A JOURNEY FROM YÜN-NAN TO ASSAM.

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THE idea of investigating the country which lies between the empires of India and China south of the Tibetan frontier is one which has long had a special attraction for geographers and travellers, both on account of the possibility of opening up a trade route between the two countries, and more especially because of the comparatively unknown nature of the intervening district; and it is with the object of communicating some information collected by the writer during a recent journey from Yün-nan to Assam that this paper has been written.

It was in the autumn of last year (1905) that, being fortunate enough to obtain leave for six months, I decided to carry into execution a long-cherished design of undertaking the journey I am about to describe. I decided, firstly, to take only two companions, Chinese servants of mine, who had been in my employ for some years, and upon whom I knew I could thoroughly rely; and, secondly, to live almost entirely on the produce of the country I was to travel through, taking only a small reserve of tinned stores for use in emergencies. The two servants were natives of Chih-li province, and it is not too much to say that but for their fidelity and pluck the journey could not have been accomplished. Our equipment and stores, etc., were limited to some five hundredweight of baggage, including a fairly complete outfit

* Map, p. 236.
of surveying instruments, and, thanks to the care with which this kit had been selected, it proved almost perfect in every respect.

On October 1, 1905, we set out from Tientsin (North China), and after travelling by sea to Haifong, passed through Tongking by rail and steamer as far as Lao-kai, on the southern frontier of Yun-nan, from which place till we reached India some five months later the whole of the journey was accomplished on foot.

Leaving Lao-kai on October 24, we travelled through the picturesque and mountainous basin of the river Nan-hai, following the line of the new French railway as far as the treaty port of Meng-tzu Hsien, from which place survey operations were commenced. We left Meng-tzu Hsien on November 1, and travelled through Lin-an Fu to Shih-p'ing Chou, passing through an undulating country with low rounded hills, which are covered with long grass and sprinkled with saplings and small trees, and with innumerable limestone boulders, whilst the valleys are populous and cultivated. The villages are solidly built, the houses being chiefly of a sort of rough concrete of earth and pebbles, rammed tightly so as to form solid walls about 2 feet thick. From Shih-p'ing Chou we turned northwards, and, after a march of about 20 miles, ascended a steep pine-clad ridge, at the top of which we found ourselves in a rolling upland country some 6000 feet above sea-level, partially cultivated, and with numerous pine woods and occasional villages. Here we encountered a distinct type of native belonging to the aboriginal tribe of I-jen. They speak a language of their own as well as Chinese, and are a peaceful and well-behaved people hereabouts, and subject to the Chinese Government. The men differ but little from Chinese in appearance, but their features are heavier and less intelligent. The women, however, are pleasant-looking people, with aquiline features, and their free independent bearing is in striking contrast with the timid manners and hobbling gait of the Chinese lady. They wear a spotted blue cloth over the head, and have petticoats of dark-blue cotton; they also wear many silver ornaments, large earrings, and necklaces, etc. Leaving the I-jen villages, our route continued northwards through a hilly wooded country, with numerous pine trees as well as crab apple, wild pear, hips and haws, and berries of different sorts. Passing through the walled city of Hsin-hsing Chou, which lies in a broad cultivated valley, we reached the village of Hsin-kai, from which point we turned to the westward.

The trend of the mountain system of this part of Yun-nan is, generally speaking, north and south, so that the traveller whose course is in an east-and-west direction runs counter to the ranges, and experiences a continual series of ups and downs, as when crossing the ridge and furrow of a ploughed field. From Hsin-kai we traversed a comparatively little-used path through a picturesque woodland district, till, after passing a village called Yang-hsing-chuang, we ascended
what appeared to be quite a low range of hills, and were surprised to
find, on reaching the crest, that we were looking down over a great
expanse of steep mountain-side which was chiefly covered in brush-
wood. Far below there was a long cultivated valley running north
and south, in which lay the town of Yi-mên Hsien, on the further
side of which a lofty range of mountains blocked the horizon to west-
wards. It was our first ridge and furrow.

We made a day's halt at Yi-mên Hsien, a small walled town of about
2000 inhabitants, and then tackled the next ridge which lay to west-
ward. On leaving Yi-mên Hsien the road ascends almost immediately,
and within a few miles climbs by a series of ridges to a height of some
7800 feet. From this height a fine panorama of mountain scenery was
obtained. The mountains are flat topped, and the slopes are sufficiently
gentle to admit of cultivation, and they presented a patchwork of fields
which bore evidence of an industrious population. A few miles along
the mountain-tops brought us to the edge of a gloomy rugged ravine
between steep and lofty hills, at the foot of which a turbid stream of
dark brown water tore its way down a shaly slope at an inclination of
about 15 degrees towards San-chia-ch'ang, a small village of flat-
topped, brown-walled houses, nestling at the foot of a bustling cliff.
Here we saw copper smelting works of a primitive type, and the hori-
zontal burrows into the side of the cliff from which the ore is extracted.
Beyond San-chia-ch'ang we encountered a series of steep and often
lofty hills, over which the path ascended and descended with monotonous
regularity. The path was practically deserted, and the few people we
saw appeared sickly and poverty striken. Many of them were stunted
and deformed, and we saw numerous cases of goitre and enlarged spleen,
as well as what appeared to be "berri-berri." In this rugged country
cultivation was scantier and was chiefly confined to the valleys, the hills
being either pine clad or covered with coarse grass. It was the end of
the harvest season, and threshing was going on. Sometimes this is done
with flails, and sometimes by striking the paddy over the edge of a large
circular sacer-shaped basket, so that the grain falls into the basket
while the straw remains in the thrasher's hands.

As we journeyed west the mountains increased in height, cultivation
was less frequent, and the country more thickly wooded, until we
reached Nan-an Chou, from which point, turning northwards again, we
passed through a few miles of undulating pine-clad uplands, descending
into the valley of Ch'hu-hsiung Fu, where we halted.

The route from Ch'hu-hsiung Fu to Ta-li Fu is so well known that I
need not attempt any description of it here. The road was good—as
Chinese roads go—the weather perfect, and the scenery picturesque and
striking, and we enjoyed a rapid and interesting march of six days
between the two towns, arriving at Ta-li Fu on November 25. At
Ta-li Fu we halted for a week, in order to make our final preparations
for the advance into the unknown regions of the Salwin river. Mules were now discarded, and loads were made up suitably for coolie transport; dollars, which had hitherto been our currency, were now melted down and turned into the small conical lumps of silver which are known as "sycee;" fur clothing was purchased, and also a supply of local provisions—hams, tea, sugar, etc.—which, together with our tinned European stores, were estimated to last us for about a month. Whilst at Ta-li Fu I received a letter from the British consul at T'eng-yüeh T'ing, the late Mr. Litton, warning me of the disturbed state of the tribes on the upper Mekong and in the neighbourhood of Wei-hsi T'ing, where a Tibetan raid had recently taken place, during which four

French priests had been murdered, and the mission stations destroyed, whilst the repressive measures of the Chinese authorities had only served to aggravate the state of affairs.

