
Rago
Rangdrub
Mdiwa
Satawa
Gepa
Goyul
Dzodzo Ly
Dembuwa
Draya (Chaya)
Nyowa
Jilewa
Lab Chu
R. MEKONG
Limestone
Topa R.H. 3792
Mt. Neri (sacred)
Igneous rocks
Japed La 4690
Limestone Crags
3584
Ch'a'o Chu
Dzamda
Lashi La 4416
Chorzhung 3884
Hot Spring
Chor Chu
Dog Chu
Boundary between Ch'amdo and Ch'angtu and Rungpu
Boundary between Gonjo and Chaya
90°
95°
100°
T I B E T
Zilling Tso
Tengri Nor
LHASA
Brahmaputra or Tsangpo
Dzogchen
Gonchen
Kandze
Riwoche
Chamdo
Polyul
Drango
Dau
Draya
Bamed
Tachienlu
Batang
Hokow
SZECHWAN
Sadiya
Talap
NEPAL
SIKKIM
BHUTAN
Darjeeling
R. Brahmaputra
A S S A M
Myitkyina
Talifu
YUNNANFU
BENGAL
R. Ganges
Bhamo
YÜNNAN
Red R.
Tropic of Cancer
Lashio
CALCUTTA
Alon
Myingyan
MANDALAY
B U R M A
FRENCH
R. Yalung
R. Yangtze
R. Mekong
R. Salween
R. Irrawaddy
R. Chindwin

98°
99°
Le La 4412
Hot Spring
Muring Ch'u
Dzogch'en 3939
Lake
Zi Ch'u
Lha Lungko (ruin)
Open valley
Galiti
Galing Ly.
Narrow ravine
Buge
Noda Ly. (ruins)
Muring La 4430
Muring Ts'o
Peak & Glacier
Kolondo 3553
Kolondo Ly.
Tro La 4630
Limestone
Hlagyar Ly.
Open Valley
Shankoutzu 3743
Mdama
Yarze Ly.
Kamhaitzu 3920
Yihung 3607
Mamda
Nangnda
Barenmda
Peak and Glacier
Granite
Kham Ts'o
Gönchen
Kashenda
3264
Muhomda
Nyermda
Wooded Foot hills
Jambed L
D
E
DRE CH'U YANGTZE
DO CH'U
Changra
Changra Ly.
Wara Ly.
Sugar Loaf Pk
Sexongdo, Chorten
Limestone
Gi 3639
Nge La
4400
Kangt'og or Dzamt'og
3033
G
3282 Timgp'u
Ngotoke
Dasho
Zamro
Lhege
Dzi Ch'u
Thickly Wooded
Zhachagyo
Ngenang 3660
Gyangk'ong
Dangt'og Ly.
Drache
Deep valley
Desho Podro
Cultivation
Gomda
Njamda
Botog
Mimda
Demda
Nyoe
Sot'ong 2995
Zhinja
Joda
Lingsho
Laxhi La 4416
Chorzhung 3884
Hot Spring
Kara La 4364
Rabdo
Dzi Ch'u
Kargang 3611
Chor Ch'u
Re Ch'u
Kele La 4261
Zung Shi Ch'u
E
Bdy. between Teko and Pelyul Districts
Limestone
Dog Ch'u
Ado
Trets'ong Ly.
Momda
Demdo 4106
Col
Main Road to Kandze
Doka 3902
Re Ch'u
Dangdra 3460
Gendi
very deep valley
Boundary between Ch'amdo & Lhato and of Ch'angtu and Tungp'u
Road to Gonjo
DO CH'U
3012
Pelyul 3111
Gyedong
Desa
Nera
Cultivation on Alluvial cones
Dzongsho
Ngu Ch'u
Ronged 3110
Sherla
Scattered houses
Ts'ech'u shi
She Ch'u
Thickly wooded range
between Ch'amdo and
gtu & Ch'aya districts
Me La 4298
Obtang
S A N A I
Thickly wooded ravine
A Y A
Boundary between Draya and Gonjo and Chaya & Kung Districts
Ma Ch'u
Gazhi Podro
Komdo 2973
Chorten
G O N J O
Pungngo
Dene
Dagyed
Road to Sanai
Lab Ch'u
Obom Ch'u
Limestone
Lhonzi La 4514
Gonjo Dzong
Gonjo 3607
Rangu
Kongsa
4443
4255
Ma Ch'u
Draya (Chaya)
3673
Rabjor 3729
Hot spring
Gorge
Bdy. between Ba and Dege and Pa'an and Pelyul.
Sama 3286
Wooded
Ngugpa La 4170
Lhagongwa
Budongwa
Mdiwa
Gepa
Goyul
Nyowa
Bunglowa
Road to Sanai
Open grass Country
Sandstone
Sandstone
Jilewa
Me Ch'u
Dongkowa
Gatsawa
Chorten
Main road to Gurundo and Batang
Thickly wooded ravine
Shi Ch'u
Do La 4443
Bdy. between Gonjo & Markham & of Kung and Ning Ch'ang districts
Plain
DRE CH'U (YANGTZE)
Do La
Lhato 4122
Shoda
Roda
Ba Ch'u
Bawngshi
Limestone
R. MEKONG
H A M
Wooded ravines
Gorge
Lhamdo
Mimda
Kesarowa 3036
Dranga
Laka
Sodongwa
Taragamda 3812
Sidi Ly.
Oze
Andre
Ba Ch'u
R K
Keme
Dranqowa
Tsanagyi
Chushugang
Tazong
Rasa
Ngode
Lamagge
Buttiwa
Napa
G
N
A
T



EASTERN TIBET

ROUTE FROM
TACHIENLU TO CH'AMDO AND RIWOCH'E

Traversed by

OLIVER COALES.

1916-17.

Scale 1/1,000,000 or 1/ M.

10 5 0 10 20 30 40 50 60

Miles

10 0 10 20 30 40 50 60 70 80 90 100


101°
3515 approx.
Dza Ch'u
Szechwan Br.
Om Ch'u
To Gönchen
F
G
E
A
C
B
H
Rising to 600m. and over
PLAN OF CH'AMDO
Yunnan Br.
3240
Cliff
3465 approx.
A General's Residence
B Magistrates „
C City Temple
D God of War Temple
E Great Temple
F Barrier Wall
G Parade ground
H Main Street
Scale 1/50,000
0
1 Mile
DZA CH'U (MEKONG)
To Draya
N T R Y
Boundary between Drio and Drango
Nyi Ch'u
Chawa
Drango
Pass 3449
Ngomen
Drangmda
Patrung
Atru
Walong
Zhore
Kanchi
Lawo
Shiewa
Zhamda
Norge
Lado
Gyachulung
Zungpa
Gara
Boundary between Dau and Luho
Rau
Grase Ch'uka
Yulu
Luo
Zhutang
Trangri or Goto
Tsime
Drato
Lara
Zuno
Chuzha
Zirkyizha
Nyokoto
Kelo
Lowa
Sargor
Dau (Tao Fu) 2814
31°
Koa
G
C
H
A
Shao
Gata Ly. (Taining)
Pamei (Bamed) 3397
IWO CH'E
Pass
Haitzu Shan (Mt. Zharari)
L
A
Trampadrong 3532 (Ch'angpachien)
Tung Ho
50
60
90
100

Taofu	... 30	58	58	C.I.M. premises.
Kandze	... 31	38	3	150 yards south of main street.
Yilung	... 31	53	20	Side of Resthouse.
Gonch'en	... 31	49	2	Spur above Village.
Ch'amdo	... 31	9	11	E. gate of Lamasery.
Draya	... 30	34	43	South star only.
Batang	... 30	0	14	In front of northern dwelling in American Mission Compound.
Pelyul	... 31	13	29	One altitude of south star. Behind uppermost building of Lamasery.

