It was they who packed the figs, wove the carpets, tanned the leather, and dug the minerals which formed the staple articles of Anatolia's export trade. Turkey has committed industrial suicide.

Whatever may be said about the Turk's treatment of his expelled Christian population, whom he regarded as enemies and traitors, nothing can excuse his neglect of the incoming Moslem *muhajirs*. He had ample time and opportunity to provide for them. Last September the British Army handed over to the Turkish Red Crescent Society at Kilia on the Gallipoli Peninsula a well-laid-out hut cantonment, with electric light and water laid on, capable of accommodating an infantry brigade. This would have formed an ideal concentration camp and clearing centre where the refugees could have been housed in cleanliness and comfort until suitable accommodation had been found for them. Far from availing himself of such an obvious and providential advantage, the Turk started to tear down the huts immediately after our evacuation, and in such a way that the timber and corrugated iron sheeting was rendered entirely unfit for reconstruction.

However, the Turk has assumed the task of running his own country in his own way, and few will dispute his right to do so. If he fails he will, in the long run, be himself the chief sufferer. And it must be granted that in many ways he is running his country better than it was ever run before, and that in spite of the enormous difficulties engendered by a succession of wars, a diminished population, and an almost chronic political and constitutional ferment. To take one example : internal order and security are now absolutely assured throughout the country, whereas six months ago it was still being ravaged by bands of deserters and brigands. Religious and racial fanaticism is dead in Turkey, and throughout our journey of 1200 miles across Anatolia we met with unfailing courtesy, candour, and kindness. During our absence of six weeks from Constantinople we never suffered a day's real discomfort, and all were full of interest and pleasure ; to any one in search of a new and fascinating experience I can confidently recommend a journey in Anatolia.

THE SNOW MOUNTAINS OF YUNNAN F. Kingdon Ward

Map follows page 272.

I T seems at first sight rather curious that the earlier travellers in western China should have had so little to say about the snow mountains of Yunnan. The reasons however are simple. Travellers as a rule have chosen the summer months for their journeys through so mountainous a country, when the snow peaks are usually veiled. Since at this season on any given route they may be visible only for a day or two at a time, unless one is favoured by fortune, it is easy to pass close to a great range without even suspecting its existence. Thus Gill, crossing the Paima La, south of Atuntze, on 9 September 1877, makes no mention of the snowy range on his right only a few miles distant, though on a fine day the peaks and glaciers are very conspicuous. "As for the rain and fog," he writes, "except for five minutes . . . rain fell and fog enveloped us incessantly the whole day " ('The River of Golden Sand,' vol. 2).

There is another reason. Many of the trade routes in the north-west corner of the province, where the snow ranges are situated, are confined for long distances to the deep river gorges. The high ranges for the most part rise abruptly above the rivers, and only an occasional glimpse of the snow peaks is obtained from below. Unless one is spending some time in the country, therefore, the chance of seeing them is remote; at best one is likely to pass on with only a vague idea of their position, height, and extent. So Cooper, in 1868, when travelling from Atuntze to the Mekong, failed to see Kakarpo, which, during the latter half of the descent, fills the mouth of the Atuntze valley, and again becomes visible for a few minutes only further down the Mekong. Similarly, M. Bacot, who visited Gongkaling (Congkaling on his map) in 1909, departed ignorant of the fine snowy range which must almost overlook the monastery. He remarks that on the day he was there the sky was overcast and rain fell—an event so rare at that season as to cause comment. He was particularly unlucky. Not so long ago, as geological time is reckoned, it must have been quite impossible to traverse Yunnan without seeing snow peaks on every hand. One can picture the remarkable spectacle in the north-west, where glaciers crawled down every range to at least as low as 10,000 feet, and in many cases must have entered the Mekong itself. At that time too the rivers must have flowed at a higher level, and it is possible that glaciers reached the Salween, and the Yangtze also. But the ice has steadily retreated till now the snowy ranges are well defined, the snow peaks isolated.

Even so, and despite the attention paid to Yunnan by recent explorers, little is known of the snow mountains of Yunnan. The heights of the great peaks are mere matters of estimation. No one has ever climbed a snow peak in Yunnan—or in Szechwan either. Their positions on the map, when recognized at all, are often wrong, their extent vague.