We left Ta-li Fu on December 3, and proceeded northwards over a stone-paved road along the west side of the Erh Hai to Shang-kuan—the upper customs barrier on the approaches to Ta-li Fu—and then on to T'eng-ch'uan Chou, which lies at the head of the lake. From T'eng-ch'uan Chou we turned west, and ascended a pass in the lofty range of mountains at the foot of which Ta-li Fu lies. From the top of the pass we looked down into a long slanting valley, with the town of Fêng-yü below us. The hillside was so steep that the
valley appeared as though seen from a balloon. It was closely cultivated, and the little banks which edge the fields and serve to regulate the irrigation water looked like the squares of a chessboard. A stream wound in a silver streak from south to north, peasants were working in the fields, and numerous villages were visible; but the height from which we viewed it precluded the sounds of rural life, and the scene was a silent one. Descending into the valley, we rested at Feng-yü, and from there ascended the Lo-pin Shan, a mountain of 10,100 feet, whose summit is said to be the abode of evil spirits, who, however, have a virtuous objection to bad language and noise, so that travellers must be careful what they say when crossing the pass, lest the spirits should send fogs or storms or other visitations to punish them! A similar belief is common in other parts of Yün-nan, and I shall have to record the existence of kindred superstitions which we observed at a later stage of the journey.

From the summit of the Lo-pin Shan, looking westwards, we saw ranges of thickly wooded mountains running north and south stretching to the horizon, but were relieved at the absence of any snow-clad heights in front of us, though behind us, to eastwards, the summit of the Tal-li Fu range was powdered with snow, whilst to north some glittering snow-clad peaks near Li-chiang Fu were plainly visible. Descending the pass, we now followed the course of a tributary of the Yang-pi Ho, and entered a thickly wooded but sparsely populated country, where for two days we marched through beautiful autumn-tinted forests of oak and walnut and fir trees. Occasionally we met caravans of mules and bullocks carrying firewood or salt, the latter commodity being in small cylindrical cakes about the size and shape of a pint-pot, but with Chinese characters moulded on the top. The foot-passengers we encountered were said to be Lolos, and were almost always goitrous and dirty. Generally they wore a skin over their shoulders, with the fur outside, and their legs were encased in ragged knickers or drawers, with cotton putties wound loosely round the lower part of the leg. Their unkempt locks were bundled away under a scanty turban or puggri. The women we passed were dressed so much like the men that we had difficulty in distinguishing them, except by the jade earrings they wore, and by the fact that they were cleaner and of more pleasant features than the men. The few houses we saw were log cabins built of unshaped pine logs, and roofed either with pine shingles or thatch. As we continued our way westward the average height of the mountains increased, though the Lo-Pin Shan was still the highest point we had crossed. We reached Yüng-lung Chou on December 9, and after a day's halt proceeded to Fei-lung-ch'iao, on the Mekong, from which point survey operations, which had been discontinued since Ch'u-hsiung Fu, were recommenced.

At Fei-lung-ch'iao I was, unfortunately, not able to take a cross-
section of the Mekong, but I observed that it was 235 feet wide at the bridge, and a sounding taken from the bridge in mid-stream gave 25 feet as the depth at that point. The water was clear and of blueish-grey colour; the current was strong, and rocks and rapids above and below the bridge rendered navigation impracticable. The famous suspension bridge is a single span bridge of 235 feet clear span, with a plank roadway 8 feet 3 inches wide, supported by twelve chains of 1-inch iron. Two similar chains form the top of the handrails, which are of wood. The chains are in groups of three, there being three double chains on each side. The height of the roadway above the water-level at that time was 44 feet at either end, and 37 feet in the centre.

From Fei-lung-ch'iao we ascended the right bank of the Mekong for a few miles, and then ascended the lofty range which divides it from the Salwin, which at this point is a continuous barrier rising to a height of well over 10,000 feet; its slopes are steep, but not precipitous, and are covered with pine woods. On reaching the summit of the pass we found a small post of three Chinese soldiers, from whom we learnt that the pass is open practically all the year round, as there is never very heavy snow on it. The midday temperature at that date (December 12) was 39° Fahr., and a high wind was blowing from the west. This is the pass by which Prince Henry of Orleans crossed in 1895. On the eastern side of the range the slope up from the Mekong
is a direct one, the river flowing past the foot of the main range; to westward, however, one looks out over an expanse of partially wooded mountains, the general trend of which is north and south, though at this point a stream flowing in a narrow valley cuts its way through them at right angles. The Salwin is not visible at this point, and indeed is three marches distant. The route passes through this valley, and we followed it to Lu-kou, on the left bank of the Salwin. The population of the Salwin valley in this neighbourhood is chiefly Liso, but there are also a few Minchias and Lolos near Lu-kou, as well as some Chinese or Han-jen. These different races are under t’ussu government as far north as Hcia-ku-ti (lat. 26° 16’), beyond which place there are independent tribes, possibly of Tibetan origin, who refuse allegiance to any government; these I shall have to deal with later.

The t’ussu or chiefs are of Chinese birth, and the office is an hereditary one, having originally been conferred on the family by the Chinese Government for services rendered in war time. The t’ussu rule is patriarchal, and considerable latitude is allowed them; but that the Chinese authorities retain a strong hold over the chiefs is evidenced by the fact that at the time we were at Lu-kou, the t’ussu of that place was absent in gaol, where he was just completing a term of ten years’ imprisonment, which had been imposed on him by the Chinese Government for having taken the life of one of his own subjects with his own hand. A young relative was in charge of the yamen at the time; but the convict chief was released shortly afterwards, and received a hearty welcome home from the members of the clan.

The Liso, who are the predominant race hereabouts, have a distinct language, which, as far as I could discover, is not written. They are of slight build, with light-brown skin and aquiline features resembling the Red Indian type. Some of the younger men and women are distinctly pleasant featured, and are often graceful in figure and carriage. The men wear a short coat and loose knickers of blue cotton, and short loose putties which are wound round the lower part of the calf and ankle; instead of putties, gaiters of coarse hempen cloth are often worn. The men shave their foreheads at long intervals, and wear a short, unkempt pigtail, which is usually tucked up under the small puggri which both sexes wear. Every man and boy is armed, and they rarely travel beyond the limits of their villages without weapons. These are a crossbow, with which poisoned arrows are used: a long, straight, two-edged sword; and usually a small dagger or clasp-knife. The women wear a long tunic and trousers of blue cotton, with often a broad horizontal band of red, white, and black round the sleeve at the elbow. They also wear shells, such as earrings and necklaces; wealthy men also often wear a silver earring in one ear.
Their houses are built of wood, and are either thatched with grass or pine shingles, or else roofed with large flexible mats of split bamboo, which are 6 or 7 feet wide, and long enough to reach from the eaves on one side to those on the other, so that two or three are sufficient to roof the whole house. The floor is of planks roughly shaped with an axe, and is raised some 4 to 5 feet above the ground on posts, the space underneath being fenced in and used as a cattle-shed or pig-stye. In this mountainous region villages are often built on a steep slope, the space under the floor then being triangular in section, one edge of the floor almost touching the ground, whilst the other is 5 or 6 feet above it. In the centre of the floor there is a square hearth of mud, plaster, or stone let into a wooden frame, and on this the fire is kindled, the smoke finding its way out as best it may. The walls are of pine logs or else of bamboo matting, there are no windows, and the door is a rough construction of planks tied on with cane. No metal is used in the construction of the houses. The furniture consists of a few wooden blocks, or sometimes bamboo stools, for squatting on round the fire; a bed made of loose planks supported by a couple of logs; and occasionally a few roughly made cabinets or boxes entirely of wood, in which food is stored. Their utensils are an iron bowl or copper pot—the latter imported from T'eng-yueh-ting and Yung-ch'ang Fu—and an iron tripod.
Pitchers of bamboo are used for drawing water and for storing honey and rice, etc. The Lisos are hunters, but the country has been largely denuded of game, and they live chiefly by agriculture. They have cows and pigs and goats, and, very rarely, a few ponies are also to be seen. In character the Lisos are reported to be fierce and warlike, but though this is true when they are in their own territory and in strong numbers, my experience is that they are timid and nervous among strange surroundings, and lacking in what we call pluck. On the other hand, they are courteous and hospitable, and have something of the Chinese respect for rank and authority.

