

GENERAL REPORT  
ON THE  
OPERATIONS  
OF THE  
Survey of India Department  
ADMINISTERED UNDER  
THE GOVERNMENT OF INDIA  
DURING  
1898-99.

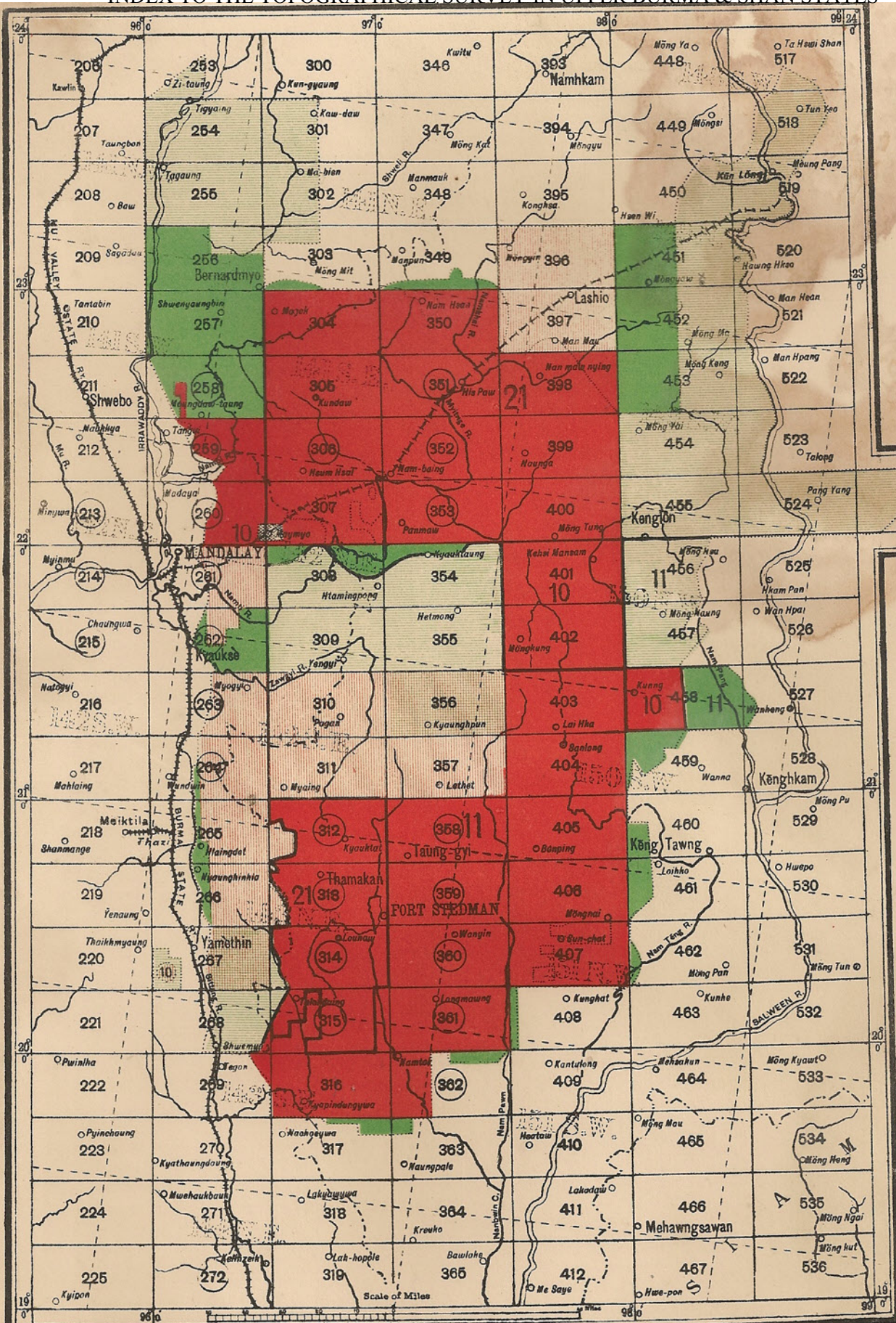
PREPARED UNDER THE DIRECTION OF  
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1900.



## INDEX TO THE TOPOGRAPHICAL SURVEY IN UPPER BURMA &amp; SHAN STATES



Reg. No. 603, S. I. D. - Apr. 05 - 1899.