The standard map of Yunnan is that by General H. R. Davies. On this map however no snow peaks are marked, though several are referred to in Davies' book, 'Yunnan; the Link between India and China.' The relationships of Yunnan and Szechwan to adjacent regions are well shown on the map of Tibet published by the Survey of India; but the 1919 edition does not credit Yunnan with a single snow peak, its compilers evidently being quite blinded by the glitter of the Himalaya. In vindication, therefore, I am tempted to write these notes—a summary of observations made during journeys undertaken in 1911, 1913–14, and 1921–22—put together in the hope that they may be of use to future explorers and climbers, since western China will certainly attract scientific travellers in larger numbers in the future.

The snow ranges of Yunnan are a prolongation southwards of uplifts which have their origin in Tibet.* They have in the past been regarded as spurs of the Tibetan plateau; a view which, whatever meaning may be attached to the word "spur," is certainly wrong. Some of them at any rate are independent uplifts. These parallel ranges grow lower in the south, and more dissected; so that in Yunnan, the groups of snow peaks are at the ends of well-defined ranges, and are neither so lofty nor so numerous as they are in Tibet itself.

The present snow peaks can hardly be considered apart from the glaciated ranges of which they are the culminating points; and I shall have frequent occasion in the course of this survey to refer to past glaciation. I will begin with the Likiang range, because that is the first snow range likely to be encountered by travellers from the Burma side. Probably it is the most southerly group of snow peaks in Yunnan, though the Tali range, 70 miles to the south, must have been recently glaciated.

The Likiang Range.—The French traveller Gervais-Courtellemont seems to have been the first to notice the Likiang snow peaks, though several travellers must have been in a position to see them, had the conditions been favourable, long before 1898. Following the main road northwards from Tali to Weisi or Likiang, a good view of them is obtained from the head of the Kienchwan valley. An even better view is obtained from the neighbourhood of Yungpeh, in the east, when the whole extent of the southern range is revealed, from the southernmost peak which rises from the head of the Likiang valley, to the gap in the north where the Yangtze cuts its way through.

After the discovery of the great Yangtze loop round Likiang, it was assumed that the snowy range (though not then recognized as such) was responsible for this. The river, so it was asserted, had been turned aside by this obstacle, and forced to flow round its end. Unfortunately for this comfortable theory, the axis of the Likiang range lies north and south, while the Yangtze here flows north-north-east, thus cutting clean across it; the range is in fact continued beyond the Yangtze, which flows through it at the bottom of a profound gorge.

The Likiang range, on Handel-Mazzetti's map published in Vienna in 1919, for the first time receives a definite name—Yülung Shan. He gives the altitude of the main summit (marked "Satseto") as 5900 metres, subsequently reduced to 5815 metres; and in a letter he informs

* I am not here referring to their geological origin. Their underlying axes may run east and west; but the traveller sees them as a series of independent ranges trending north and south.

me that this height was obtained by "photogrammetric construction over Lidjiang (Likiang) 3340 metres." It is unlikely that the highest summit is under 19,000 feet, or that it attains 20,000 feet.*

The Likiang range is crossed at its southern end (at Kan-hai-tzu, "dry lake") by the main road to Chungtien, which after crossing the Yangtze follows its western foot. The main road to Yungning, on the other hand, passes through the centre of the Yangtze loop, following the eastern foot of the range and gradually diverging from it. On the first two days the glacier torrents Pai-shui Ho and He-shui Ho are crossed. From Minying, reached on the fourth day, a road crosses the mountains to Taku, on the Yangtze, whence Chungtien may be reached by a road along the eastern foot of the snows.

The big glacier which feeds the Paishui on the east flank of the range has retreated some miles, and is evidently still in retreat; and the same is true of the other glaciers. The lake at Kan-hai-tzu has virtually disappeared, and so has a lake on the east flank, immediately south of the Paishui. A lake at the head of the Likiang valley has shrunk till it is now little more than a marsh; while the valley or plain of Likiang itself is obviously the bed of a former lake. The level strata of gravel and sand on the floor, containing lacustrine shells, prove that. The Likiang range was marked correctly as a snowy range on the map of Tibet and Adjacent Regions published by the Survey of India in 1914. For some curious reason it was removed from the 1919 edition, yet it is some 40 miles in length. Unlike most of the snow peaks of Yunnan, the Likiang range is composed mainly of limestone.