During our passage through the Liso country, we noticed a considerable trade in a species of herb, called Lu-tze by the natives, which grows in the patches of jungle found low down in the valleys. The plant is a creeper, and grows on the trunks of large trees much like ivy does; its stem is thick and strong, and its leaves, which grow thickly all the way up the stem, are pear-shaped, and resemble the leaf which the natives of India use for wrapping betel-nut in (called "pan"). It has no fruit except a sort of bulbous pod, half berry and half leaf, which constitutes the valuable part of the plant. This usually grows high up on the trees, which the Lisos climb by driving wooden pegs into the trunk at intervals so as to form foot-rests. The herb has a pungent aromatic taste like a mixture of ginger and orange-peel, and is highly esteemed as a stomachic. As already stated, there is quite a large trade in this article, and we met Chinese merchants who were buying all they could get hold of. It sells from ten to twelve taels (3d. or 4d.) per pound.

At Lu-kou I took careful measurements of the Salwin, and found it to be of the dimensions shown in the cross-section (see map) which gives an approximate discharge of 23,000 cubic feet per second. The water was clear and of a beautiful blue-green colour; the banks are strewn with huge boulders, chiefly of granite, and there are occasional strips of silver-grey sand, evidently of granitic formation; the bed of the river is rocky, and there are frequent rapids. The river is evidently liable to a great rise at certain seasons, as its banks showed a water-mark fully 15 feet above water-level, and grass and sticks and other débris were hanging in the branches of trees on the banks high above our heads.

From Lu-kou there are two river-routes, one on either bank. That on the left bank had been followed by Prince Henry of Orleans during his brief excursion to the Salwin in 1895, whilst that on the right bank was said to have been used by Mr. Litton, of the extent of whose explorations in this district I have not yet seen any account. I chose the right bank, and started from Lu-kou on December 16. The Salwin valley has long been notorious for the extraordinarily precipitous and rugged character of its mountains and for its deadly climate. The bed of
the river, as is well known, lies at an extremely low level relatively to the surrounding country, and I found that at a point a few miles north of Lu-kou it was only about 3000 feet. The mountains on either side rise to heights varying from 10,000 to perhaps 15,000 feet, and their slopes are extraordinarily steep and precipitous. At rare intervals there are small patches of flat land in the folds at the foot of the slopes, but, generally speaking, the slopes descend straight to the water's edge, except where they are sheered off as it were into vertical cliffs of rock. Even to walk on these slopes without artificial means of support is often extremely difficult, and the only means of communication are narrow footpaths which wind up and down and in and out of the deeply indented hillsides. These paths are usually high above the river, but sometimes they descend into its bed, when the unfortunate traveller has to drag himself over immense boulders, and rocks of all sizes from a few tens to several thousands of cubic feet, and where he must sometimes crawl along the face of a vertical cliff literally hanging on by fingers and toes, or has sometimes to climb a precipitous wall of rock, where loads, etc., have to be raised or lowered by ropes; or, again, has to cross a steep smooth slope of bare rock where a slip would send him to certain destruction in the boiling torrent below. The hillsides are chiefly covered with grass or brushwood, having been largely denuded of forest, but numerous patches remain, and one encounters widely different types of vegetation as one ascends the mountains, the lower levels presenting all the features of semi-tropical jungles, whilst pine and oak and other hardy trees are found on the upper slopes.
The deadly character which the Chinese attribute to the climate of the Salwin valley is well known, and many travellers have alluded to the superstitions that this has given rise to, notably Mr. Colborne Baber, who gives a striking account of the Salwin valley in his 'Notes on the Route of Mr. Grosevenor's Mission,' where he says, "we then discovered the strange fact that this valley is uninhabitable during the summer months on account of the malaria, the natives retiring as soon as the fields are planted, and returning to reap them in the autumn." This must apply to the particular district he travelled in (lat. 26° 0'), as, in spite of repeated inquiries, I failed to find any local belief in these deadly attributes, whilst there was no evidence of any abnormal sickness or mortality in this region. Our visit was made during the winter season when the weather was cool and pleasant as a rule, the mean day temperature during the five weeks we spent there averaging only 51° Fahr. The temperature, of course, varied considerably with the altitude, and the natives admitted that the low-lying villages suffered much from malaria, probably on account of the stagnation of air in the deep land-locked valleys, and the semi-tropical vegetation found there; similar statements, however, had been made to us at many places in Yunnan, and quinine was always in great demand.

The rugged and mountainous character of this part of the Salwin valley, and the evil reputation its climate has been said to possess, are not suggestive of a populous region, yet one of its striking features is the comparative density of the population which finds a living there. Almost every valley contains one or more villages, and the hillsides, steep though they be, are dotted with villages, which are built at all elevations right up to the snow-line, on the tops of spurs, or wherever the formation affords a sufficiently gentle slope to admit of buildings being erected and land cultivated. These villages are practically self-contained, and there is little or no trade between them. There are no markets and no shops, every family providing for its own wants by the labours of its members. The soil is a fertile one, but, owing to the steepness of the land, only limited areas are brought under cultivation. Some rice is grown in the Liso country, but this grain is almost unprocurable further north. No cotton is grown, cotton goods being imported from Téng-yüeh Ting and Yung-ch’ang Fu, but a coarse undyed hempen cloth is manufactured locally by the women.