Photo, S. I. O. Calcutta.

No. 445-S. 00.

## REFERENCES.

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## NOTES.

The numerals 312, &c., indicate the Standard sheets on the Scale 1 inch = 1 Mile.  
The figures and lines in strokes represent the numbers & limits of the Engraved sheets of the Indian Atlas.  
The thick lines represent the areas surveyed by the different Topol. Parties, the large figures indicating the number of the Party.



94. The party, with the exception of Mr. White, who had started a week earlier, left Bangalore, the recess quarters, on the 2nd of November 1898, sailed from Madras on the 3rd and reached Lawk Sawk, in the Southern Shan States, its head-quarters for the field season, on the 8th of December. Field work was commenced on the 7th of December and closed on the 18th of May 1899. The party, with the exception of Mr. White and Sadiq Hossein, returned by the steamer leaving Rangoon on the 2nd of June, and office opened at Bangalore on the 12th.

95. The programme for the season was the detail survey of sheets Nos. 310, 311, and 357, sheet No. 356 was also to be taken up, if possible. The triangulation to be taken up was that of sheets Nos. 308, 309, 354, 355, 356, 456, and 457 as "triangulation in advance."

*Detail Survey.*—The programme was completed, sheet No. 356 was not only planetabled but also triangulated.

*Triangulation.*—The sheets laid down for triangulation in advance were all completed except Nos. 456 and 457, of which only 250 square miles could be finished.

96. The outturn of work is as follows :—

- (a) Detail survey on 1 inch scale, 2,524 square miles, inclusive of an overlap of 306 square miles.
- (b) Triangulation, 3,234 square miles, inclusive of an overlap of 220 square miles.

The area surveyed, considering the nature of the ground and the reduction in the strength of the party, is very creditable.

97. The total cost of the party is R81,093-5-10.

The cost-rate, as noted below, compares favourably with the rates of previous season. Triangulation for 1 inch survey, R11-6-4. Detail survey on 1 inch scale, R17-8-0.

98. The health of the party during the field season was good. At the beginning and particularly at the close there were several cases of fever among the natives. During the recess, the malaria contracted in Burma has shown itself among the surveyors and *khalâsis*.

99. The detail surveyors were visited regularly during the season. The work after a rigorous test proved excellent.

100. The programme for the coming season will be the survey in detail of sheets Nos. 308, 309 and the western halves of sheets Nos. 354 and 355, and the triangulation of sheets Nos. 525 to 528 and the portions of 456 and 457 left unfinished during the season under report.

101. The Surveyor-General visited the party on the 19th of September, and after a careful examination into the working, expressed himself as "very well satisfied."\*

## UPPER BURMA.

### NO. 21 PARTY.

102. The Party left recess quarters at Bangalore on 2nd November 1898,

#### *Personnel.*

Captain C. H. D. Ryder, R.E., Officiating Deputy Superintendent, 1st grade.\*  
 " H. J. Hare, R.E., " " " 1st " †  
 Mr. A. J. James, Extra Assistant Superintendent, 2nd grade.  
 " W. F. E. Adams, Sub-Assistant Superintendent, 1st grade.  
 " A. H. Peychers, " " 2nd " Died 20th February 1899.  
 " P. Williams, Sub-Assistant Superintendent, 3rd grade.  
 " P. R. Anderson, " " 3rd " †  
 Munshi Ikbaluddin, " " 3rd " †

#### *Surveyors and Sub-Surveyors.*

Lachman Jadu,\* Ram Sabad,\* Ganu Mal, Natha Singh,† Mohamed Latif,§ Kudrat Ali, Jamna Pershad, Keshao Jadu,† Abdul Gaffur, Hazrat Ali, Per-manand, Shamsuddin, and 4 Probationary and Apprentice Sub-Surveyors.

\* Attached to Yunnan Survey throughout the season.  
 † " to Burma-China Boundary Commission throughout the season.  
 ‡ " to Yunnan Railway Survey throughout the season.  
 § " to Fekin Syndicate.

\* The officer in charge reports in high terms of the work done by Messrs. W. M. Kelly, H. G. Shaw, and B. M. Berrill.