Kakarpo.—Neither Cooper nor Gill mentions these peaks. M. Roux, whom Prince Henry, when at Tzeku, had sent up to Atuntze, sighted "the three snow peaks of Dokar La, with its fine glaciers, on the right bank of the Mekong, and estimated their height at about 17,875 feet" ('From Tonkin to India,' Prince Henry of Orleans). Davies and Ryder saw two of the peaks from the Dong Gorge just north of Atuntze, and calculated them at 20,000 feet by clinometer observation. Handel-Mazzetti on his map marks them "about 6000 metres." Prof. J. W. Gregory, on the other hand, who saw them only from a considerable distance, estimated the highest peak at 24,000 feet. Considering that the rainfall on Kakarpo is probably much heavier than on Paima Shan, it is quite unlikely that the highest peak exceeds 22,000 feet.

The Kakarpo range extends for about 30 miles from north to south between lats. $28^{\circ} 45'$ and $28^{\circ} 15'$, forming part of the Mekong-Salween

^{*} Writing at a distance from libraries, the author seems to be slightly in error in regard to the earliest accounts of the Likiang snows. In describing his journey of 1895 Bonin already spoke of two peaks covered with perpetual snow and probably exceeding 5000 metres, and was aware that the Yangtze passed between them. Gervais-Courtellemont was not there till 1903, and had been preceded in the same year by Litton, who also spoke of the great snowy range.—ED. $G.\mathcal{F}$.

divide. The range is crossed at its southern end by the Dokar La, and at its northern end by the Chu La, each pass being overshadowed by a snow peak. From above Atuntze six snow peaks are revealed, one of which—the southernmost and highest—is itself a triple peak. This type of peak, a central pyramid flanked by two smaller teeth, is common in Yunnan. The central peaks of the range are almost due west of Atuntze, and are well seen from the high peak west of that village. An even better view is obtained from Paima Shan. Again, some of the peaks are visible from the valley of the Yü Chu, and one at least from Trana, just below Menkung, in the Salween valley. Kakarpo, in fact, is a sacred mountain, and one or other of its half-dozen peaks is in view from almost any point on the circuit followed by the pilgrims.

When crossing the Dokar La I glimpsed the big glacier which discharges a torrent into the Salween at Lakorah. But there appears to be no record of the appearance of these glaciers on the western flank, or of the peaks: doubtless owing to the inaccessible nature of the Salween-Irrawaddy divide.

From the Dokar La it is a simple matter to reach the foot of the southernmost glacier and approach the highest peak. Similarly the most northern peak could be climbed from the Chu La.

M. Bacot, when crossing the Dokar La in 1910, caught sight of the glaciers of Kakarpo. He does not, however, call the mountain by that name, but speaks of a saint named Koa Kerbo, who some centuries ago lived (so it is alleged) amidst the desolate snows; hence the name of the mountain, henceforth sacred ('Dans les Marches Tibetaines,' J. Bacot). But Karpo ("dkar po," ref(i)) means "white" and "Ka" ('k'a p) means "snow," a description attached to many otherwise nameless snow peaks in eastern Tibet; for instance, Kangri Karpo. This therefore seems to be the more simple explanation of the name. Like the Likiang peak, Kakarpo has had its plumes cropped on the new edition of the Indian Survey map, and no longer figures as a snow peak. The range appears to be composed chiefly of granite.

Paima Shan is a snowy range, part of the Mekong-Yangtze divide between lat. 28° 10' and lat. 28° 25'. It does not exceed 15 miles in length, with four or five snow summits. On the west flank there appear to be no glaciers. From those on the east flank rises the Kari river. They all show signs of long-continued retreat, which is still in progress. A good view of the whole range is obtained from the high plateau between the Mienchu La and the Paima La, on the route between Tungkhuling and Atuntze. The view from Kakarpo is more distant and less convincing. Indeed, from this direction they would hardly pass for snow peaks but for the fact that one of the glaciers of Tsaya, the highest peak, is just visible.