Travelling northwards from Lu-kou, the difficulties of the route continually increased, and our rate of advance was proportionately slow, a whole day’s hard work often resulting in a net advance of only 4 or 5 miles. It was not many days before it became impossible even for unladen animals to accompany us, and I had to dispose of the two donkeys, whilst the number of coolies was increased to fourteen in order to lighten individual loads. On our way north we passed through Cheng-ka, recently the scene of tribal warfare.
A little beyond Tsao-ku-ti we left the Li-so country and entered that of the independent tribes, who at this point are called Ulu Lamas. The change of type was sudden and complete, the dividing-line between the territory of the two tribes being a steep and lofty spur from the main range. The Ulu Lamas are a tribe possibly of Tibetan origin, as the name Lama implies, Lama Ti (i.e. the ground or territory of the Lamas) being the Chinese name for Tibet; they inhabit the Salwin valley north of lat. 26° 19', and are quite independent. They have no form of government, not even village headmen or chiefs. They are lawless and treacherous, and it would seem that life is held but cheaply among them; we were frequently shown the ruins of a house or hamlet and informed that the former occupants had been slain in some quarrel. They are armed in the same way as the Lisos, and, like them, are particular to carry their weapons wherever they go. In appearance
they are quite distinct from the Lisos. They are short but sturdily built, and their features are heavy and brutal in appearance; they are excessively dirty, their skin being coated with grime, and their whole appearance being suggestive of an absolute ignorance of the cleansing power of water. They wear their hair long, in shaggy locks, with a miniature queue which is usually hidden under a skull cap or turban. They told us that they shave the forehead in Chinese fashion once a year, an operation which they described as a very painful one. The men's dress consists of short knickers and a long gown or tunic of homespun hempen cloth, usually in a ragged condition. Their heads, as already mentioned, are covered with either a turban or a close-fitting skull cap, and they wear a band of split cane round the leg just below the knee. The women wear petticoats and a short coat, and are fond of wearing bead necklaces, silver earrings, etc. Clothing is scarce and in great request; we were continually pestered with requests for presents of clothes. The tribe supports itself by hunting and agriculture, but the latter is carried on in the most haphazard and wasteful fashion. There is but little rice grown, and the staple diet is Indian corn. Their language appears to be closely akin to the Lisos, but is not identical. They have no written language, but transmit messages, etc., by notations on a piece of wood. They are inhospitable to strangers, very few of whom ever enter their country, and they have a deeply rooted objection to work. The women do all the household work, besides drawing water and bringing in firewood, etc. Their country contains iron and silver, both of which we saw being worked, and we heard rumours of gold. In common with the Lisos, they bury their dead, and have an aversion to either burning or dismembering the corpse. They bury them in their gardens or anywhere adjoining their houses, the grave being marked by a wooden frame, from which are suspended the weapons of the deceased in the case of a man, or a cooking-pot and "housewife" in the case of a woman. They also make offerings of food and clothing, etc., to the dead.

It was on December 23 that we entered the territory of these wild people, and a week later, after a series of severe and toilsome marches over the rock-strewn banks of the Salwin, we reached Lanchia-ti, in lat. 26° 29' N., where we were obliged to halt in order to collect supplies. My transport at this time consisted of fourteen coolies, eight of whom were Lisos. The latter had shown evident signs of panic ever since leaving their own country, and on halting at Lanchia-ti they took the opportunity to desert in a body by night, leaving us with only six Chinese coolies to carry fourteen loads. The attitude of the Ulu Lamas had so far been outwardly friendly, if not over-civil. It was a festive season, December 27 being their New Year's Day, and they were celebrating the occasion with feasting and much drinking. They brought small presents to me, such as a lump of salt, a couple of
eggs, or a slice of pork—things of little value, but significant of good will. As soon, however, as they found we were left stranded by our coolies their attitude changed; they refused to supply either food or transport, in spite of liberal offers of silver, and they showed by their manner that they quite understood the fix we were in. After abandoning everything we could spare, we made several attempts over the most trying country to cross into the Irawadi basin. To my intense chagrin we were forced to return to the Salwin by the cowardice of the coolies, who absolutely refused to go on. We now returned still further south to Lu-ch'ang, from which place there is a regular trade route across a comparatively low pass, which is open practically all the year round. Here we crossed without difficulty, the snow being only knee-deep, and on January 21 we entered the basin of the Irawadi.

The change, both in the physical characteristics of the country and the type of its inhabitants, is most striking: on the eastern side of the pass one is in China, on the west one finds one's self in what may be described as an extension of Burma, and when the question of frontier delimitation has to be decided in this locality, there is no doubt that the mountains of the Salwin-Irawadi divide ought to be accepted as the political, as they are the geographical and ethnological, boundary of China.

Our route from the Lu-ch'ang pass entered the valley of the Hsiao Chiang (small river), as the Chinese call the small river which is marked on the map as the Ngaw-chang Hka, and we found ourselves in a country which, though mountainous, was obviously of a much lower average level than the district we had just left. No flat land was visible, the mountains seemed jumbled in picturesque confusion, and were covered in heavy jungle, in which bamboos, and plantains, and orchids, and other of the smaller forms of tropical vegetation mingled with gigantic trees of different kinds, whilst monkeys and parrots and other of the tropical fauna were frequently met with. Behind us the snow-clad range we had just crossed stood up like an enormous wall, shutting out the eastern horizon and towering above the less-imposing heights we were now in the midst of. The Lu-ch'ang pass is the outlet of a recognized trade route between Lu-kou and T'eng-yüeh T'ing, and we were informed that Mr. Litton had more than once travelled this way. The T'eng-yüeh T'ing road turns south from a point a little beyond Tawng-gaw, west of which the communications are—except in the immediate vicinity of the villages—mere tracks through the jungle. Travelling due west, we followed the course of the Hsiao Chiang for several days, crossing it more than once by the ingenious bridges in use here. These bridges are much superior to the single-rope bridges of the Salwin; they are made of canes and creepers—one rope forming the footway, and two others the handrails, with a network of smaller canes connecting them.

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The inhabitants of the region we now passed through are of two distinct types, called by the Chinese Tsa-shan-jên and Langsu-jên respectively. The former inhabit the head of the valley of the Hsiao Chiang, and at this point are said to be under the government of the T'usun of Tengan on the Salwin, though it was admitted that the government was more in name than in fact. They have a distinct language or dialect of their own, but many of them speak Chinese. Their appearance is ugly, dirty, and forbidding, and they are classed by the Chinese as Yi-jên, or wild men. They dress much like the Lisos, with knickers, cloth gaiters, and shell-embroidered shoulder-belt and satchel, but do not use the crossbow, being armed with the Burmese "dha," or short sword, or occasionally with a spear. They neither shave the head nor wear the queue, but tie their hair into a loose top-knot which is bound round with a puggri. The men pierce the lobe of the ear and insert bamboo tubes, etc.; whilst the women, who wear voluminous petticoats, indulge in numerous large earrings of brass wire which are about 4 inches in diameter.