C H' A M D O
D R A Y A
Dza chu (Mekong)
Riwoche 3678
Chongeka
Daratong
Yarungka
Sumdo
Zhapa
Ratsa
Pats'eka
Drashigong
Marawowa
Reyab
Ngemda (Enta) 3934
To Lhasa
Lamda 3315
Reong
Kocho
Satongwa
Rimda
Tongkating
Dromdo
Nguro
Ngomda
Bege
CHAMDO 3243
Chowa
Yemda
Namts'o La 4634
Limestone Crags
Lagong 3642
Bdy. between Ch'amdo & Riwoche and between Chang tu and Enta
Dza Chu
Mangp'u
Reya 3584
Japed La 4690
Topa R.H. 3792
Mt. Neri (sacred)
Igneous rocks
Limestone Crags
Sogtri La 4256
Narawa
Dagong
Nyalawa
Bomde (Paotun)
Main road to Draya
Pudug La
Boundary between Ch'amdo and Draya & of Changtu & Chaya districts
Shingka 3945
Pen La 4372
Patog
Yang La 4383
Chinewa
Wongk'awa
Kasango
Butawa
Jangragang 4079
Lhagpawa
Yedo
Narrow valley cultivated
Opo
Sotong
Kamdawa
Nemdo
Pachu
Keparawa
Towa
Zhaniwo
Yengmdo (Yentaitang)
Kegongwa
Dongp'u
Su Chu
Me Chu
Nyeparawa
Papa
Tr'ip'uwa
Ripa
Gyang Ling Ly.
Budongwa
Lhagongwa
Mdiwa
Bika Ly.
Draya (Chaya)
Gepa
Goyul
Satawa
Rangdrub
Dzodzo Ly.
Dembuwa
Nyowa
Jilewa
Lab Chu
Obom Chu
Chorzhung 3884
Hot Spring
Chor Chu
Dog Chu
Lashi La 4416
Dzamda
Limestone
Boundary between Ch'amdo and of Ch'angtu and Tungpu
Boundary between Gonjo and Chaya
Ch'a'o Chu
Dong Chu
Ngo Chu
Om Chu
R. MEKONG
31
98°
90° 95° 100°
T I B E T
LHASA
Brahmaputra or Tsangpo
Giama nu Chu (Salween)
Zilling Tso
Tengri Nor
Riwoche
Dzogchen
Gonchen
Kandze
Pelyul
Drango
Dau
Chamdo
Draya
Bamed
Tachienlu
Batang
Hokow
SZECHWAN
NEPAL
SIKKIM
Darjeeling
BHUTAN
Sadiya
Talap
R. Brahmaputra
A S S A M
BENGAL
Myitkyina
Talifu
YUNNANFU
YÜNNAN
Bhamo
Tropic of Cancer
Lashio
CALCUTTA
Alon
Myingyan
MANDALAY
B U R M A
FRENCH INDO CHINA
BAY OF
BENGAL
Prome
RANGOON
S I A M
Bassein
Scale 1/20,000,000
Railways
R. Yalung
R. Mekong
R. Salween
Red R.

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EASTERN TIBET
Coales.

The Geographical Journal

Vol. LIV No. 5 November 1919

THE DESERT CROSSING OF HSÜAN-TSANG, 630 A.D.

Sir Aurel Stein, K.C.I.E.

IT was on my second Central-Asian expedition, in the autumn of 1907, that I travelled across the stony "Gobi" of the Pei-shan by the desert track which leads from the oasis of An-hsi to Hami and serves as the Chinese high-road connecting westernmost Kan-su with the province of *Hsin-chiang*, the "New Dominion," or Chinese Turkestan. I knew at the time that I was following that ancient "Northern Route," which, ever since the Chinese had first acquired a firm foothold at Hami in 73 A.D., had been used by them as a main line of access to their Central-Asian dominions whenever they were able to assert political or military control over those distant territories. This knowledge then helped to reconcile me to the fact of having been obliged by practical considerations to choose a route which since the days of Prjevalsky has been followed by more than one European traveller, and which in its great wastes of crumbling rock and gravel offers but little chance for new observations of interest.

But it was not until I came to deal with this ground in 'Serindia,' the detailed report on the scientific results of my second Central-Asian journey, completed in 1918 and, I hope, soon to be published by the Oxford University Press, that I paid adequate attention to the circumstances which give this desolate desert track a claim upon the special and quasi-personal interest of the student of the historical geography of Central Asia. It arises from a celebrated episode in the life of the great Chinese pilgrim Hsüan-tsang, our Buddhist Pausanias and Marco Polo combined, to whose travels from China across Central Asia to India and back in the second quarter of the seventh century A.D. we owe such ample and so important records on the geography, history, antiquities, etc., of the vast regions he traversed. I mean the adventurous desert journey by which the pious traveller about the beginning of 630 A.D. made his escape from the jealously guarded north-west border of the Chinese Empire, as it then stood, into those "Western Regions" he was about to explore in his eager search for the sacred Law of Buddhism.

The story of this great adventure, which nearly caused Hsüan-tsang to

perish of thirst in the desert, has not hitherto been examined in the light of exact topographical knowledge. It is not to be found in Hsüan-tsang's own 'Hsi-yü-chi,' or 'Records of the Western Countries' (these do not take up the relation until his start westwards from Turfan), but only in Hsüan-tsang's 'Life,' a work originally compiled by his disciple Hui-li and edited later under conditions which were bound to impair the critical value of its text.* Hence doubts as to the accuracy of the details contained in this narrative might well have arisen, particularly in view of the supernatural tinge which the story as related by the devout biographer imparts to certain incidents connected with the great pilgrim's quasi-miraculous rescue when lost in the waterless desert and faced by imminent death through thirst and exhaustion.

All the more interesting is the close agreement which a careful examination reveals between all precise details of the story and the topographical facts ascertained in the course of our survey from the tract of An-hsi to Hami. This exact agreement affords striking evidence of the faithfulness with which Hsüan-tsang himself must have remembered and related this famous initial episode of his wanderings. It helps to confirm afresh the subjective trustworthiness of his records, and as we have to use these so often when dealing with questions of ancient geography in Central Asia or India, the following notes on Hsüan-tsang's desert itinerary may find an appropriate place here.

Before, however, we attempt to trace the pious traveller's steps, it will be well to indicate briefly certain main topographical facts concerning his starting-point, the oasis of An-hsi, and as regards the ground which the present high-road thence to Hami traverses. In chapters xv. and xxvii. of my 'Serindia' I have had occasion fully to discuss the broad geographical features which have obliged the Chinese from the earliest expansion of their power westwards, in the last quarter of the second century B.C., down to the present day, to follow the north foot of the snowy Nan-shan as their main line of progress towards Central Asia. There alone can be found a succession of relatively well-watered fertile tracts, stretching from Liang-chou past Kan-chou to Su-chou, such as could serve as a secure base for trade and military movements across the great deserts intervening between Kan-su and Chinese Turkestan. Beyond Su-chou, where the mediæval Great Wall of the Empire ends, this line thins out westwards into a series of small oases, comprising the present Yü-mên-hsien, An-hsi, and Tun-huang. These are situated in the wide but for the most part utterly barren valley in which the lower course of the Su-lo Ho descends to its terminal basin in the desert east of the ancient Lop Sea bed. Map I. attached to my 'Ruins of Desert Cathay,' and first published in the

* Cf. Stanislas Julien, 'Histoire de la vie de Hiouen-thsang,' preface, pp. lxxvi. *sqq.*, regarding the conditions under which the text of the biography, originally compiled by the monk Hui-li, was recovered and edited.

