APPENDIX A

LIST AND DISCUSSION OF SCIENTIFIC OBSERVATIONS

TAKEN AND CALCULATED BY

M. ÉMILE ROUX

ENSEIGNE DE VAISSEAU

I. LATITUDES

Numerical Order.	Name and Position of Place of Observation.	Latitude.	Method Employed.
1	*Pho-lu*, Red River (Upper Tonkin), near the post	22° 21′ 30″	Pole Star (Theodolite).
2	*Manhao*, Red River (Yünnan), market by river-side	23° 00′ 45″	Circummeridian altitudes of sun (Sextant).
2 bis.	*Manhao*, Red River (Yünnan), market by river-side	23° 00′ 15″ Mean adopted for Manhao : 23° 00′ 30″	Two groups of circummeridian altitudes of the sun (Theodolite).
3	*Mongtse* (Yünnan), court of the French Consulate at 1′ 2″ S. of the centre of the town	23° 20′ 15″	1 Circummeridian altitude of sun (Theodolite). Result uncertain ; the theodolite being insufficiently rectified.
3 bis.	*Mongtse* (Yünnan), court of the French Consulate at 1′ 2″ S. of the centre of the town	23° 21′	Pole Star (Theodolite). Direct measurement by sun.
3 ter.	*Mongtse* (Yünnan), court of the French Consulate at 1′ 2″ S. of the centre of the town	23° 21′ 55″ Adopted for Mongtse: 23° 21′ 30″, mean between 3 bis. and 3 ter.	Circummeridian altitudes of sun Theodolite).
4	*Fong-Chen-Lin* (Yünnan)	23° 4′	Circummeridian altitudes of sun (Theodolite).
5	*Oua-Kouitsen* (Yünnan)	23° 7′	Meridian altitude of sun (Sextant).
6	*Tamatolo* (Yünnan)	23° 10′	Meridian altitude of sun (Sextant).

Numerical Order.	Name and Position of Place of Observation.	Latitude.	Method Employed.
7	*Ta-Min-Mi*, Red River (Yünnan)	23° 11′	By deduction from the latitude of Tamâtolo. See note.
8	*Mai-Cheu* (Yünnan)	23° 18′ 30″	Meridian altitude (Sextant).
9	*Isa*, above the Red River (right bank) (Yünnan), camping ground on mound to W. of town	23° 22′	Pole Star (Theodolite). Direct measurement by Sirius.
10	*Souto* (Yünnan)	23° 19′ 30″	By deduction from the latitude of Isa.
11	*Sou-Tchou-Saï* (Yünnan)	23° 9′ 30″	Circummeridian altitudes of sun (Theodolite).
12	*Sama* (Yünnan)	22° 57′	Circummeridian altitudes of sun (Theodolite).
13	*Point on the Black River* (Ly-sien-kiang), at intersection of route from Isa to Muong-Le	22° 49′	Circummeridian altitudes of sun (Theodolite).
14	*Muong-Le* (Yünnan), centre of town	22° 35′ 20″	Circummeridian altitudes of sun (Theodolite). 28th March.
14 bis.	*Muong-Le* (Yünnan), centre of town	22° 35′ Mean adopted for Muong-Le: 22° 35′ 10″	Circummeridian altitudes of sun (Theodolite). 29th March.
15	*Ta-Koue-Lin* (Yünnan)	22° 33′ 30″	Circummeridian altitudes of sun (Theodolite).
16	*Im-Pou-Tsin* (Yünnan)	22° 37′ 45″	Circummeridian altitudes of sun (Theodolite).
17	*Ssumao* or *Semao* (Yünnan), court of the inn Ou-shing-hao	22° 46′ 07″ 22° 46′ 47″ 22° 45′ 50″ Mean adopted for Semao : 22° 46′ 30″	6 Circummeridian altitudes of sun taken 2 by 2 (Theodolite).
18	*Kotchiento* (Yünnan), to E. of Ta-lotsin chain	22° 39′ 25″	Pole Star (Theodolite). Direct measurement by Sirius.
19	*Tïan-Pi*, point where the Mekong is intersected by the route from Semao to Dayakeu (Yünnan)	22° 37′	Circummeridian altitudes of sun (Theodolite).
20	*Nampe*, point where the Mekong is intersected by the route from Chuen-lo to Mong-pan (Yünnan)	23° 00′ 45″	Circummeridian altitudes of sun (Theodolite).
21	*Mang-Kaï* (Yünnan)	23° 13′ 41″ 23° 13′ 17″ Mean adopted 23° 13′ 30″	Two groups of Pole Star altitudes (Theodolite). Direct measurement by Venus.