The Langsus are more akin to the Kachins or Singphos of North Burma; they inhabit the basin of the Nmai Hka or Langsu-ta Chiang (called also Puma Chiang or Puma Hka, i.e. the Puma or Burma river). The men wear the Burmese waistcloth and a short coat of Chinese pattern, and are armed with the dha; their hair is usually cut short at the neck. The women wear a short coat and a cotton cloth of many colours wrapped round the breast, and, like the Tsa-shan women, indulge in many necklaces and earrings of portentous size. In common with the Tsa-shan-jên, both sexes chew betel, and they exhibited an extraordinary craving for opium. One of our party had a little opium, tiny pellets of which he bartered for food, etc., and it was evident that had we possessed a stock of the drug, we could have lived for next to nothing, and should have met with a hearty welcome as traders. I was taken for an opium merchant, and our baggage was supposed to be full of that commodity; wherever we went the villagers pestered us for opium, and would pursue us for miles in vain attempts to obtain it. Silver was of little purchasing power, and we had the greatest difficulty in obtaining supplies, our presence being regarded with more fear and suspicion than cordiality.

The type of house which these people dwell in is one which, with very slight variations, extends throughout the Kachin or Singpho country right through into Assam. They are long, low, one-storied buildings, and are often occupied by several families, presumably of the same stock or clan, the interior being partitioned off into numerous recesses, besides having two or more cubicles. The framework is of timber, and the floor is raised some 4 feet above the ground, access being obtained by a sloping log with notches cut in it. The walls are of bamboo, and are only 3 or 4 feet high; the roof, which is of bamboo
thatched with grass or palm leaves, being very high pitched, and the eaves descending to floor-level. There are no windows, but small doors are cut at intervals in the low walls, which, when open, admit a very limited amount of light. At each end the roof is prolonged over a space which is fenced in and serves both as a cattle-pen and as a place for husking rice, weaving cloth, or other household occupations. The gables project beyond this space, and the roof is undercut so that the peak of the gable extends far in front of the eaves. The post which

supports the gable at the front of the house is decorated with the horns of buffalo and oxen, the number of which is an indication of the prosperity or wealth of the residents. The floor is of bamboo-mat, with a hearth of mud plaster to each compartment, the smoke of the fires finding an exit as best it may through the doors.

That part of the basin of the Nmai Hka which we passed through may be described as rich and fertile in spite of its mountainous character. We saw tea, indigo, cotton, tobacco, oilseed, and other useful plants,
the foregoing varieties often growing simultaneously in the small patches of cultivated land adjoining the villages. Rice is also grown wherever the ground admits of it. The tea plant is indigenous to the district, growing wild in the jungle, and is not of the Chinese variety, but of a similar type to the Manipuri or indigenous plants of Assam. The leaf is manufactured by the inhabitants on a small scale by drying it in the sun, after which it is packed into bamboo tubes. The climate of this region was hot, close, and oppressive, and we suffered from attacks of malaria. A very poisonous variety of jungle fly also caused us much trouble, and doubtless was largely responsible for the malaria. This fly, which resembles a small house fly in shape and size, is striped like the anopheles mosquito. It inserts its proboscis into the skin and draws blood; the bite does not hurt at the time, but several hours afterwards the wound swells and becomes painful, and the irritation continues for several days, accompanied by a watery discharge.

After following the course of the Hasiao Chiang till it turned northwards, we crossed the range which divides it from the Nmai Hka, whose tributary it is, at a height of about 7200 feet, and reached the banks of the latter river on January 28, when the measurements were taken which are shown in the cross-section (see Appendix A). These measurements give an approximate discharge of 28,000 cubic feet per second, i.e. more than 20 per cent. larger than that of the Salwin, and more than double that of its sister stream, the Mali Hka. The water of the river is of a different hue to that of the Salwin, being a dark olive-green; it is clear and free from silt. The bed of the river is strewn with rocks of granite and quartz, etc., and there are rapids which obstruct navigation. The banks of the river show that it is liable to a considerable rise in flood-time. The valley through which the river flows is at this point of peculiar section. The lower slopes are extremely steep, but at a height of several hundred feet above the water they are comparatively gentle; the formation suggests that the river has cut its way down into its present narrow channel through what was originally a broad and comparatively shallow valley.

After crossing the river, we ascended the range which separated it from the Mali Hka or western branch of the Irawadi. The range is a comparatively low one, being only about 6000 feet where we crossed it; its summit is broad and undulating, and, though thickly covered in heavy jungle, there is a fairly good path from Laung-pam on the east to Ning-ki on the west. After crossing the watershed, we turned north-west and shaped a direct course for the Mali Hka. The country we thus entered is in many respects quite different to that we had recently passed through. To south and east are mountain ranges, but to the north and west the country opens out, disclosing a wide view of low hills and undulating slopes. This district is a populous and fertile one, and is well watered by numerous streams, whose placid
waters and sandy beds bear little resemblance to those of the rocky torrential tributaries of the Salwin, the Mekong, and the Nmai Hka. There are numerous large villages whose inhabitants are evidently prosperous and in a far higher stage of civilization than the wild tribes of the Chinese frontier. The land is chiefly covered in thick forest, but large areas adjoining the villages are under cultivation; quantities of rice are grown, as well as sweet potatoes and other vegetables, and we saw magnificent rubber trees, enormous baians, and, in fact, practically all the luxuriant vegetation of the jungles of Assam. Good roads have been made between the villages, and the one by which we

travelled was evidently a main route, and, though of course not metalled, was well kept and properly graded and drained, and we were now able to push on rapidly. No animal transport is used in this country, and there is no large transit trade, the villages being almost entirely self-supporting and independent of imported goods.

The inhabitants of this region, which extends northwards as far as the boundaries of the Hkamti Long district, call themselves Pu-ma (i.e. Burma) men, but are in appearance, dress, and customs, etc., identical with the Singphos of the Assam frontier. We were, of course, unable to converse with these people, but the few words of their language which we did acquire served us equally well among the
Singphos, and I believe that their language is the same. They are brown-skinned, of medium height, and slight build, with features of the Burmese type. The men wear a straight waistcloth or kilt, and a short coat; their hair is either cut short at the neck or worn in a topknot, and they wear a broad-brimmed palm-leaf hat with a small conical crown. They are armed with the "dha," but occasionally carry spears as well, and we noticed a few flint-lock tower muskets, one of which I observed was dated G.R. 1815. The women wear a coloured cotton cloth similar to the Indian "sari," which they wind round them so as to form a dress. Their breasts are bound tightly down by the cloth after the fashion of the Manipuri women; but, like other natives of hot climates, they are very free and easy in their dress, and display their bosoms freely, often removing the cloth altogether above the waist. The clothing of both sexes is of local manufacture, cotton weaving being one of the most important of the feminine duties. Women take a large and active part in the maintenance of the household; they spin yarn, weave cloth, cut grass for thatching purposes, husk rice, and superintend the poultry yard, besides performing many of the lighter duties of the cultivator, such as reaping and weeding, etc.