Geographical Journal for March 1911 to illustrate the explorations of my second journey, will help to make clear these essential features.

As long as Chinese trade and military enterprise towards the Tarim Basin could continue the move westwards in a straight line along that earliest route which led through the clay and salt wilderness of the dried-up Lop Sea to the ruined Lou-lan settlements, and which I succeeded in tracking right through by my Lop Desert explorations of 1914–15,* Tun-huang, the last oasis within the ancient Chinese border of Han times, remained the starting-point and eastern bridgehead as it were for the great desert crossing. But when after the third century A.D. Lou-lan was abandoned to the desert, and this difficult but most direct route became impossible for traffic through total want of water, such intercourse with Central Asia as survived the downfall of Chinese political control over the "Western Regions" was bound to be diverted almost wholly to the routes crossing the Pei-shan "Gobi" to Hami.

Of these routes the one starting from the An-hsi oasis and leading in a nearly straight line north-westwards to the cultivable area of Hami at the southern foot of the Karlik-tagh must certainly have been at all times relatively the easiest and the most frequented. It follows the line on which the distance over absolute desert ground to be covered by travellers from or to China proper is the shortest. It crosses the stony desert of the Pei-shan in eleven marches which our survey showed to aggregate to a total marching distance of about 218 miles. Hami, owing to the irrigation facilities assured by its vicinity to the snows of the Karlik-tagh, has all through historical times been a place noted for its agricultural produce and a natural emporium for whatever traffic passed across the desert south-eastwards. An-hsi has not yet recovered from all the destruction caused by the great Tungan rebellion of the sixties of the last century. But even thus, scanty as its resources now are, they suffice to allow trade caravans and other travel parties to revictual locally. In earlier times they are sure, as plenty of historical evidence shows, to have been considerably greater. What other routes there are, leading from Hami and the eastern extremity of the T'ien-shan towards the border tracts of Kan-su and China proper, all cross the barren wastes of the Pei-shan "Gobi" for considerably greater distances.† As my journey of September 1914 from Mao-mei to

* Cf. for the line of this ancient Lou-lan route "A third journey of exploration in Central Asia, 1913–16," in *Geographical Journal*, 1916, 48, pp. 124–129; also 'Serindia,' chap. xiv., for a review of the Chinese historical notices bearing upon it.

† Such routes leading across the Pei-shan east of the Hami–An-hsi line are indicated in Sheets XXI., XXIII. of the Russian Asiatic Transfrontier Map, 40 versts to 1 inch, partly from the surveys of Russian explorers like Grum Grishmailo and Obrucheff, partly from "native information." A route-line distinct from the above and leading from Hami to the great bend of the Su-lo Ho was followed in 1898 by Prof. Futterer, who has very carefully described it in "Geographische Skizze der Wüste Gobi," Ergänzungsheft No. 139, *Petermanns Mitteilungen*, 1902. This memoir provides a very instructive account of the geology and physiography of the eastern Pei-shan ranges in general.

Of the several route-lines shown by the above Russian map as crossing the Pei-shan

the Karlik-tagh showed (see "A third journey of exploration in Central Asia," *Geographical Journal*, 48, p. 200) they offer the same, if not greater, difficulties about water and grazing.

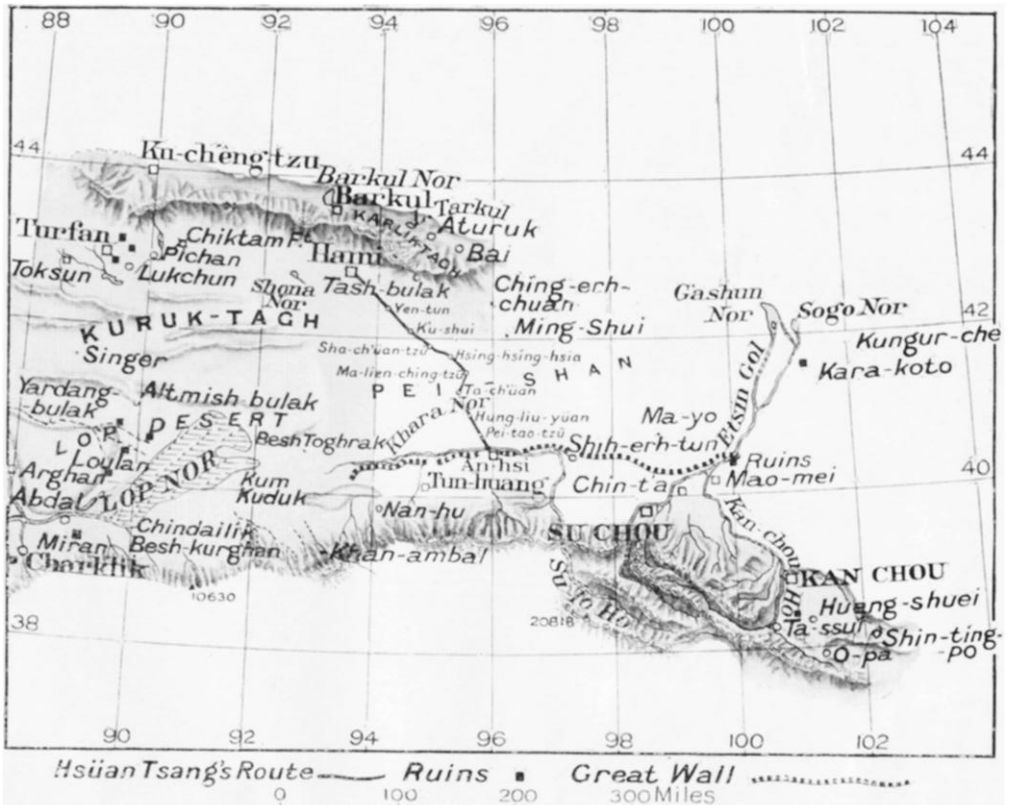
In view of these plain geographical facts it appears to me clear that the importance of the route leading from An-hsi to Hami cannot have undergone any material change during the periods while it was open for Chinese intercourse with Central Asia, and further that its track is not likely to have ever diverged far from the present one. The latter conclusion is all the more justified because, as can be seen from the map attached to 'Desert Cathay' and in fuller detail from sheets reproducing our surveys on the scale of 4 miles to 1 inch,* the actual road, except for a small détour between the springs of Ta-ch'üan and Sha-ch'üan-tzŭ, due to necessities of water supply, leads in what practically is a straight line from An-hsi to the nearest outlying settlement of the Hami oasis.

An-hsi, the ancient *Kua-chou*, where that episode of Hsüan-tsang's travels starts with which we are concerned here, need not detain us long. In my 'Desert Cathay' I have already recorded what observations of its extant conditions I was able to gather during my stays in 1907 (cf. 'Desert Cathay,' 2, pp. 235 *sqq.*). The present *An-hsi-chou*, situated not far from the left bank of the Su-lo Ho, is, in spite of its grand name, "the City of the West-protecting [garrison]," scarcely more than a straggling street within a big enclosure of crumbling walls. It owes its importance, such as it is, solely to being the last halting-place with local supplies on the road to Hami. To the south of the "town" there stretches between the river-course and the foot of the outermost barren hills of the Nan-shan a wide scrub-covered plain, where strips of poor cultivation are broken up by extensive stretches of waste lands. Ruins of walled villages and towns abound in this desolate tract, attesting its former prosperity. Among them the largest and most central still bears the name of *Kua-chou-ch'êng*, "the walled city of Kua-chou," and is known to local tradition as the site of the ancient chief place of the district.† Antiquarian reasons, which I have discussed in 'Serindia,' make it appear highly probable that this tradition is correct, and that we have to locate here the district head-

west of the An-hsi–Hami road only one can be considered as practicable and actually proved to exist. It is the one surveyed by Captain Roborovsky's expedition in 1893, which branches off from the Chinese high-road at K'u-shui, four marches from Hami, and leads due south to Tun-huang. Owing to difficulties about water, etc., it is but rarely followed nowadays, Chinese travellers from the last-named oasis preferring to join the high-road at Hung-liu-yüan, the second station after leaving An-hsi. The existence of the other routes, in view of information collected by Captain Roborovsky and Prof. Pelliot, appears very problematical.