There is a difficult pass across the range immediately north of Tsaya,

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THE ICEFALL OF A KAKARPO GLACIER



THE DOUBLE FOOT OF THE DAMYON GLACIER



A GLACIER ON KAKARPO



Glacier source of stream on right: Amoeboid glacier of north face on left: Pass on extreme right

the trail crossing the foot of a glacier. On the right-hand side, *i.e.* north, is a small "dead " glacier (or corrie glacier) facing the valley of Atuntze ; there is no snow peak here, however. There are three distinct glaciers on Tsaya, and two more on Omagu, the next peak to the south. Beyond Omagu are two smaller peaks, each with one glacier. All these discharge into a deep valley which runs from north to south at the western foot of the range; and this stream appears to be the source of the Kari river, the evidence for which is as follows : The Kari river is formed by the confluence of two streams which unite just below the village of Kari. From this point to the Kari pass, whence one of the streams is derived, is just 7 miles; and to the head of the Paima Shan valley, due north 23 miles. From this confluence, however, to the source of the main stream, as shown on Davies' map, is only 14 miles. But this main stream, from the north, is enormously greater than the stream from the Kari pass, and it is inconceivable that, with an identical rainfall, the source of the main stream is only twice as far distant as that of the small tributary descending from the Kari Pass, unless indeed it rises amongst very lofty snow peaks. For the Kari river at this point is still a formidable stream, and it has moreover all the appearance of a glacier torrent.* I may add that Dr. Handel-Mazzetti is quite of the same opinion as to the source of this stream.

The only reasonable alternative is to suppose a group of high snow peaks immediately south and west of Tungkhuling, from which the Kari river rises; and for this there is no evidence. The glacier stream from Paima Shan rises from the glacier on the north face of Tsaya, crossed on the way to the pass over the range. It flows at first northwards, then east round the shoulder of the pyramid, leaving a glacier lake at the angle where it turns; though most of the water does not flow through the lake now. While flowing east it receives the drainage of the big "amœboid" glacier on the north-east face. Finally it turns south. Streams from the limestone range east of Paima Shan flow west or southwest to join the main stream. Photographs of this mountain were published in the Geographical Journal (48, 56, July 1916, and 56, 188, September 1920). Gill writes that the Chinese name Paima Shan, or Paina Shan, is probably an attempted translation or transliteration of an old Tibetan name-a conclusion not supported by modern Tibetan nomenclature, at any rate. He adds that the present Tibetan name is N'geu-La-ka (surely it ought to be N'geu ka La ?), or the mountain of Atuntze (' River of Golden Sand,' vol. 2, p. 239).

The entire Mekong–Yangtze divide is intensely glaciated, but these appear to be the only surviving snow peaks between Yakalo in the north and Weisiting in the south, though there are several "dead" glaciers north-east of Atuntze.

^{* &#}x27;From Kari we followed the stream . . . to its junction with Chin-chu [Kari river], a beautiful clear river 16 to 20 yards wide, coming from the west, and flowing rapidly through a pretty valley " ('The River of Golden Sand,' vol. 2, p. 253)

Paima Shan has never been recognized or marked as a snow peak on any map with which I am acquainted. The range seems to be composed entirely of porphyry.

Damyon is a hump of porphyry, composed indeed of the same rock as Tsaya, situated on the same range as Kakarpo, but separated from the northern Kakarpo peak by 40 miles of mountains amongst which no snow peaks are visible. There are, however, in this gap numerous "dead" glaciers, one of which is shown. A photograph of the peak was published in the *Geographical Journal* (62, 7, July 1923).

The Damyon group is well seen from any of the passes above Yakalo, which lead from the Mekong to the Chiang Ka river, namely, from north to south, Lhong La, Bi La, and Kia La. I crossed the Lhong La in 1911, and caught sight of Damyon, then known to me under the name Ta-miu ('Land of the Blue Poppy'). Bailey, crossing the Kia La in the same year, did not see them, as they were then buried in cloud; but when I crossed the Kia La and subsequently the Bi La in September 1922, I had a perfect view. There are only two snow peaks, connected by a saddle, the southern one being the higher. Damyon has two glaciers on its south-east face, uniting below and discharging into one valley. This stream, after receiving a contribution from the Pitu La, enters the Mekong below Legong.

The glaciers of Damyon were formerly far more extensive. The existing glacier extended many miles down the main valley, which it now scarcely reaches; and from every side valley a glacier entered the main ice stream. The Pitu La also was glaciated, and so too was the Kia La on the opposite side of the Mekong, on neither of which does so much as a "dead" glacier remain to tell the story.