The houses of these people are similar to those of the Langsus, and, as with that tribe, each village has a headman or chief whose house is usually distinguished for its superior size, and the number of buffalo-horns with which its portals are decorated, and by an arrangement of logs a short distance in front of it somewhat like the letter W. Again, similarly to the Langsus, they burn their dead, the ashes of the corpse being placed in an oblong wooden box, shaped roughly like a mummy and approximately the size of the dead person's body. This box is supported above the ground on bamboo trestles, and is sheltered from the elements by a roof of a more or less elaborate character according to the position the deceased held; thus the remains of ordinary individuals are merely roofed over by a small shed, whilst those of the headmen and their families are placed inside large dome-shaped erections of bamboos, thatched with palm leaves, and provided with a door through which the mourners can enter. The summit of the dome is decorated with a pair of buffalo-horns, or imitation ones of wood. A small bamboo pedestal is erected by the side of the bier, and on this various offerings of food, etc., are placed, whilst the urn itself is often wrapped in a blanket or other clothing as a protection against cold.

The reception we met with from these people was not altogether unfriendly, but they exhibited an extraordinary objection to selling us provisions, etc., and we often came near to a serious fracas in our attempts to procure the necessaries of life. Their diet consists chiefly of rice, but they have poultry and eggs, fish, pork, etc., though they almost invariably denied the existence of these articles, or produced
them in such minute quantities as to be useless to us, whilst demanding exorbitant prices; consequently we had to exist largely on rice during our passage through their country. They are not a trading people, and they had no wish to deal with us, whilst they undoubtedly looked on us with suspicion and fear. Here, as amongst the Langaus, there is a great demand for opium, and I have no doubt that one reason we passed without molestation was because of our reputed character of opium dealers bound for Hkamti. In connection with this, it is interesting to note that the Chinese appear to have traded throughout this country, even as far as the Hkamti Long district. We were told that this was

![Village scene in the valley of the Nmai Hka. House and natives are Langbu or Shans. The man with the gun is one of my Chinese servants.](image)

the case, and occasionally we came across men who knew one or two Chinese words; the Chinese mode of address "Lao-ban" was often applied to my servants, who were spoken of as Kuang-tung men (i.e. Cantonese).

The climate of this region in January and February was warm and moist; the daily mean temperature was only about 55° Fahr., but the humidity made the air very oppressive, and there were frequent thunderstorms.

We came in sight of the Mali Hka on the morning of February 2, when we noticed a phenomenon which appears to be of frequent occurrence in this district. Our route was at a considerable elevation above the valley of the river, and we looked out over a vast sea of
dense milk-white mist, which completely screened the river and the lowlying ground before us, only the tops of the hills protruding above it like islands. Far away to north and west stretched a high wall of snowclad mountains—those of the Patkoi and Namkin ranges—forming a huge semicircle, as it were, which barred the way to India and Tibet; above the mist all was clear and bright, and the snowy barriers on the horizon glittered in the morning sun, whilst below us all was hid from view by the mist. It was a striking and curious sight. About 11 a.m. the mist slowly rolled away, and we now enjoyed a spacious view of the valleys before us. These morning mists are of dense white vapour saturated with moisture, which falls pattering on the leaves of the trees like drops of heavy rain. They are probably of a malarious character, and some of our party suffered from that malady during our stay in this region. Similar mists are common in Assam during the cold weather, and I noticed a like phenomenon in some of the valleys of the Singpho country on the borders of that province.

The Mali Hka is very different in character to its sister stream, the Nmai Hka. It is comparatively shallow, its maximum depth being only 20 feet, and it is much broader, whilst its current is less swift, and its discharge is only some 13,000 cubic feet per second, or less than half that of the Nmai Hka. Unlike the Nmai Hka, which is confined by steep and rocky banks, it flows between low banks of earth, which are covered in dense jungle; its waters are clear and of a dark olive-green hue, and they abound with fish. There are rocks and rapids which prevent navigation, but its bed at this point (lat. 26° 21') is chiefly of sand and clay. The river is apparently not subject to any great rise in flood-time, its high-water mark being only some 5 feet above the water-level.

Beyond the Mali Hka we turned northwards, following what is a main trade route from British Burma to the Hkamti Long district. The jungle now became thicker, and clearings less frequent, whilst roads only existed in the immediate vicinity of villages, the route otherwise being a mere jungle path which often lost itself in streams whose course it followed. At length, some ten days later, after marching for two days through an uninhabited belt of jungle, we emerged at Intaw, in the Hkamti district, and a day's march further we reached the town of Langnu, from which point I had determined to attempt the passage of the Chaukan pass.

We now found ourselves in a country which, though in most respects similar to that we had just passed through, is populated by a distinct tribe or race who boast of a king, whose capital at Putau is also called Hkamti. We were now on comparatively well-known ground, the kingdom of Hkamti having been explored by a survey party from India in 1895, under Woodthorpe and Macgregor, of whom we found traces in Langnu, by Errol Gray in 1892, and by Prince Henry of Orleans in 1896.
Langnu is a town, or rather a collection of four villages, on the right bank of the Nam Kin, a tributary of the Mali Hka, and is the head-quarters of the "Chowpa," or headman of the surrounding district. On arrival there we were received in a most cordial fashion; we were invited to stay in the "Chowpa's" house, and were furnished with ample supplies. As soon, however, as it leaked out that we were bound for India, all sorts of difficulties were put in our way, and neither guides nor coolies were forthcoming. The maps which I possessed showed two villages on the Hkamtie side of the Chaukan pass, and the Hkamtis furnished me with the names of ten stages on the route, which seemed to imply that it was inhabited. Accordingly, after spending a day in fruitless efforts to obtain transport, we started for the pass without guides, carrying a supply of rice sufficient for a week.

A few miles from Langnu the route entered an enormous tract of jungle, which extends without interruption from this point, across the Namkin and Patkoi mountains far down the valley of the Dihing river, with only a solitary break near Kumki. We marched westwards, groping our way through dense, gloomy, and uninhabited forest, where we followed the tracks of rhinoceros, elephant, buffalo, tiger, and other wild beasts, and where our only guides were the compass and the faint trail or "blaze" with which the trees were marked at intervals. It rained the whole time, and we were attacked by incredible quantities of leeches and poisonous insects. At night we camped, or built ourselves shelters of bamboo, and kept fires alight to ward off the wild beasts. After five days we failed to see any signs of the villages marked on the map, whilst the stages mentioned by the Hkamtis proved to be the
sites of long-extinct villages, now distinguishable only by the remains of graveyards deeply buried in the forest, which showed no signs of ancient clearings or cultivation. Food was now running short, and it became necessary to give up the attempt. We returned by forced marches and on very short rations, and with difficulty succeeded in regaining Langnu just as our supplies gave out.

The coolies were so exhausted and footsore after this experience that we had to halt for a week at Langnu. Provisions were collected, and, by means of the bribe of a gun, guides were obtained, and on March 2 we set out on a second attempt to cross the Chaukan. Again we entered the jungle, but after another period of wandering the guides proved incapable and unable to find the route over the passes, so that, in spite of having ample supplies, we were at length obliged to return once more. This time, however, we did not reach Langnu, as before emerging from the jungle we encountered a party of Hkamtis who were setting out on a journey to Assam to bring back an elephant for one of the local headmen, and, after some palaver, we arranged to attach ourselves to their party and travel in company. Some of the coolies were too weak to go on, and we had to allow them to return to Langnu, which meant that their loads had to be thrown away, as we were already laden to the utmost.