* See Sheets Nos. 73, 76, 77, 80, 81 of the Atlas prepared by the Survey of India for my 'Serindia.' Advance copies of this Atlas were presented early in 1914 under the orders of Surveyor-General of India to the principal geographical institutions of Europe and America.

† See for the exact position of this ruined site and the topography of the An-hsi tract the inset map, on 1/M scale, in Map 1 of 'Desert Cathay.'



MAP SHOWING THE ROUTE OF HSÜAN-TSANG

quarters of Kua-chou, where the 'Life' makes Hsüan-tsang arrive towards the close of 629 A.D.*

The learned Buddhist monk had set out from Ch'ang-an, the Chinese capital, with the avowed object of "travelling to the west to search for the Law in the kingdom of the Brahmans," *i.e.* India. But though the great T'ang Emperor T'ai Tsung (627–650 A.D.) was already engaged on that policy of expansion westwards which was destined before long to reassert Chinese power and authority in the Tarim Basin and even beyond after the lapse of long centuries, the traditional methods of Chinese seclusion against the barbarian West were still rigorously enforced on the Kan-su border. "At that time the administration of the country was still new, and the frontiers of the Empire did not extend far. The people were subjected to severe restrictions, and nobody was permitted to leave in order to visit foreign countries" (cf. Julien, 'Vie de H.,' p. 16).

So Hsüan-tsang had been obliged to leave Liang-chou secretly and to travel to Kua-chou by night marches. After his arrival there "the Master of the Law, on inquiring about the western routes, was told: 'At 50 *li* from here, marching to the north, one comes to the River *Hu-lu*, of which the lower course is wide and the upper one very contracted. Its waters are constantly whirling and flow with such impetuosity that they cannot be passed in a boat. It is near to the widest part that the *Yü-mên* Barrier has been established, by which one is obliged to pass, and which is the key of the western frontiers. To the north-west, beyond this barrier, there are five signal-towers where the guards entrusted with keeping the look-out reside. They are a hundred *li* apart one from the other. In the space which separates them there is neither water nor herbage. Beyond these five towers there lie the desert of *Mo-ho-yen* and the frontiers of *I-wu* (Hami)."

The 'Life' gives a touching account of how the eager pilgrim came to brave the official prohibition and to venture into the dread desert beyond (see Julien, 'Vie de H.,' pp. 17–21). On receiving that information he had first become downcast, and having also suffered the loss of his horse, passed a month in distress. Then the local governor, who happened to be a man of piety, learned from spies of Hsüan-tsang's intentions, showed him secretly their report, but in the end, moved by his sincere fervour, decided to close an eye—*more Sinico*. Still the saintly traveller's troubles increased through the defection of two young monks who were to have accompanied him, and through the difficulty of securing a guide. But auspicious dreams and omens gave him fresh courage, and a devout young native helped him to meet in secret an aged "barbarian" who had done the journey to I-wu fifteen times to and fro. The old man gave

* Cf. Stan. Julien, 'Histoire de la vie de Hiouen-thsang' (Paris, 1853), p. 17; also Beal, 'The Life of Hiuen-tsiang,' p. 13. In subsequent quotations from the 'Life' the version of the great French Sinologue will be followed, from which the latter work is in the main retranslated.

him the grave warning: "The western routes are bad and dangerous. At times streams of drift sand obstruct, at others demons and burning winds. If they are encountered no one can escape. Often big caravans lose themselves and perish."

But Hsüan-tsang remained firm and declared that if he did not reach the country of the Brahmans in the end he would never turn eastward again to China. "If I were to die on the way I should not regret it." Thereupon said the greybeard: "Master, since you are decided to start, you must mount my horse. More than fifteen times already, going and coming, he has done the way to *I-wu* (Hami). He is strong and knows the routes. Your horse, on the contrary, is weak and will never reach there." We shall see further on how important a part this hardy mount, "lean and of russet colour," for which he exchanged his own, was destined to play in the pilgrim's final escape from death in the desert.*

Thus mounted and accompanied by the young native who was to act as guide, Hsüan-tsang started at night from Kua-chou. "In the third watch they came to the river and sighted the *Yü-mên* Barrier from a distance. At 10 *li* from the point where the barrier stood,† the upper river-course had its banks not more than a *chang* (10 feet) apart." Here a crossing was effected by a rough foot-bridge which the "young barbarian" improvised with cut-down branches of trees, etc. Then, after resting by the river-bank, they set out with the first rays of the sun. But after going a short distance Hsüan-tsang's companion, frightened by the dangers ahead, refused to venture beyond, and left the brave pilgrim to pursue his adventure alone.

Before we proceed to follow Hsüan-tsang further, it will be convenient to sum up the indications derived from this brief account and from the local information previously reproduced and to compare them with the actual topography of An-hsi. Starting from the town of Kua-chou, the route to *I-wu* or Hami first led north for 50 *li* to the river *Hu-lu*, where the watch-station of *Yü-mên-kuan*, or the "Jade Gate Barrier," was then placed. From this point the route towards Hami turned to the

* The mention of this experienced equine wayfarer seems to me to give a distinct touch of reality to the story as recorded in the 'Life.' Together with other points to be indicated below it creates a presumption in favour of the substantial veracity of the account as received and handed down by Hsüan-tsang's biographers.

At the same time the way in which the 'Life' connects the acquisition of this auspicious mount with a prognostic Hsüan-tsang had received from a diviner before his start from Ch'ang-an, shows the same quaint intermingling of sense of reality and naïve credulity which characterizes the personality of my Chinese "patron saint"—like that of so many of his compatriots, ancient and modern—throughout his own 'Records'; cf., *e.g.*, 'Desert Cathay,' 2, 169 *sq.*, 180.

† I follow here Beal's interpretation; see 'Life of Hiuen-tsiang,' p. 10. Julien's version would imply that the point of crossing was at the barrier itself. But this obviously cannot be the sense intended, since the passage had to be effected secretly. Besides, we have been told before that the Yü-mên Barrier stood where the river was widest, and consequently may be supposed to have been fordable.

north-west and passed towards the five signal-posts maintained in the desert for look-out purposes. Hsüan-tsang, having to avoid the "Jade Gate Barrier" where his unauthorized move beyond the border would have been stopped, set out from Kua-chou at night and reached the river at a point some 10 *li* above the watch-station. Having effected a crossing, unperceived, in the third watch, he thence picked up the track leading to the nearest of the watch-towers, and, as we shall presently see, arrived there after covering 80 *li*.