The surveyors and sub-surveyors with one exception have worked well.

and proceeded to Lashio in the Northern Shan States, where the head-quarters were established, and returned to recess quarters on 18th May 1899, regular office being opened from 25th idem.

103. Owing to the exigencies of



the Burma-China Boundary Commission the working strength of this party was considerably reduced during the field season, with the natural result that the outturn of work was considerably below that of a normal season.

The detail survey of sheets 396 and 397, with a small gap remaining in sheet 350, on the scale of 1 inch=1 mile, was completed.

The triangulation in advance for 1 inch survey was carried out in parts of sheets 450, 451, 452, and 453; over the whole of 454, 455, and 524, and in parts of 518, 519, 520, 522, and 523.

The outturn of work is as follows: Triangulation for the 1 inch survey 3,416 square miles, Topography on the 1 inch scale 1,133.5 square miles, Topography on the  $\frac{1}{4}$  inch scale in Yunnan 26,850 square miles. The total cost of the party from 1st October 1898 to 30th September 1899, is Rs 92,724-9-4, and the cost rates per square mile are as follows:—

	Per square mile.		
	R	a.	p.
Triangulation for 1 inch survey . . . . .	11	9	8
Detail Survey 1 inch scale . . . . .	11	12	3
„ $\frac{1}{4}$ inch „ . . . . .	1	8	0

which figures are as low as could be expected under the conditions of the smaller outturn.

104. A very regrettable incident occurred during the course of the field season, Mr. A. H. Peychers, Sub-Assistant Superintendent, having been murdered in cold blood by a sepoy of his escort, while at work on 20th February at Loi Hopong Hill Station. Mr. Peychers was a promising lad and his untimely death is much regretted. The murderer was duly tried and executed.

105. The health of the party, with a few exceptions, was uniformly good throughout the season, and no deaths occurred from sickness.

106. The country surveyed included parts of the Hsi Paw, and the Northern and Southern Hsinwi States. The ground is all very hilly and covered with heavy tree and scrub jungle. About four miles to the north of Lashio there are hot sulphur springs, more or less in the shape of a horse-shoe; the waters of which have the reputation of possessing healing properties for curing certain diseases if regularly bathed in for some time. The Shans of the country, as well as Natives of India living round about Lashio, make free use of them.

107. The Surveyor-General inspected the party on the 20th September 1899, and was generally satisfied with what he saw of maps, records, etc., of the party during his inspection.\*

## SIND.

### NO. 12 PARTY.

108. The operations during the year under report were in continuation of those of the previous season.

#### Personnel.

Mr. C. F. Erskine, Deputy Superintendent, 1st grade, in charge from 1st October 1898 to 13th July 1899.

Mr. J. A. Barker, Extra Assistant Superintendent, 4th grade, in charge from 14th July to 30th September 1899.

Mr. G. G. Vander-Beek, Extra Assistant Superintendent, 5th grade.

Mr. R. F. Warwick, Extra Assistant Superintendent, 6th grade.

Munshi Rahmatullah, Sub-Assistant Superintendent, 2nd grade.

Mr. E. C. J. Bond, Sub-Assistant Superintendent, 2nd grade.

Mr. C. J. Veale, Sub-Assistant Superintendent, 3rd grade.

Babu Dhani Ram, Sub-Assistant Superintendent, 3rd grade, and 55 permanent and temporary Sub-Surveyors, Computers and Draftsmen.

Mr. C. F. Erskine held charge of the party up to the 13th July 1899 when he proceeded on three months' privilege leave making over the temporary charge to Mr. J. A. Barker.

109. The programme, which was as follows, was completed:—

(a) A short series of secondary triangulation, about 35 miles in length, as a check on traversing, and another short series to supply points.

(b) Village boundary traverse survey in sheets Nos. 20, 21, 37, 38, 39, 40, 57, 58, 59, 77 and 78.

(c) The detail survey on the 2-inch scale of an area situated between the Indus river on the west, and the desert on the east, in sheets Nos. 70, 71, 90, portions of 50, 51, 91, 108, 109, and 40.

\* The officer in charge is perfectly satisfied with the work of all his assistants.