APPENDIX A

Numerical Order.	Name and Position of Place of Observation.	Latitude.	Method Employed.
22	*Mong Ka* (Yünnan)	23° 25′	Circummeridian altitudes of sun (Theodolite).
23	*Mienning* (Yünnan), court of the inn Iang-Ching, suburb E. of town	23° 53′ 45″	Pole Star (Theodolite). Direct measurement by moon.
24	*Tcheya* (Yünnan)	24° 12′ 45″	Pole Star (Theodolite). Direct measurement by Venus.
25	*Yünchou* (Yünnan), court of the inn Fou-tchi-tchou	24° 25′	Circummeridian altitudes of sun (Theodolite).
26	*Chunning-Fou* (Yünnan)	24° 34′ 15″	Circummeridian altitudes of sun (Theodolite).
27	*Tsa-Fa-Se* (Yünnan)	25° 01′ 30″	1 Circummeridian altitude of sun (Theodolite). Direct measurement by sun.
28	*Tali-Fou*, court of the Catholic Mission in the centre of town	25° 42′ 30″	Circummeridian altitudes of sun (Theodolite).
29	*Kiang-Pin* (Yünnan)	25° 59′ 25″	Pole Star (Theodolite). Direct measurement by the Great Bear.
30	*Yun-Long-Cheou* (Yünnan)	25° 47′ 15″	Pole Star (Theodolite). Direct measurement by Sirius.
31	*Pen-Tchou-Miao*, near Tchelotsen (Yünnan)	25° 48′ 15″	Pole Star (Theodolite). Direct measurement by Venus.
32	*Hekipa*, above the route from the Mekong (Yünnan)	26° 22′ 30″	Pole Star (Theodolite). Direct measurement by the Great Bear.

The two instruments used for determining the above latitudes were—

(1) A Hurlimann sextant graduated to 10″, and
(2) A Hurlimann small theodolite graduated to 1′.

The sextant observations are subject to errors of centring, both constant and variable, amounting in the best instruments to 1′; so that the readings apparently true to 10″ are not absolute. The error can only be partially rectified by taking the meridian altitudes of two stars, one to the north and the other to the south, and adopting the mean of the results. This proceeding, however, requires both time and patience, and the care and difficulty attending night observations with the sextant are well known.

Moreover, in tropical and semi-tropical countries these latter methods are the only ones possible during the greater part of the year. From the 8th of March I was obliged to discontinue the use of the sextant for obtaining latitudes by observation of the sun, the double meridional altitude on that date reaching 126°, or almost the extreme limit of the graduations. From latitude 23° the instrument became unavailable until October. Added to which the necessity for having a

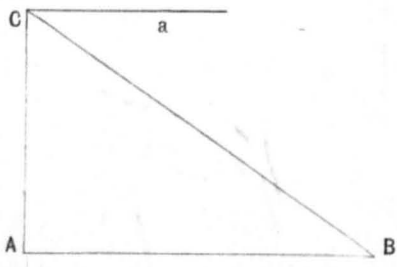
sufficient quantity of mercury for the artificial horizon, and of keeping it perfectly clean, are further drawbacks when on the march. For the foregoing reasons, I soon gave up using the sextant in favour of the theodolite. By land the latter instrument is far handier, and quite as accurate. By always taking double observations of the altitudes—that is to say, with the telescope on the right and again on the left—the errors of collimation and level are eliminated; and as it is easy to estimate to $\frac{1}{2}$ and even to $\frac{1}{3}$ of a division, one can count on being correct to 30″.

I most generally employed the method of finding the latitude by two circummeridian altitudes without previous calculation. This has the advantage of dispensing completely with the knowledge of absolute values, and it is sufficient to have a good watch with a second hand to mark the exact interval of time between the two observations, which may be taken, immaterially, either before or after noon. The calculation is a little longer than that of latitude deduced from meridian observation; but the observation is easier and more reliable, the greatest advantage being that one has usually from twenty minutes to forty minutes during which it is possible to take it, instead of being obliged to seize a precise moment, when, as likely as not, the sun may be covered by a cloud.

On days when we were halted I have sometimes taken a single circummeridian altitude, but on these occasions it was imperative to know exactly the error of the watch, and for that reason to take the observation either two hours before or two hours after midday. From all points of view this method is inferior to the other. Finally, I often employed the pole star, obtaining the true value by some heavenly body immediately before my observation.