It is easy to demonstrate the full accord of these indications with the topographical facts as our survey shows them. By the river *Hu-lu* no other but the Su-lo Ho can be meant.* From the ruined town of Kua-chou-ch'êng, which in view of its central position and surviving local tradition may safely be assumed to mark the approximate site of the *Kua-chou* of T'ang times, it is 8 miles almost exactly due north in a straight line to the point where the present road to Hami crosses the Su-lo Ho. If we assume that the river-course in Hsüan-tsang's days lay about 2 miles further to the north where our survey marks an old river-bed, the agreement in distance with the 50 *li* of the 'Life' becomes still closer; for the equation of 5 *li* to the mile is the one which my extensive experience of Hsüan-tsang's distance-reckonings along Central-Asian routes has proved to be the generally correct average. That the road to Hami after leaving the river leads steadily in a north-westerly direction is shown by a look at the map. Finally, the 80 *li* which Hsüan-tsang is said to have covered from the river-crossing to the first watch-tower agree in a striking fashion with the 16 miles or so which the map shows between the above-mentioned old bed and the first halting-place, Pei-tan-tzŭ, with its spring, on the present caravan road.

As to the exact position of the *Yü-mên* Barrier, as located at the time of Hsüan-tsang's departure, I am unable to state anything definite; nor does it affect his itinerary with which we are concerned here. The discoveries made in the course of my explorations of 1907 along the ancient Chinese *Limes* have solved the question as to the original position and remains of this famous frontier station of the "Jade Gate," once far away to the west of Tun-huang,† and there is strong antiquarian reason to believe that even in Hsüan-tsang's times its transfer to the north of Kua-chou could not have been of old date.‡ To the strict watch over all trans-

* This identification with the Su-lo Ho, the Bulungir of the Mongols, was first correctly made by V. de Saint-Martin (cf. Julien, 'Mémoires de Hiouen-thsang,' **2**, p. 202).

† How long the "Jade Gate Barrier" remained near Kua-chou, and when and how the present *Yü-mên-hsien*, between Su-chou and An-hsi came by its designation derived from the ancient frontier station of Han times, is another question which must be left for future investigation (cf. 'Desert Cathay,' **2**, pp. 115 *sqq.*; 'Serindia,' chapter xix., sec. i.-iii.).

‡ A passage of the T'ang Annals referring to the despatch in 610 A.D. of the famous Chinese Commissioner Pei Chü to *Yü-mên-kuan*, distinctly places this frontier "Barrier"

border traffic which was kept in ancient times at this western main gate through the original Great Wall, and which had its close analogy in the procedure observed down to recent times at the Chia-yü-kuan Gate west of Su-chou, I have had repeated occasion to refer elsewhere (see 'Desert Cathay,' 2, pp. 148, 154, 282; 'Serindia,' chap. xxvii., sec. i., ii.).

It will help us better to appreciate the conditions under which Hsüan-tsang's desert-crossing was effected, if we cast a rapid glance at the general aspects of the route as it exists now and at the topographical features distinguishing certain of its stages. To the Chinese, with their strongly fixed notions of civilized existence, this desert route must have at all times been distinctly deterrent, whether they had to face it as soldiers, traders or casual travellers. It was easy to realize this as we moved along from one wretched little roadside station to another, each established with its refuse-filled mud hovels and tiny post of soldiers at a point where some shallow depression offers a scanty supply of water in spring or well. Only here and there do they offer patches of equally scanty grazing on scrub or reeds. The conditions of traffic I was able to observe while moving across the utterly barren wastes of gravel, crumbling rock or drift-sand which extend between these miserable halting-places could certainly have changed but little since ancient times.

The difficulties about securing a sufficiency of reed straw and water for animals, together with the equally great dearth of fuel, must have at all periods seriously hampered the use of the route whether for trade or troop movements. The very trying climatic conditions of the central Pei-shan, with its dreaded north-east blizzards frequent in the winter and spring and with its parching heat and dust-storms in the summer, were always bound to imply grave risks for individual travellers. There is danger for them now too, if unguided, of straying from the track along certain portions, and obviously this risk must have been far greater still during periods when the political seclusion of China prevented all regular traffic.

Uniformly barren and dreary as the ground crossed by the route is, it yet divides itself into certain distinct sections; in the detailed map-sheets accompanying 'Serindia' we can easily make them out, and even the map of 'Desert Cathay' suffices to mark their limits. The first five marches from An-hsi lead across a succession of narrow hill ranges, all striking approximately east to west and rising but little above the wide plateau-like valleys between them. Water is found in springs at the first three stages (Pei-tan-tzŭ, Hung-liu-yüan, Ta-ch'üan), and subsoil drainage is reached by wells, not more than 6 to 8 feet deep, at Ma-lien-ching-tzŭ and Hsing-hsing-hsia. It is probably not without reason that the boundary between the provinces of Kan-su and Hsin-chiang or Chinese Turkestan

at the town of Chin-ch'ang (cf. Chavannes, 'Documents sur les Turcs occidentaux,' p. 18). Chinese antiquarians and local traditions of An-hsi seem to agree in considering Chin-ch'ang as a sub-prefecture dependent on Kua-chou and situated to the east of the present An-hsi. But its exact position still remains to be determined.

is fixed now close to Hsing-hsing-hsia; for beyond, the character of the ground changes and distinctly for the worse. Much of bare rocky ledges and of detritus is passed on the next two marches to Sha-ch'üan-tzŭ and K'u-shui, there being a steady descent of some 2000 feet from the average level of the preceding stages. Vegetation even of the humblest sort becomes increasingly rare and the water decidedly brackish, as the name of *K'u-shui*, "Bitter Water," rightly indicates.

But it is the next march to the station of Yen-tun which is most dreaded of all by Chinese wayfarers. For a distance of some 35 miles it leads down over absolutely bare gravel slopes into a great depression or trough lying at its bottom some 1500 feet below the level of K'u-shui. Totally devoid of water or shelter of any sort, this long march is attended with risks both on account of the great summer heat here experienced and the icy north-east gales to which it is exposed in the winter and spring. Carcases of transport animals mark the route all the way from K'u-shui; nor are losses in human lives unknown here. From Yen-tun another march, over similar gravel wastes but much shorter, brings the traveller to the springs of Chang-liu-shui (*Chang-liu-shin* in the 1 : 3,000,000 map is a misreading), at the southern edge of a wide belt of loess ground receiving subsoil water from the snows of the Karlik-tagh and covered with abundant scrub and reed-beds. At Chang-liu-shui the first tiny patch of Hami cultivation is met, and after two more marches the town of Hami or Kumul is reached in the central oasis.

With these topographical features of the route the essential points in the story of Hsüan-tsang's desert journey can be proved to be in close accord. This agreement is all the more remarkable in view of the avowedly imperfect text of Hui-li's 'Life' and the impossibility of checking its statements from Hsüan-tsang's own travel records. A variety of details and personal touches strongly support the impression that Hui-li gathered his graphic account of the desert adventures from the Master's own lips and has reproduced it with faithfulness. We know too much of Hsüan-tsang's pious ardour and naïve credulity to mistrust the few references to supernatural incidents; they obviously reflect genuine subjective illusions such as conditions of intense strain and real peril were most likely to produce in a mind so devout and fervid.

From Hui-li's narrative of the journey we gather the following main facts (cf. Julien, 'Vie de H.,' pp. 23 *sqq.*; Beal, 'Life of H.,' pp. 18 *sqq.*). Forsaken a short distance beyond the Su-lo Ho, by the "young barbarian" who was to have acted as his guide, the pilgrim moved ahead alone, guiding himself by the bones of dead animals and the droppings of horses along the track. Visions of armed hosts moving in the distance caused him alarm. But seeing them disappear on closer approach, he recognized that they were vain images created by the demons. Obviously mirages are meant such as I frequently observed on my first few marches beyond An-hsi. After covering 80 *li* Hsüan-tsang arrived at the first

signal-tower. In order to pass it unobserved he hid himself until night-fall. When he tried then to replenish his water-bottle from the water near the tower he was shot at with arrows by the men on guard. On declaring himself a monk come from the capital they took him before the commandant of the post.