# APPENDIX.

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## EXTRACTS

FROM

### REPORTS BY EXECUTIVE OFFICERS.

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*Narrative Report by Captain C. H. D. RYDER, R.E., Officiating Deputy Superintendent, 1st Grade, on the Survey Operations in Yünnan, Season 1898-99.*

Having received orders to accompany Captain Davies, Oxfordshire Light Infantry, into Yünnan, I left Bangalore on the 26th October, reaching Rangoon on the 31st. Captain Davies arrived on the 4th, and on the 8th after handing over charge of No. 21 Party, I left by mail train, reaching Katha on the 10th and Bhamo on the 11th November. At Bhamo I was kept busy arranging for transport, but we finally got away on the 16th and marching *viâ* Myothit and Nampaung, crossed the frontier on the morning of the 19th. Our party was composed as follows :—

Captain H. R. Davies, Oxfordshire Light Infantry.

Captain C. H. D. Ryder, R. E., Survey Officer.

Lieutenant Watts-Jones, R.E., Railway Survey Officer.

Two Survey of India Surveyors, Lachman Jadu and Ram Sabad.

An Intelligence Surveyor was to have accompanied us, but fell sick, and had to be left behind at Nampaung.

We each had two servants, my own two Madrassis; Captain Davies had a North-Western Provinces Mahomedan and a Chinaman, and Watts-Jones a Goanese and a Chinaman; four Indian *khalásis* and some Chinese coolies and interpreters completed the party. Our transport, which was on the whole satisfactory, consisted of mules with Chinese drivers. After crossing the frontier we passed a number of small Chinese stockades, with a few so-called soldiers loafing about; however, they did not interfere with us, after seeing our passports and although at first we felt rather shy of surveying openly, neither then, nor at any other time was any obstacle placed in the way of our surveying as much as we liked.

On the 18th we reached Man-yuen, a small town with a stockade, and had our first sight of the Chinese and a first experience of a Chinese crowd and their untiring curiosity. The women here had their feet bound up, a curious sight at first, but one to which a traveller in China soon gets accustomed to. From Man-yuen, Captain Davies left us for a couple of days in order to visit Santa and the path on the right bank of the Taping, and Watts-Jones and I marched straight up the valley, crossing the river about 200 yards wide by ferry. After two days' march we halted to allow Captain Davies to catch us up and then continuing up the Taping valley, or rather one branch of it, we reached Momien on the 26th.

The following day we paid a long visit to the Ting Kuan (magistrate) and were regaled with Peek and Frea's biscuits and green chartreuse. Here I first noticed the long finger nails on which a literary Chinaman prides himself, as a sign that he has never had to do any manual labour. The Ting-Kuan, however, showed us that his long nail had its advantages, as with its help and with great deftness he picked a fly out of Watts-Jones' chartreuse much to the latter's disgust.

That night I was able to take longitude observations with Captain Pirrie at Bhamo, but with some difficulty, as my star observations were executed before a noisy spitting



crowd of Chinese, and the telegraph operations were not improved by being carried out at my end in a room in which the Telegraph clerk had invited several friends and his family to watch the performance. One of the sights of Momien is a waterfall about 60 feet high, about a mile outside the town, down which it is said the Chinese threw 500 Mahomedan prisoners at the close of the rebellion.

At Momien we again separated, Captain Davies leaving on the 29th to explore to the north, he visited Si-lien and Pa-lien, and reached Yungchang-fu by a path north of the main road; from Yungchang-fu he proceeded southwards to Tawnio, our frontier post, where he was delayed a month waiting for Mr. Turner and Mr. Ker, who had been sent out by the Yunnan company to report on the province, the former from a commercial, the latter from a mining point of view.

Lieutenant Watts-Jones and I left Momien on the same day the 29th, and reached Yungchang-fu, following the main trade route in 5 marches continuously up or down hill, and crossing the Shweli and Salween rivers by iron chain suspension bridges, distinctly creditable to the Chinese in their design and construction. Watts-Jones only stopped here a couple of days, but I was delayed a week owing to cloudy weather.

Six marches through jungly country took us to Shunning-fu and two more to Yünchon, a small town, but one that will be of importance, as it is the first town in Chinese territory on the line of the proposed railway. My interpreter, Haroon, was a native of this place and he had many marvellous stories to relate of the fighting between Mahomedans and Chinese during the rebellion. From here turning towards our frontier, the country becomes more Shan-like in appearance and after a few marches Shan villages are met with. The path does not follow the Nam Ting valley, as the railway will, but keeps on the hills to the south. On the 26th I caught up Watts-Jones at Man-hkü, a small Shan village; he had been exploring the Nam Ting valley and found it possible for a railway but not good.