All my altitudes have been invariably observed in the following manner:—Set the telescope so that the sun shall be either a little above or below the observing wires; then begin to count, taking the time when the sun's disc is tangent to the first thread; observe successively the time of passing the seven threads of the eye-piece; read upper and lower vernier: this reading is that which corresponds to the mean of the times noted. If the observation has been made with the telescope on the right, repeat with it on the left, and take the mean. Every altitude thus obtained corresponds in reality to the mean of a series of 7. Those which differ from the mean, and which therefore are useless, can be struck out. When obliged to count for myself, I thought it enough to observe the passage at the 1st, 4th, and 7th threads.

The latitudes obtained by the theodolite may be considered as, approximately, exact to 30″ or 45″; those of Ssumao, Manhao, Mongtse, etc., being the mean of two or three groups of observations, exact to 15″ or 30″. Similarly, those obtained by the sextant are to be regarded as approximately exact to 1′ to 1′ 30″. Both at Tali-Fou and at Ssumao I was able to compare my results with those of Francis Garnier, and the discrepancy in neither case amounted to 1′.



Latitudes Nos. 7 and 10 were deduced from Nos. 6 and 9 by the subjoined method, common enough in mountainous countries:—

Let C B be two points, visible to each other, the latitude of B being ascertained by observation, and its altitude known by barometric readings. The next day being at C, and the state of the atmosphere precluding observation, the latitude of C may be deduced from fixing its position relatively to B.

For this purpose observe the altitude of C, and take by theodolite the inclination of the slope CB:

Let H = altitude of B
and let H′ = altitude of C,
then in the triangle ABC
$AB = AC \cot \alpha = (H' - H) \cot \alpha.$

The result of this calculation gives the horizontal projection, that is to say, the distance on the map, and hence the latitude of C. It is enough that the difference of position of the two points should be sufficient to prevent any slight intermediate barometric change producing more than an insignificant effect on AB. In cases 7 and 10 these differences were considerable, amounting to 3,136 feet and 1,394 feet respectively.

II. DECLINATIONS

The declinations were obtained with the compass-theodolite with additional piece. Previous observations of the sun had given its azimuth, and consequently the true north. The mean of forty readings of the needle (5 point south; 5 point north; needle above, telescope on the right; *id.*, needle above, telescope on the left; *id.*, needle below, telescope on the right; *id.*, needle below, telescope on the left) gave the magnetic north. The declinations of Tali-Fou and Ssumao were obtained by eighty readings, forty with each of my two needles. Their error was from 30″ to 1′.

Numerical Order.	Date.	Name and Position of Place of Observation.	Magnetic Declination.
1	11 October 1894	*Pnompenh* (Cambodia), Residency garden . . .	1° 30′ 50″ E.
2	23 „ „	*Battambang* (Siam), court of the mission	1° 16′ 10″ E.
3	3 February 1895	*Lang Nhu* (between Baoha and Pho-lu, Red River, Upper Tonkin)	1° 23′ 15″ E.
4	11 „ „	*Manhao* (Red River, Yünnan).	1° 23′ 30″ E.
5	22 „ „	*Mongtse* (Yünnan), court of French Consulate . .	1° 18′ 40″ E.
6	8 March „	*Tamatolo* (Yünnan). . .	1° 08′ 40″ E.
7	8 April „	*Ssumao* (Yünnan), 1093 yards south, 18½ m. east of the inn Ou-Shing-Hao . .	1° 38′ 40″ E.
8	19 „ „	*Ta-Chui-Chong*, between Tian-pi on the Mekong and Dayakeu (Yünnan) . .	1° 42′ 10″ E.
9	29 „ „	*Mong-Ka* (Yünnan) . .	1° 47′ 40″ E.
10	13 May „	*Tcheya* (Yünnan), route from Mienning to Yün-chou .	1° 45′ 30″ E.
11	23 „ „	*Tsa-Fa-Se*, road from Chunning-fou to Mêng-Huating (Yünnan)	1° 36′ 55″ E.
12	29 „ „	*Tali-Fou*, court of mission (Yünnan)	1° 38′ 30″ E.
13	25 June „	*Tche-lo-Tsen* (Yünnan) . .	1° 47′ 30″ E.
14	17 July „	*Hekipa*, above the right bank of the Mekong (Yünnan) .	1° 57′ 30″ E.

As was to be expected, the N.-E. declinations increased almost steadily in proportion as we advanced in a north-westerly direction. It was only near Muong-le (Chinese Laos) that minerals were in sufficient evidence to falsify completely the indications of the needle. There I found three declinations so

utterly at variance with each other and with the probable result, that I was obliged to reject them altogether. On every other occasion constant verifications admitted of my placing entire reliance upon the readings of the compass.