This third attempt proved successful, and at length, on March 15, we crossed the watershed of the Dihing and entered what is, geographically speaking, Assam. We found that the villages of Mokosbat and Galut no longer exist, though we camped on their sites, and that the route over the Chaukan pass is now disused in favour of one which crosses the neighbouring height of the Songsan Bum, which, though somewhat longer, is said to be easier. We followed the disused route, and had to frequently cut our way through the thickly growing bamboos and fallen trees, etc., so that our progress was necessarily very slow, especially as the natives themselves had the greatest difficulty in finding the track, and frequently lost their way. Altogether we were nineteen days from the time we left Langnu on our second venture until reaching the first village on the western side of the pass, and during most of that time we had to travel on short rations, whilst the rain fell almost continually. Frequently there were heavy thunderstorms, and on the heights we experienced hail, and sometimes even snow.

Our companions, the Hkamtis, travelled in the most leisurely fashion, and observed several curious customs, some of which were doubtless based on practical experience as well as on superstition. Thus they prohibited us from burning bamboos until they had been split or notched, so as to allow the air and water to escape, as the loud reports which they would otherwise make were said to be infallible rain-producers—an idea which, considering we were among the clouds, and in an extremely rainy locality, was probably not devoid of reason.
They also forbade us to speak above a whisper on the mountains, as they said that if we made a noise we should certainly have rain. Later on, however, when we had descended to lower levels, these prohibitions were withdrawn. On the summits of mountains, or after specially difficult undertakings, such as the passage of rivers, etc., prayers and offerings were made, the latter being placed on small bamboo pedestals, and consisting of a little rice or some leaves or grass.

The long sojourn in the jungle and continued short commons told severely on our Liso coolies, who became terribly weak and sickly and dispirited, and it was a great relief when we at length emerged suddenly from the forest and found ourselves in a long grass-grown valley, with low hills to the south, and a lofty range of snow-clad mountains to north of us. The route now followed the banks, and often the bed, of the Dihing, and we soon reached Kumki. Kumki is a village of some 200 to 300 inhabitants on the left bank of the Dihing; its inhabitants are Singphos, a tribe which is so identical with that which I have already described as inhabiting the basin of the Mali Hka, that there is no need for further description. Our reception by them was not pleasant, and we had to use threats in order to obtain food. Five days more of jungle travelling, accompanied by the usual amount of rain and leeches, etc., brought us to the Dihing again, where, owing to the river being in flood, it was impossible to ford it, and we were thus in measurable distance of starvation, as our supplies were almost exhausted, and there were no villages on our side of the river. Fortunately, a band of Mishmis who we encountered were in the same plight, and constructed a rope bridge by which we were enabled to cross to the other bank.

The method of construction was interesting. First a thin string of split cane about \( \frac{1}{2} \) inch in width was prepared, and a round pebble securely fastened to one end of it. Then the experts of the party exercised their skill in hurling it across the river. The Dihing at this point was about 100 yards across, so that the operation was not easy.
The thrower whirled the stone round and round by a sufficient length of string, and then, when it had acquired enough momentum, hurled it with all his force across the river, where it was made fast by some compatriots who had come to the assistance of the party. Then three ropes of whole cane, about \( \frac{3}{4} \) inch in diameter, were hauled across by means of the string and made fast to tree-trunks on either bank, so as to form a triple rope of adequate strength. The bridge was now ready, and loops of cane were made and tied over the rope. The passenger sits in the loop, and hauls himself across backwards (i.e. head first) by his hands, propelling himself by his feet at the same time. When women have to cross, they are trussed on to the rope so that they cannot fall off, and then have to haul themselves across by the arms only, their feet being tied on the rope. The Mishmis crossed first, and accomplished the feat skilfully enough; but it is not easy for an amateur, especially when there is a boiling torrent some 20 feet below one, and we found it difficult and exhausting work.

Across the river our troubles were nearly over, but it was still a day's march to the first village, and between us lay the Daphpani river, where we again found ourselves cut off by the swollen stream from the food we required. Fortunately, before matters became desperate, we were relieved by a band of friendly Singphos, who provided us with food, and rafted us across the river as soon as the waters had subsided somewhat. We were now on British territory, the Daphpani being the limit of effective British rule in this direction, and from this point we descended the Dihing without difficulty, and a week later reached Sadiya, and once more came in contact with civilization.

The results of the journey I have described can only be gauged by expert geographers, and I am well aware that, in comparison with the time occupied and the distance covered, they are insignificant; nevertheless, some new areas have been explored, and the existence or practicability of a direct trade route from China to India demonstrated. The course of trade, like water, follows the line of least resistance, and our difficulties in the Salwin valley were largely due to our attempts to explore a region in which no trade exists. When following the trade route across the Pien-ma pass through the basin of the Nmai Hka, we encountered no serious difficulties, except those due to our ignorance of the language and the distrustful attitude of the natives—the latter, I believe, being largely due to the former cause, though, doubtless, also based on a well-founded fear of foreign invasion and interference. Our passage through the Singpho country and into the Hkami district was also a main trade route, which, as already pointed out, has been used by Chinese traders as well as by the inhabitants of the country. This district is both fertile and populous, and the physical characteristics of the country render it suitable for the construction of lines of communication, such as railways and roads.
A JOURNEY FROM YUN-NAN TO ASSAM.

The chief obstacle on the route to India is undoubtedly the vast tract of uninhabited jungle between Hkamti and Assam; yet it is to be noted that a trade route existed here at one time, as is shown by the remains of the old villages which are to be seen on the present track, whilst even now there is a small trickle of trade (passing chiefly by the Songsan route), which might possibly be enlarged. The actual trade is of the smallest, for the reason that any one making the journey has to carry such a large stock of provisions as to preclude the possibility of carrying much merchandise—though I found that Indian tea, blankets, and matches were known and used in Hkamti—but parties of natives are in the habit of passing through to Assam and back from time to time.

The chief difficulties of this forest track are the lack of roads and supplies, and the heavy rainfall, whilst the lofty ranges of mountains strictly limit the number of possible routes. I heard of two other routes besides the one I travelled by, viz. one over the Songsan Bum, and one through Manse and down the valley of the Daphanani river, the latter being that followed by Prince Henry of Orleans. West of Kumki the configuration of the country is not exceptionally difficult, and I believe
it would be quite feasible to construct a railway up to the Dihing valley to a point near Kumki, and then through the Patkoi hills, and down the valley of the Sinan Hka.

Although, as I have shown, I travelled by what is probably the easiest and most direct route from Yün-nan to Assam, yet it should not be supposed that such a journey is an easy one. As in any expedition of this kind, our chief difficulties were those of commissariat and transport, for though in China we found no difficulty in obtaining supplies and the means of carrying them, and in fact were received with cordiality and treated with respect and hospitality, yet almost everywhere west of the Salwin the reverse was the case, and, though in a land of plenty, it was often only possible to obtain food by high-handed methods which only necessity could warrant, whilst it was frequently impossible to recruit coolies for transport purposes. I, of course, paid liberally for all supplies, but more than once we had to "commandeer" rice, etc., in spite of the obviously false statements of the villagers that no kind of provisions were to be obtained.