After a day's halt at Mong-hsa and an excursion for a couple of days on the road towards Kunlong, I struck over the hills by a little used path for Mienling, which I reached on the 6th, crossing one range at 9,500 feet. From Mienling I made for Ching-tong-ting, by a very rough path crossing the Mekong by ferry at Kali-kai.

The headman of this and the surrounding villages had an unenviable notoriety, one of his proudest feats having been the drowning of 13 Panthays in the river, as they were escaping from the Chinese. On January 16th I got into the valley, narrow but well cultivated, of the Black river and following it up, in two days reached Ching-tong-ting. Here I found two missionaries, Messrs. Nichols and Sanders, and was glad to meet a European again. I then followed up the valley to its source for several days, crossed over a watershed to Nantien on the 26th; here I heard that Watts-Jones, who had returned from Mong-hsa *via* Yünchon had passed through some days before: two days more brought me to Meng-hua, a fairly large town in a good plain, and two more to Hsia-kuan at the foot of the Tali plain. I had a very fine view of the Tali lake, crossing a watershed at 8,700 feet and looking straight down on to the lake; it was bitterly cold as snow was falling, but the view was magnificent. The lake some 30 miles long by 4 to 7 wide is encircled by hills, those to the west being covered with snow and rising to 14,000 feet.

A short march, snow hills to the left and lake to the right, brought us to Tali-fu. Meeting Watts-Jones on the road, I persuaded him to return and come northwards with me as he had been several days in Tali-fu, I only allowed myself a day's halt which was well filled up by calls on the officials, seeing the missionaries and longitude observations.

Leaving Tali-fu on the 3rd February, we reached the Yangtze on the 11th having to halt two days *en route* for the Chinese New Year. The country we passed through was a succession of well cultivated plains over 7,000 feet in elevation. We had good shooting as the plains were full of duck and the hill sides crowded with pheasant. The cold was very great, my thermometer marking 19° of frost one night. A short march down the right bank of the river here, 6,000 feet above sea-level, and a long up hill march the following day, brought us to another fine plain, Li-Chiang-fu 8,000 feet in height, with a splendid snow-clad mass of mountains to the north, over 18,000 feet in height. Our reception in Li-Chiang-fu was not cordial, but we halted a day there. On the 15th we left, Watts-Jones marching southwards to Haching and the main trade route from Tali-fu to Yunnan-fu. I proceeded eastward, crossing a range at 10,500 feet and then descending very abruptly to the Yangtze, which was crossed by a chain suspension bridge in a very bad state of repair. On the 17th, while on the march, my mule men got into a row with another set of mule drivers connected with some copper mines in the neighbourhood, one of the men, not mine, was nearly killed and his comrades went off vowing to bring the rest of the miners to attack us that night; however, the night passed over without incident and a forced march took us to Yungpe-ting the following day, where I settled the matter satisfactorily with the Chinese officials.

The next six marches were very much up and down, crossing affluents of the Yangtze several times. I had fine views northwards, the country apparently one mass of hills, many of them under snow. At Chin-ya-pin I came upon some very good coal, which was being used in all the houses for fuel; and the next day, the 26th, after a short march reached the Yangtze again at Machang, where I found two French priests who very hospitably insisted on my stopping the night with them. They informed me that a great deal of coal existed in the neighbourhood. I then followed the left bank of the river until I crossed it on the 28th at a height of 3,500 feet. The river here is fast running, about 150 yards wide, and a small quantity of gold is found in the sand. After crossing the