Being actually the first traveller in Yünnan to take precise declinations (Francis Garnier had no theodolite), I had no data for a comparison with the annual increase or decrease of magnetic intensity in that country. It is to be hoped that future observations made at the same points for several years may supply what is desirable.

My instruments having been stolen at the end of July by the Lamasjen, my astronomical observations ceased from that date.

III. LONGITUDES

Numerical Order.	Date.	Place of Observation.	Longitude (E. of Paris).
1	2 April 1895 .	*Impoutsin* (route from Muong-le to Ssumao) . . .	99° 24′
2	6 „ „ .	*Ssumao* (court of the inn Ou-Shing-Hao)	98° 47′ 30″
3	27 „ „ .	*Mang-Kaï* (route from Mong-Pan to Mong-Ka) . .	98° 4′
4	30 May „ .	*Tali-Fou* (court of the Catholic Mission)	97° 59′
5	25 June „ .	*Pagoda Pentchou-Miao*, near Tche-lo-tsen (route from Yunlong-Chou to the Mekong)	97° 14′
6	26 „ „ .	*Fey-Long-Kiao* (on the bank of the Mekong) . . .	97° 6′

The longitude of Fey-Long-Kiao was the last observed, owing, as above, to the loss of my theodolite.

Instrument and Method Employed.—The foregoing longitudes were obtained by the use of the small Hurlimann theodolite graduated to 1′. For their determination I used the method of equal altitudes of moon and stars ably set forth by M. Caspari, ingénieur hydrographe de la marine, in the second part of his *Cours d'astronomie pratique* (Paris, Gauthier-Villars, p. 155). The principle of this system is essentially the same as that of the method of lunar altitudes; but errors of refraction, reading, and graduation are allowed for in the following manner:—

Fix the telescope of the theodolite at a certain height, which it is not necessary to know exactly. Choose a star, for purposes of comparison, as near as possible to the moon's trajectory, and note the time at which the foremost of the two bodies, in the direction of the diurnal motion, passes beneath the horizontal thread. Then displacing the telescope in azimuth, without altering its height, await the transit of the second body, and again note the time. At each of such junctures observe the level, to check the stability or variations of inclination of the axis of the telescope.

As shown by the formulæ of M. Caspari, the refractions, which owing to the proximity of the two bodies may be considered as identical, do not appear in the calculation; the absolute altitudes being immaterial, the errors of graduation are removed; and it is enough to observe one side of the axis only, whether with the telescope on the right or on the left. Immediately before or after, the local time should be ascertained.

In the case where the two bodies are near meridian passage, the observations

of azimuth may be substituted for those of altitude. The former was the method adopted in determining the longitude of Ssumao.

This proceeding is, on the whole, the best that can be followed in exploration, next to that of occultations, which necessitate the carrying of a powerful telescope. It is superior to those of lunar altitudes and lunar distances by the sextant, as the value of the latter depends upon taking several series east and west to eliminate the error of centring. Nevertheless, it must be borne in mind that every error of observation being multiplied by thirty in the result, an approximation only of from 7′ to 10′ can be counted on with the small theodolite at my disposal. With a large theodolite repeater M. Caspari was able to obtain an approximation of 2′, but such a result can only be regarded as exceptional.

This want of precision being recognised, I was unable to bring to bear the same exactness of correction on my longitudes as on my latitudes. I can, however, affirm that each point entered in the foregoing list lies within a settled zone of between 15′ and 20′ in breadth. It is important, while bearing in mind the vast tracts of wholly unexplored country involved, to admit a certain, even if exaggerated, margin for error. This importance naturally decreases in proportion as the divergence in the observations diminishes, and disappears if it is a matter of correcting a march of a few days only.

By a systematic comparison of my estimated with my observed latitudes, I can show the amount of reliance to be placed on my reckoning. In a period of travel extending over two months the error never amounted to more than between 7′ and 10′. As Francis Garnier based all his longitudes on observations of lunar distances with the sextant, their approximation is not closer. For the positions of Tali and Ssumao, the two fundamental points of my map, through which places he also passed, I have therefore judged it the most reasonable process to take the mean between our respective observed longitudes, using my value for error in the estimated longitudes.