Many of our difficulties arose from ignorance of the language, as, although I speak Chinese and Hindustani, neither of those languages were of use much beyond the frontiers of the two empires. On the other hand, I believe that it was the smallness and insignificance of my party which enabled us to travel so freely through the districts where white men had never been seen, and where his presence is regarded with the greatest suspicion. That we never encountered active hostility is creditable to the natives, and also, I think, in some degree to the various members of my party, and in conclusion I must again record the admiration I feel for the pluck and fidelity of my two Chinese servants.
APPENDIX A.

The accompanying cross-sections were all taken in the following manner: (1) The width of the river was triangulated from a measured base. (2) The soundings were taken with a measured rope, marked at every 5 feet, and weighted with a stone; the intervals between soundings being judged so as to be as equal as possible. (3) The sections were taken on a straight reach of the river not in the immediate vicinity of the rapids. (4) The speed of the current was measured with a bamboo float about 10 feet long, weighted at one end to keep it upright and immersed about 6 feet below water. This float was placed in the water from a boat or raft at the approximate point of maximum velocity, and its speed was timed between stakes on the bank 300 feet apart.

RIVER MEASUREMENTS

<table>
<thead>
<tr>
<th>River</th>
<th>Speed of Current</th>
<th>Area of Cross Section</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salwin</td>
<td>2.5 feet per second</td>
<td>10.25 sq ft</td>
<td>10.45</td>
</tr>
<tr>
<td>Nmai Hka</td>
<td>2.6 feet per second</td>
<td>13.54 sq ft</td>
<td>10.50</td>
</tr>
<tr>
<td>Mali Hka</td>
<td>1.6 feet per second</td>
<td>9.03 sq ft</td>
<td>10.55</td>
</tr>
</tbody>
</table>

These methods are, of course, only rough and approximate, and it would therefore be useless to make very elaborate calculations of the discharge of the river. Assuming, however, that the velocity observed was the maximum, the mean velocity, as given by accepted formulae and confirmed by local experience, would be about 0.8 of the maximum; and adopting this ratio for the Nmai Hka and Mali Hka, we get approximate discharges of 28,000 and 13,000 cubic feet per second respectively. In the case of the Salwin, the section of the bed is so narrow and deep, and the current consequently so uniform, that I have taken 0.9 as a probable ratio, which gives a discharge of 23,000 cubic feet per second.
APPENDIX B.

LATITUDES.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of place</th>
<th>Method of observation</th>
<th>Latitude</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Meng-tze-Hsien</td>
<td>Ex-meridian alts. of Polaris</td>
<td>23 16 1</td>
<td>Fair.</td>
</tr>
<tr>
<td>2</td>
<td>Mien-Tien</td>
<td>Meridian alts. of Formalhaut</td>
<td>23 36 55</td>
<td>Good.</td>
</tr>
<tr>
<td>3</td>
<td>Do</td>
<td>Ex-meridian alts. of Polaris</td>
<td>23 38 12</td>
<td>Good.</td>
</tr>
<tr>
<td>5</td>
<td>Do</td>
<td>Ex-meridian alts. of Polaris</td>
<td>25 48 48</td>
<td>Fair.</td>
</tr>
<tr>
<td>6</td>
<td>Fei-lung-Chiao</td>
<td>Meridian alts. of Sun</td>
<td>25 47 20</td>
<td>Good.</td>
</tr>
<tr>
<td>7</td>
<td>La-ba</td>
<td>Ex-meridian alts. of Polaris</td>
<td>25 51 40</td>
<td>Doubtful.</td>
</tr>
<tr>
<td>8</td>
<td>Do</td>
<td>Meridian alts. of Rigel</td>
<td>25 50 22</td>
<td>Good.</td>
</tr>
<tr>
<td>9</td>
<td>Lu-kou</td>
<td>Meridian alts. of Dubhe</td>
<td>25 50 46</td>
<td>Good.</td>
</tr>
<tr>
<td>10</td>
<td>Do</td>
<td>Ex-meridian alts. of Polaris</td>
<td>25 52 35</td>
<td>Doubtful, sky hazy.</td>
</tr>
<tr>
<td>11</td>
<td>Mao-chao</td>
<td>Meridian alts. of Rigel</td>
<td>26 2 27</td>
<td>Doubtful.</td>
</tr>
<tr>
<td>12</td>
<td>Do</td>
<td>Meridian alts. of Sun</td>
<td>26 29 42</td>
<td>Doubtful, sky very hazy.</td>
</tr>
<tr>
<td>13</td>
<td>Lan-chia-ti</td>
<td>Meridian alts. of Sun</td>
<td>26 29 19</td>
<td>Good.</td>
</tr>
<tr>
<td>14</td>
<td>Do</td>
<td>&quot;</td>
<td>26 2 9</td>
<td>Good.</td>
</tr>
<tr>
<td>15</td>
<td>Near Meng-chao</td>
<td>Meridian alts. of Rigel</td>
<td>26 12 50</td>
<td>Moderate.</td>
</tr>
<tr>
<td>16</td>
<td>Lao-Yang-Ka</td>
<td>&quot;</td>
<td>26 21 10</td>
<td>Good.</td>
</tr>
</tbody>
</table>

The above observations were made with a 7-inch sextant (by Stanley & Co.) and a mercurial artificial horizon, times being noted by a Benson's half chronometer "Field" watch.

APPENDIX C.

LONGITUDES.

<table>
<thead>
<tr>
<th>No.</th>
<th>Station</th>
<th>Object observed</th>
<th>Longitude E</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fei-lung-chiao</td>
<td>Sun E. 99 10 12</td>
<td>Observation good.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lh-ha</td>
<td>Star E. 99 3 39</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Lu-Kou</td>
<td>Star W. 98 54 52</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Do</td>
<td>Sun E. 98 55 5</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Lan-chia-ti</td>
<td>Sun E. 99 10 33</td>
<td>Observation good, but error of watch doubtful; reject.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Do</td>
<td>Sun E. 99 3 39</td>
<td>Observation good, and error of watch determined approximately by calculating back from deduced rate.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Right bank of Ma-li-Kha in lat. 26° 21' 10&quot;</td>
<td>Sun E. 97 57 43</td>
<td>Observation good, but result probably too high.</td>
<td></td>
</tr>
</tbody>
</table>

The above observations were made with a 7-inch sextant (by Stanley & Co.) and a mercurial horizon. The method used was that of chronometric difference of time, G.M.T. being kept on a Benson's half chronometer "Field" watch. In the case of the sun, the mean was taken of six observations of the upper and lower limbs at ten-second intervals of arc; and in the case of stars, the mean of seven observations at ten-second intervals of arc was taken. Unfortunately, the watch proved so susceptible to changes of temperature, in spite of its being fitted with a Breguet spring and other improvements, that its rate was erratic, and as I was not able to rate it at sufficiently short intervals, the longitudes I obtained can only be considered as roughly approximate.