The Damyon peak is most easily approached from Legong by following the torrent northwards up the valley. Mules can be taken almost to the foot of the glacier, but not beyond the head of the valley. The trail leads nowhere, save by a difficult path back to the Mekong. It was formerly a pilgrim route round Damyon—though as a matter of fact it impinged on, but did not make the circuit of, that mountain.

The Pitu La crosses the Damyon range at its southern end. Northwards there seems to be no way across until the Ghotu La is reached; the explorer A—K crossed the Ghotu La from Sambaduka, and his information is all there is from this part. The name Damyon is neither Tibetan nor Chinese. Probably it is of Moso origin. On some maps the range is marked Kha kar po; but this is incorrect. The height of Damyon is probably about the same as that of Paima Shan—in the neighbourhood of 20,000 feet.

Gangkaling.—Strictly speaking, the Gangkaling range is in Szechwan, not in Yunnan, though close to the provincial boundary. However, it is convenient to consider it here. The Gangkaling range comprises three needle peaks, each between 19,000 and 20,000 feet high. Their position I was able to fix with fair accuracy from two peaks on the Yungning plain, observations to which had already been taken from a measured base on the plain. The peaks may also be seen from the pass at the southern end of the Yungning lake, on the road to Yungpeh, and from the cliffs above Muli. A distant view of them is also obtained from the plateau above the Litang river, to the east. The range rises west of the Sholo river, one branch of which appears to rise from the snowy peaks.

Davies glimpsed the Gangkaling peaks when marching from Kulu to Muli, but says nothing more about them. Bacot visited Gangka Ling monastery in 1909—apparently the first and last European to do so. He does not mention any snow peaks, though he must have been very close to them; but he writes: "Il pleut, malgré la saison qui devrait être sèche. La pluie en Octobre est dans ce pays aussi singulière que le serait la neige au mois de juin en France" ('Le Tibet Revolté,' by J. Bacot).

The range is called Gangkaling (**ACN**, "the snowy place"), after the monastery of that name at its foot. The names of the three peaks are said to be Gangka, Nyapo, and Soni.

The 1919 edition of the Indian Survey's map of Tibet, which is as prolific in snow peaks for Szechwan as it is niggardly towards Yunnan, marks a big range some 50 miles long here, height 19,000 feet. The altitude is about right, but the range is not so extensive as shown.

Gompa La.—Of all the snow peaks in Yunnan this is the least known. It has been seen by few travellers and crossed by still fewer. No one has ever explored or climbed it. However, it is shown on Handel-Mazzetti's map of his travels in Yunnan, which is excellent as far as it goes.

The Gompa La (5 for grav, "monastery mountain") is on the Salween-Irrawaddy divide just above the village of Tramutang (Chamutong) on the Salween, in about lat. 28° 2′. Its name is derived from the monastery of Tramutang. It is visible from several passes over the Mekong-Salween divide, notably the Londre La (a pass immediately south of the Dokar La), the Nyiserrigo, above Bahang, and from a low internal pass above Kieunaton. Indeed, it is visible from the Salween valley itself at Tramutang—a striking tribute to the difference between the Mekong and Salween valleys.

Gompa La appears to have escaped even the eagle eyes of the Indian surveyors, working from the Irrawaddy side, though from that direction the mountain is probably far less imposing to look at. Undoubtedly the Salween-Irrawaddy divide is invisible the greater part of the year. If a glimpse of it is obtained between January and June, it is almost impossible to discern which are snow peaks and which are not. I have, however, on three occasions seen it in October and November from three different places, and am thus able to give a definite description of it, as seen from the east. There is, to begin with, only one snow peak, which sends down three glaciers towards the Salween. Two of these join up below, and discharge into the main valley over a cliff. The third follows an independent course, but discharges into the same valley lower down. There appears to be a fourth glacier flowing north; but it is in any case much smaller than the other three. On the south-west face is a single small hanging glacier, high up in a couloir.

Dr. Handel-Mazzetti, who crossed the Gompa La in the summer of 1916, writes to me that he saw no glacier on the Gompa La, and only a very small one on a peak he calls Schatsakon, a few miles to the south. But this statement is not borne out by his own map, which shows a large glacier on the Gompa La, and the veriest remnant of one on Schatsakon. The existence of this latter is doubtful, as the whole range was visible day after day in October, and I saw no trace of it.