This, a native of Tun-huang, Wang-hsiang by name, closely examined him. Having verified his identity with the would-be pilgrim in search of the Law, about whom a report had reached him from Liang-chou, he felt pity and gave him a kindly reception. Having failed to persuade him to return, he directed him in the morning to proceed to the *fourth* tower commanded by a relative of his. On arriving there the *same* night Hsüan-tsang passed through a similar experience. He was stopped by an arrow shot by the guard and then taken before the commandant. On receiving the message of Wang-hsiang the officer gave him hospitable welcome, but warned him not to approach the fifth and last watch-tower, as it was held by men of violent disposition. Instead he was advised to go to a spring, a hundred *li* off, called *Yeh-ma-ch'üan*,* "The Spring of the Wild Horses," and to replenish his water supply there.

"A short distance from there he entered the desert called *Mo-ho-yen*, which has a length of 800 *li* and which in ancient times was called *Sha-ho*, or the 'River of Sand.' One sees there neither birds nor quadrupeds, nor water nor pasture." In this desert the pious traveller was troubled again by demonic visions, *i.e.* mirages, from which he protected himself by reading his favourite sacred text, the Prajña-paramita Sutra. After having covered a hundred *li*, he lost his way and failed to find the "Spring of the Wild Horses." To add to his distress he dropped the big water-skin he had been given at the fourth tower and lost its precious contents. "Besides, as the route made long détours, he no longer knew which direction to follow. He then meant to turn back to the east, towards the fourth signal-tower." But after having thus proceeded for 10 *li* he thought of his oath not to take his way again eastwards until he had reached India. "Thereupon fervently praying to Kuan-yin (Avalokiteśvara) he directed himself to the north-west. Looking all round he saw only limitless plains without discovering a trace of men or horses." At night he was troubled by lights lit by wicked spirits, and in daytime by terrible sandstorms. "In the midst of these severe trials his heart remained a stranger to fear." But he suffered cruel torments from thirst.

After having thus travelled for four nights and five days without water he lay down exhausted. In the middle of the fifth night after fervent prayers to Avalokiteśvara he felt refreshed by a cool breeze, and then found rest in short sleep. A divine vision seen in a dream roused him to a fresh effort. After about 10 *li* his horse, which also had found strength

* *Yeh-ma-ch'üan* is still a frequent designation for desert localities beyond the Kan-su border.

to get on its legs again, suddenly turned into another direction, and after a few more *li* carried him to a patch of green pasture. When he had allowed his horse to graze and was about to move on, he discovered a pool of clear water and realized that he was saved. Having halted a day at this spot, he continued his journey with a fresh supply of water and fodder, and after two more days emerged from the desert and arrived at I-wu or Hami.

If we compare this summarized account of Hsüan-tsang's desert crossing with the actual topography of the route from An-hsi to Hami, we cannot fail to recognize their close accord in essential points as well as an obvious lacuna in the text of the 'Life.' This makes the pilgrim proceed in a single march from the first signal-tower to the fourth. But this is clearly in contradiction with the previously quoted passage of the 'Life,' which records the information given to Hsüan-tsang at Kua-chou: "To the north-west beyond this Barrier there are five signal-towers. . . . They are 100 *li* apart, one from the other." We are thus obliged to assume that Hsüan-tsang in reality had to cover four marches from the river before reaching the fourth tower, and that in the narrative presented by the extant text two of these marches have been left unrecorded.

Once allowing for this lacuna, which unfortunately has its only too frequent counterparts in the 'Life' and is easily accounted for by the extant condition of its text, we can easily trace the stages and incidents of the desert journey. That the position indicated for the first signal-tower clearly points to the present Pei-tan-tzŭ, the first stage from An-hsi, has been shown above. The 480 *li* reckoned from the Su-lo Ho to the fifth signal-tower are in remarkably exact agreement with 96 miles marching distance recorded by cyclometer on our journey from the river to Hsing-hsing-hsia, the fifth halting-place on the present road. The statement about the dreaded Mo-ho-yen desert extending beyond the fifth signal-tower is in perfect accord with the marked change for the worse which the character of the ground exhibits after we leave Hsing-hsing-hsia. Nor is it difficult to prove that all the matter-of-fact indications which the narrative of Hsüan-tsang's experiences in this desert furnishes, are fully consistent with what the map shows us.

We read there that the traveller, having been advised to avoid the fifth signal-tower, *i.e.* Hsing-hsing-hsia, turned off from the main route at the fourth tower in order to reach the "Spring of the Wild Horses," at a distance of 100 *li*. When he failed to find this and thought of regaining the fourth tower, he is said to have turned back to the east for a short while. This makes it quite clear that the *Yeh-ma-ch'üan* spring to which he had been directed must have lain in a westerly direction. Now a look at the Russian Trans-frontier map shows that the route from Tun-huang to Hami, as surveyed by Captain Roborovsky's expedition, passes at a distance of about 30 miles west of Ma-lien-ching-tzu before joining the An-hsi–Hami road at K'u-shui, and that one of its halting-places with

water is to be found at about that distance to the west-north-west of Ma-lien-ching-tzŭ. Thus the existence, in the past or present, of a spring approximately in the position indicated for the Yeh-ma-ch'üan which Hsüan-tsang vainly sought for, becomes very probable. That the pilgrim unguided failed to find it is an experience with which I became only too often and painfully familiar myself when we made our way in September 1914 across unexplored portions of the Eastern Pei-shan (cf. *Geographical Journal*, 48, p. 200).

In any case it is certain that if at the present day a wayfarer from An-hsi had reason to avoid observation at Hsing-hsing-hsia he could do no better than leave the main route at Ma-lien-ching-tzŭ and strike to the west-north-west. He would have to cross there a continuation of what appears to be the highest of the decayed hill ranges of the Pei-shan, the one which the main road passes in tortuous gorges just above Hsing-hsing-hsia. On such ground it would obviously be difficult to follow a straight line, and this circumstance may well account for the passage in the narrative telling us that "as the route made long détours he no longer knew which direction to follow." After vainly searching for the "Spring of the Wild Horses," and a brief attempt to regain the fourth tower, we are told that Hsüan-tsang turned resolutely to the north-west and continued his journey undaunted by thirst and the perils of the desert. It was a resolve needing all the religious fervour aud courage of the great pilgrim, but it was also the wisest course to follow—for one who knew how to keep up that bearing. And that Hsüan-tsang fully possessed that instinct of the compass, so prevalent among Chinese of whatever condition, is abundantly proved by the topographical records he has left us in his 'Hsi-yü-chi.'

As the map shows, this course to the north-west was bound to carry the traveller across the utterly barren gravel glacis about K'u-shui down to the Yen-tun depression, and beyond this to the south-eastern edge of the loess belt, where subsoil drainage from the Karlik-tagh supports vegetation. We are told that on his progress across the Mo-ho-yen desert he went without water for four nights and five days, until after the refreshing rest of the fifth night his hardy mount carried him a few miles beyond to pasture and water in a pool. Here we find once again the approximate distance reckoning, as indicated by the record of the 'Life,' as closely concordant with the actual topography as we could reasonably expect; for we have seen that on the present caravan road five marches are needed to bring the traveller from Ma-lien-ching-tzŭ, *i.e.* the fourth signal-tower, to Chang-liu-shui, the first place with spring water and verdure on the Hami side, the total marching distance amounting to 106 miles.