river I turned south and reached Tsu-hsiung on March 11th, meeting Captain Davies, Lieutenant Watts-Jones, and Mr. Ker two days previously. Here we halted six days while I got my longitude observations; the main party then went into Yünnan-fu by the main road, I marching by a route more to the south. Mr. Ker, with whom I sent Surveyor Ram Sabad, left Tsu-hsiung for the north going up to Hui-li-chon and returning to Yünnan-fu, early in May. Yünnan-fu, the capital of the province, where we arrived on the 24th, is a fine large town, walled as all the Chinese towns are, and contains some 50,000 inhabitants. The trade in foreign goods is nearly all carried on with Tong King, but a great many goods of English manufacture come that way. Here I was obliged to stay 28 days, trying in vain to get direct telegraphic communication with Bhamo for longitude, but it ended in a failure owing to the incapacity and laziness of the clerks at intermediate stations. In the mean time Captain Davies and Lieutenant Watts-Jones left by different roads for Weining and Pichich-hsien, near where they finally met Captain Pottinger's party who had been much delayed by the weather and by the hostility of the Chinese. Captain Davies then returned to Yünnan and marching on the direct road to Mongtzu-hsien came out down the Red river. I finally left Yünnan on the 23rd April and marching south-east visited several fair sized towns, but their trade is small and the country generally poor. On the 4th April I reached Mongtzu-hsien, a place comparatively civilized, there being a French Consulate as well as a Chinese customs station. Mr. Spinney, the head of the customs, kindly put me up and I halted 3 days there expecting letters. However, none came, so I left on the 7th, 4 days taking me to Kai-hua-fu and five more down to Lad kai on the Red river, and the French frontier station. Here I got a boat and two days down stream brought us to Yen-bai, where I had to wait a couple of days for the steamer, then three more days took us to Hai-phong, the port of Tong King, from where I found a steamer going to Hong Kong and so to India by P. and O.

The results of our trip were as follows:—

Some 44,000 square miles of country were surveyed on the  $\frac{1}{4}$ -inch scale, of which the Survey of India may take credit for 29,000 square miles. A possible route for a railway has been found in continuation of the Kunlong line, and a great deal of miscellaneous information has been collected about the country. I have the pleasure of recommending very highly the two surveyors who accompanied us—Lachman Jadu and Ram Sabad. They both worked untiringly and with great energy in a country, where the people were foreign to them and very often unfriendly, and their traverses checked by the longitude and latitude observations were generally found very good. I also wish to mention the very excellent work done by my interpreter Haroon. In addition the longitudes of Momien, Yungchang-fu, Tali-fu, and Tsu-hsiung-fu were fixed by telegraph and over a hundred latitudes were observed.

During the field season 1899-1900, another expedition, will be sent into Yünnan, consisting of Captain Davies, Oxfordshire Light Infantry, Captain Ryder, R. E., Survey of India, and Major Manifold, I. M. S., each accompanied by a surveyor; Captain Rigby of the Wiltshire Regiment and Lieutenant Fraser, R. A., each also accompanied by a surveyor, will also be exploring in Yünnan, so that by the end of the season a fairly complete map and Gazetteer of Yünnan will be available.

*Narrative report by CAPTAIN T. F. B. RENNY-TAILYOUR, R.E., Offg. Superintendent, 2nd grade, on the Survey operations with the Burma-China Boundary Commission, Northern Section, season 1898-99.*

It was again decided to send two parties to demarcate the Burma-China Boundary, one working at the northern end and the other at the southern end, leaving in the centre the frontier between the Wa country and China for next season.

The distance between the parties was so great that, as far as actual survey operations were concerned, they were practically independent of each other, and Captain H. J. Hare, R.E., who was in charge of the Survey Detachment with the Southern Party, is submitting a separate report.

Captain T. F. B. Renny-Tailyour, R.E.  
Surveyor Mahmud Husain.  
Abdul Rahim.  
Sub-Surveyor Mowni Ram,  
39 Khalásis, Interpreters, etc.

} The Survey detachment detailed to accompany the Northern Party is given in the margin.

Mr. J. C. Scott, C.I.E., was the British Commissioner and accompanied the Northern Party. Mr. J. W. Jamieson, of the China Consular Service, was the Chinese Adviser and the following officers were posted to the party:—Lieutenant-Colonel Lloyd, V.C., R.A.M.C., as Medical Officer, Captain H. B. Walker, D.C.L.I., as Intelligence Officer, Captain R. C. Dundas, the Royal Scots, as Signalling Officer after Namhkam, and Captain J. L. W. Ffrench-Mullen, 13th B. L., as Signalling Officer up to Namhkam, 25 Sappers and Miners of the Burma Company were also sent.

General Liu was again the Chinese Commissioner, he was accompanied by Mr. P'eng, several other civil officers and a fairly large escort. Our programme was to demarcate the boundary from the Taping river in a south-easterly direction as far as the Nam Ting (river).