The height of the Gompa La can only be assumed from the height of the pass. The peak rises in an almost sheer cliff above the pass to a height of perhaps 3000 feet, giving a total height for the mountain of about 17,000 feet. The glaciers once extended much further down the valley. The Gompa La, like Tsaya and Damyon, is built up chiefly of porphyry, which rests on limestone.

Other Snow Peaks.—There is a snow peak on the Mekong–Salween divide south of the Si La, in about lats. $27^{\circ} 30'-27^{\circ} 45'$. Looking south from the mountain above Atuntze, it is quite a conspicuous object, owing to a big snowfield on the east flank.

I know of no other snow peaks on this range; but Dr. Handel-Mazzetti informs me there are several "dead" glaciers south of the Dokar La. The same authority denies the existence of my snow peak in lat. 27° 40', so that I can only leave the disagreement to the next traveller to unravel.

Between the Chu La and the Pitu La I counted five "dead" glaciers, but saw no snow peaks between the northernmost Kakarpo peak and Damyon.

Going much further east, from above Muli I observed a snow peak in the east, probably within the loop of the Yalung river, just as the Likiang range is situated in the loop of the Yangtse, and Namcha Barwa in the loop of the Tsangpo.

The range of snow peaks seen from the Pitu La, on the west bank of the Yü chu, is of course in Tibet proper, and forms part of the watershed between the Salween and Yü rivers. I counted eight glaciers on the eastern face of the range, all discharging into the Yü river.

It is possible that Orpor, a twin snow peak visible from the Chu La, is on this same range, further south; but Orpor is certainly not visible from the Pitu La.

Here, however, we are overstepping the boundaries of Yunnan. I

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wish merely to emphasize the fact that, up to a point, the further one travels north-westwards the more snow peaks one meets with, and the more obviously they are gathered into great ranges. This is due in part to their greater altitude, and in part to increasing precipitation. After a certain distance, however, the drier regions behind the rain screen of the Himalaya are reached, and snow peaks probably become scarcer again. The greatest concentration would seem to lie in the almost unexplored region lying in lat. $28^{\circ}-30^{\circ}$ and long. $96^{\circ}-98^{\circ}$.

There are, however, many fine snow peaks in the almost equally unknown Tibetan Marches, and I may fitly close this brief survey with a note on what I believe to be the highest peak in these parts. This was a snow pyramid seen from Paima Shan in a north-easterly direction, some distance away, across the Yangtze, in Szechwan. Judging by its apparent height at that distance, it must have been even more lofty than Kakarpo.

NOTES ON THE VEGETATION OF BURMA L. Dudley Stamp, B.A., D.Sc., Professor of Geography in the University of Rangoon, Burma

Map following page 272.

THE following brief notes are published to enable geographers to correct the extraordinarily erroneous ideas which are contained in "vegetation maps" of Burma published in atlases and elsewhere. Some of the latter seem to be founded on suppositions (e.g. that tropical forest fringes the coasts and runs up the main valleys—which it does not); others on the idea that all forests are gazetted Government reserves, and that the remainder of the country is covered with grassland or scrub. Further, the vegetation has an extremely important significance in the economic development of the one of the least developed provinces of the Indian Empire. In value timber has long held third place amongst Burma's products, yet hitherto one timber alone—teak—out of the multitude of valuable species has been seriously exploited.

These notes are based mainly on the author's own observations during the greater part of three years' travels in all parts of Burma. The details of the investigations are published or are in course of publication elsewhere.*

The Factors governing the Distribution of Vegetation.

Taking Burma as a whole, two factors are of paramount importance in determining variation in vegetation. These two factors are climate

^{*} Stamp and Lord, "The Ecology of Part of the Riverine Tract of Burma," Journal of Ecology, vol. 11, Sept. 1923, pp. 129–159; Jour. Asiatic Soc. Bengal, N.S., vol. 20, 1924; Stamp, 'The Vegetation of Burma' (in the press).

Map to illustrate the paper by F. KINGDON WARD ON THE SNOW MOUNTAINS OF YUNNAN



Published by the Royal Geographical Society

YUNNAN. Kingdon Ward.









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