There are likely to have been wells then as now on the regular route leading from the fifth watch-station to Hami, in positions corresponding, or near, to Sha-ch'üan-tzŭ, K'u-shui, Yen-tun. But how difficult, if not impossible, it would have been for Hsüan-tsang, once off the caravan track, to find them I know only too well from my own personal experience

on similar desert ground. The line he followed obviously lay more or less parallel to the route. Yet this might easily have remained hidden from him even if approached within a few miles.

That it was the scent or local sense of his horse which enabled Hsüan-tsang in the end to reach the saving spring before succumbing to thirst and exhaustion, distinctly strengthens my belief in the authenticity of the record as presented by Hui-li. We have been told in it before how Hsüan-tsang, when preparing for his adventure at Kua-chou, had wisely, by exchange for his own, secured this horse from an "old barbarian" who had ridden it more than fifteen times to Hami and back (see above, p. 270). The remarkable way in which horses and camels in the desert can scent water and grazing for considerable distances, or correctly locate such places remembered from previous visits is too well known to need my personal testimony. But I may well record this as regards the fact that a horse trained to desert travel may in the cold of a Central Asian winter well go on for five days without water. On my crossing of the Taklamakan to the Keriya River end our few ponies could not be watered for fully four days (see 'Desert Cathay,' 2, pp. 391 *sqq.*); yet, judging from their condition when we at last struck the river, they might probably have held out for a couple of days longer. (It is true, they were never ridden on this desert crossing.) It must also be noted that the going on the uniform gravel slopes and plateaus of the Pei-shan is far less tiring to horses and to men, too, than the crossing of dune-covered areas in Taklamakan.

The accuracy of the narrative preserved in the 'Life' asserts itself to the end; for the two more days which it makes Hsüan-tsang spend *en route* before reaching Hami correspond exactly to the two marches now reckoned from Chang-liu-shui to Hami town, a distance of some 35 miles. Thus we close the story as handed down in the 'Life' with the gratifying assurance that even this initial chapter of the pilgrim's travels, which in view of the grave perils and quasi-miraculous escape it records might most readily have lent itself to exaggeration and fiction, has retained in Hui-li's narration the form in which the Master of the Law himself is likely to have told it.

THE KASEMPA DISTRICT, NORTHERN RHODESIA

F. H. Melland, Magistrate for the District

THE Kasempa district of Northern Rhodesia lies to the extreme north-west of the territory, with the Katanga Province of the Belgian Congo on its northern border, and on the west Portuguese Angola. The Barotse and Kafue districts of Northern Rhodesia form its southern and the Luangwa district its eastern boundary. In the last three

Rev. Henry Lansdell, D.D.

One of the older members of the Society, best known for his books of travel on Central Asia and Siberia, has passed away in the person of Dr. Henry Lansdell, who died at his residence at Blackheath on October 4, in his seventy-ninth year. The eldest son of Henry and Julia Lansdell, he was born at Tenterden in 1841, and after receiving his education at home and at St. John's College, Highbury, was ordained in 1867. After holding a curacy at Greenwich he soon began his extensive travels (undertaken in part with a view to studying openings for missionary work), which made him acquainted with large parts of the four principal continents. In Northern and Central Asia they led him to some extent off what was then the beaten track, and the resulting narratives were valuable aids to a knowledge of the conditions then prevailing in those regions. The first in date, 'Through Siberia' (2 vols., 1882), was followed in 1885 by 'Russian Central Asia' (also in two volumes), of which an abridged edition came out two years later under the title 'Through Central Asia.' In 1893 the series was completed by a third two-volume work, 'Chinese Central Asia : a Ride to Little Tibet.' His travels continued for some years longer, but on a less extensive scale, and from 1892 to 1912 he was chaplain at Morden College, Blackheath. He had been forty-three years a Fellow of the Society, having joined in 1876.

Lieut.-Col. Sir Henry Trotter, K.C.M.G., C.B.

Lieut.-Col. Sir Henry Trotter, recently member of the Council of the Royal Geographical Society, and Chairman of the Council of the Central Asian Society, who died lately at Chobham after a long illness, was one of the last survivors of that distinguished corps, the Bengal Engineers. He was transferred to the Imperial list when the old East India Company's service was abolished after the Mutiny. After obtaining his commission from Addiscombe College in 1860 he went to India, to be almost immediately attached to the Great Trigonometrical Survey, and it was in the Survey Department that he acquired his first experience as an Himalayan geographer. Sir Douglas Forsyth's mission to Yarkand in 1873–74 gave him his first opportunity for distinction in a wide and almost untrodden field for geographical research. For the first time we learned something of the course of the Upper Oxus tributaries in the Pamirs, and of the conformation of the mountain chains which traverse Chinese Turkestan. He fixed the position of the Mustagh Ata, a mountain which, for a time, was believed to rival Mount Everest in altitude, and he organized an exploration of the valley of the Oxus below the Pamirs, which proved subsequently to be of great value in the interests of Central Asian Geography. His work with this mission earned him the distinction of this Society's Gold Medal in 1878. Leaving India he was appointed to be an additional military attaché at Constantinople, and during the Russo-Turkish war of 1877–78 he served with the Turkish Army throughout the campaign in Asia, being present at the siege and relief of Kars and acquiring a comprehensive knowledge of the geography of Asia Minor. He was subsequently appointed Consul-General of Syria and took a leading part in several special missions, acting on one occasion as H.M. Chargé d'Affairs at Bucharest. His was a most useful and adventurous life, and throughout it he preserved that kindly courtesy and modesty of demeanour which is not always found in public officials, and which endeared him greatly to those who knew him as a loyal and faithful friend. Sir Henry Trotter was in his younger days a keen sportsman. He was the first European to shoot an *Ovis Poli* in the Pamirs, and one of

very few who have shot lions in Gujrat. He could have told of several surprising adventures in the field of sport, but habitual reticence was a marked feature in his character, and few even of his closest friends knew the full story of his experiences. T. H. H.

We have to record also the deaths of Prof. Haverfield and of Dr. Arthur Neve: of whose services to Geography we shall give some account in the next number of the *Journal*.

CORRESPONDENCE

Names in the Čecho-Slovak State.

THE interesting and valuable article entitled "The Boundaries of Čecho-Slovakia" which appeared in the September issue of your *Journal*, calls for just one comment on what appears to be a slight misunderstanding. Discussing the nomenclature of the Czecho-Slovak Republic, your contributor says of the form "Slovakia," that "it perpetuates a distinction between Slovaks and Slovenes which the State itself would avoid, if we may judge from its official title: Československa Republika." Now as regards this, it should be pointed out that there is no connection whatever between Slovaks and Slovenes, the latter being a Southern Slav race. The Czech adjective "slovenský" means Slovak and nothing else. ("Slovacký" is also frequently used in this sense.) It does not in any way concern the Slovenes, for whom the Czech adjective "slovinský" would be used. Besides these two adjectives, similar in form but referring to quite different races, there is a third one, "slovanský," which means Slavonic. In each instance, the masculine form of the adjective has been quoted.

R. HUVAR.

Czechoslovak Press Bureau,
9, Grosvenor Place, S.W. 1,
23 September 1919.

[We are glad to publish the above letter correcting our remark in the September *Journal*; and we are indebted also to the Secretary of the Čecho-Slovak Legation for the assurance that Slovensko, the name of the province, is really substantival; the adjectives being Slovensky (m.),—a (fem.), e (neut.). Further, the alternative Slovacky for Slovensky, though common, is incorrect. —ED. *G.J.*]

September 23. *At the request of two of his colleagues we print below a further appreciation of his character and services.* ED. *G.J.*]

In his book 'Surveying and Exploring in Siam,' published in 1900 by the Royal Geographical Society, James McCarthy has related his experiences as a geographer in Siam from 1881 to 1893. The Royal Survey Department of Siam (known in that country as the Map Department) was created by Royal Decree about 1885–1886, and McCarthy was its Director for sixteen years. That period, though it included times of stress and danger for the country, marked the inauguration of many of the reforms and developments that have helped to place Siam in its present prosperous state.

It is not, however, to McCarthy in connection with the initiation and cultivation of survey work in Siam that the present writers wish to refer. Associated with him in his official life for some years before it ended, to them the man as much as the geographer made an appeal. The difficulties that had been encountered for years, one soon learned to understand. It was when one came to realize the manner in which they had been met and overcome that appreciation and admiration for the man who had won through sprang into being spontaneously and grew with greater knowledge. And to these feelings must be added personal affection.

Heads of departments do not always gain the attachment of the members of their staffs, but McCarthy succeeded in this without effort. He was a man who made many friends, both European and Siamese. Some of the latter speak of him with deep feeling to this day.

It was said by one who knew McCarthy well in Bangkok that he just missed being a great man. Greatness perhaps connotes general or widespread recognition of fine performance, and much actual achievement may miss this. Be that as it may, McCarthy did really great work as a geographer. He endeared himself to his friends, men in many instances of diverse interests, he gained the esteem of many others, he served well the King whom he respected and admired and who valued and trusted him. It is not the custom in the British Empire to bestow official honours on men who have honourably served countries other than their own, and McCarthy would never have looked for such recognition. Nevertheless it is beyond doubt that his honest, strenuous and efficient service in Siam were such as to reflect honour both on his own country and on the Survey of India Department in which he received his early professional training. He was given a fine opportunity for an important and useful career, and he availed himself of it to the full.

R. W. G.
A. J. I.

Arthur Neve.

A great loss has befallen Kashmir by the death of Arthur Neve; he probably did more than any one who ever lived towards the amelioration of suffering for the various native races of that country, amongst whom his reputation was extraordinary. His death will be equally felt amongst a large circle of English patients and friends.

Born at Brighton in 1858, he was educated at the Grammar School there and at Edinburgh R.C.S. and University, qualifying in 1880 and taking the F.R.C.S.E. in 1884.

Arriving in India in 1881 he at once took up the medical mission work previously carried on by Maxwell and Elmslie. In 1886 he was joined in this work by his brother Ernest, at the sacrifice of an already brilliant career at

home. The mission started in an old barrack outside Srinagar, where now stands a fine hospital and other buildings among trees and gardens. All that the Neves earned from British visitors and Kashmiri gentry went towards the cost of the establishment and upkeep of this institution, at which Arthur laboured for nearly forty years. Theirs too is the leper asylum on the Dal Lake.

In 1900 he was awarded the Kaiser-i-Hind Medal of the First Class. In 1908 he was elected President of the Indian Medical Missionary Association, and in the following year Vice-President of the International Medical Congress at Bombay. When the War broke out he obtained a commission in the R.A.M.C., serving at the War Hospital, Dartford, in France, and at the Indian Hospital, Brighton. Demobilization found him worn out. He had already suffered from attacks of angina pectoris, but returned at once to his old work in Kashmir. His death was probably accelerated by his unremitting devotion to duty through the entire duration of the war.

Arthur Neve carried his healing art to the remotest corners of Kashmir territory, for mountain travel was his one relaxation. Though never accounting himself a scientific traveller nor a skilled mountaineer, yet he actually accomplished much in both fields, and in 1911 received the Back Grant from our Society. He probably had a wider knowledge of the mountain regions of Kashmir than any other single traveller, as his well-known 'Tourist's Guide to Kashmir' sufficiently testifies. He also published 'Picturesque Kashmir' and 'Thirty Years in Kashmir.' He it was who reported the extraordinarily rapid advance of the Hunza glaciers; he cleared up the problem of the Barmal glaciers of the Nun Kun group; he first explored the Panamik glaciers of the great Nubra Peaks and the Murgisthang glaciers of Sasir. Besides this he accomplished many pioneer ascents among the peaks on both sides of the Vale of Kashmir, all new and some of considerable difficulty.

In 1909 he accompanied the late Captain Morris Slingsby and myself on our trip up the Saltoro glaciers and over what was then marked as the main water-parting to the great Siachen glacier, and it is as a good companion that I remember him. Always cheerful under the constant discomfort of high glacier travel, never put out by anything, and a safe man amongst the worst crevasses. And because of his wonderful reputation amongst all classes and tribes of natives he was such a positive asset towards the success of our expedition. Before my own plans were completed I wrote to consult him with regard to the problem I wished to solve. I thereupon discovered that he too had long had designs upon the same region. At that time there was no prospect of his joining me, and I was about to forestall him. Nevertheless every scrap of information in his possession he freely placed at my disposal without the faintest trace of jealousy. At the last moment he decided to snatch a few weeks' well-earned holiday and joined my party. Never shall I forget that journey into Baltistan with him. At every halt the sick awaited his coming, in sometimes pathetic hope of instant recovery. At the end of every march, even on the roadside, he would be at work. His skill in the treatment of cataract was remarkable; also his rapidity of operation. Very many hill-folk came to him blind, and left his hands with sight restored. Their faith in him was so absolute that he found it at times almost impossible to convince hopeless cases that he could do nothing. By his reputation amongst the natives, earned also by invariable fair treatment of his coolies, succeeding British travellers will profit greatly.

He was a man of devout but quite unostentatious piety: withal a good companion on rough roads. His friends cannot think of him with sadness, but their profound sympathy must go out to his widow and to his brother.

TOM G. LONGSTAFF.

CORRESPONDENCE

The Discovery of Dr. Oudney's Grave.

I SEE that in this month's *Journal* in quoting a despatch of the Acting Governor of Nigeria you mention me as the discoverer of Dr. Oudney's grave. The grave was identified by my cousin, Mr. H. E. W. Bovill, District Officer i/c Katagum Division. The similarity of our initials, combined with the fact that we were both serving in Kano Province, no doubt accounts for the error. In justice to my cousin perhaps you would be so kind as to make the necessary correction in the next *Journal*.

E. WILLIAM BOVILL,
late 5th (Mounted Infantry) Battalion Nigeria Regt.

21 October 1919.

MEETINGS: ROYAL GEOGRAPHICAL SOCIETY: SESSION 1919-1920

At a Special Meeting of the Council on 7 July 1919 the following were elected Fellows of the Society:—

Lieut.-Commander C. E. V. Craufurd, R.N.; Captain Charles G. C. Davey; Charles Grey; Frederick Gudgin; Ernest Hambloch; Colonel Edward P. Hobdey, C.M.G.; George H. Jones; Ralph Tennyson Jupp, M.B., B.SC.; Geoffrey Appleby Longden; Henry L. Lynch; Dr. Hannibal Porto; Gerald Power; Dr. Robert Cochrane Simonson; Nathan P. Stedman; Captain Kenneth Forbes Glascott Stronach, M.C.; Arthur Evelyn Weatherhead; A. Crawford White; Post Wheeler; Miss Florence J. Williams.

First Evening Meeting, 3 November 1919.—The President in the Chair.

PAPER: Central Kurdistan. Major Kenneth Mason, M.C., R.E.

First Afternoon Meeting, 10 November.—The President in the Chair.

PAPER: Surveying in Mesopotamia during the War. Lieut.-Colonel G. A. Beazeley, D.S.O., R.E.