From all which deliberations I am in a position to assume that the error in the longitudes of my map does not exceed 4′ to 5′—at any rate as far as Tali-Fou. After the loss of my theodolite I had to rely on my estimation; yet, on comparing my journey with that of Captain Gill to Atentsé, and with the geodesic survey of India, I was able on arrival in Assam to check my calculations, and to correct the intermediate points in proportion. When we reached Khamti, after three months' travel through the most arduous country, I was only 6′ out in latitude and 5′ in longitude from the position laid down by Colonel Woodthorpe. Such a result, which I confess surpassed my expectations, shows how accurate the method of estimation can be made with great care and some experience. I should add that during those three months I was able to look back from each summit to others which I had passed a week or a fortnight previously, and thus had several opportunities of checking my results.

I had carried with me two of those chronometers (Leroy) known in the navy under the name of torpedo-boat watches, but I soon gave up using them. I found that in a rough and difficult country, where falls, immersions, and all manner of accidents were of constant occurrence, it was next to impossible to preserve watches from sudden shocks. Further, we daily experienced changes in temperature of as much as 20°, which disturbed their rate of going, while the practical impossibility of making sufficiently long and frequent halts to regulate them, quickly convinced me of the futility of attempting to determine longitude by the passage of time.

As for occultations, I confess that I had not a single opportunity of observing one under favourable conditions. My telescope was not of sufficient power to allow me to observe clearly the occultations of stars of the fifth and seventh magnitude, nor did the atmospheric state ever admit a chance of observing those of the first magnitude, which, as is well known, is sufficiently rare elsewhere.

IV. ALTITUDES

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Hong-Kong.	Temperature (Fahr.) Mean at Hong-Kong.		
1895.							Feet.
7 Feb.	Bac-Sat (Tonkin), Red River	29.64	64°.40	30.03	57°.20	22°	368
,, ,,	Long-Pô (China-Tonkin frontier), Red River	29.56	68°	,,	,,	23°	444
,, ,,	*Manhao*	29.48	71°.60	,,	,,	,,	516
18 ,,	*Mongtse*	25.70	,,	30.11	66°.20	,,	4,509
27 ,,	Highest point of col on route, Mongtse to Long-choui-tieou	24.05	48°.20	,,	69°.80	,,	6,273
28 ,,	Long-choui-tieou	24.64	57°.20	,,	,,	,,	5,676
,, ,,	Highest point on route, Long-choui-tieou to Choui-Tien (summit of the Cone Chain)	24.13	55°.40	,,	,,	,,	6,227
,, ,,	Choui-Tien	25.82	66°.20	,,	,,	,,	4,371
3 March	Sha-ha-te	25.27	57°.20	30.19	59°	,,	4,950
4 ,,	Passage of the Mafong Ho	27.00	,,	,,	62°.60	,,	3,120
,, ,,	Col of chain between the Mafong Ho and the Chilipo Ho	25.31	60°.80	,,	,,	,,	4,946
,, ,,	*Fong Chen Lin*	25.94	57°.20	30.00	,,	,,	4,058
5 ,,	Highest point of col on route, Fong Chen Lin to Sin-Ka	24.01	68°	,,	,,	,,	6,290
,, ,,	Col near Sin-Ka	24.68	60°.80	,,	,,	,,	5,490
6 ,,	Ouong-chou-pe	23.66	62°.60	,,	,,	,,	6,672
7 ,,	Bottom of valley of the Yang-si Ho	26.25	82°	29.92	68°	,,	3,765
,, ,,	Highest point on route, Poun-ka to Tamatolo	25.11	68°	,,	,,	,,	5,059
9 ,,	Bank of Red River near Ou-pang	28.93	91°	30.00	66°.20	,,	1,047
,, ,,	Sintchaï	26.41	68°	,,	,,	,,	3,367
10 ,,	Ou-mou (banks of the Ou-long Ho)	28.89	82°	29.92	64°.40	,,	1,063
,, ,,	Pin-ngantchaï (banks of the Ou-long Ho)	28.70	73°.40	,,	,,	,,	987

APPENDIX A

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Hong-Kong.	Temperature (Fahr.) Mean at Hong-Kong.		
1895.							Feet.
11 March	Col crossing chain between the Ou-long Ho and the Red River . . .	26.81	95°	30.00	66°.20	23°	3,278
,, ,,	Banks of the Red River near Lou-ping . .	28.77	91°	,,	,,	,,	1,204
12 ,,	Col between Maïcheu and Toute	28.03	,,	,,	69°.80	,,	1,978
13 ,,	*Isa*	26.37	80°.60	29.84	75°.20	,,	3,581
14 ,,	Souto	25.00	78°.80	29.80	,,	,,	5,088
15 ,,	*Long-ti*	24.09	68°	29.88	69°.80	,,	6,095
16 ,,	Col above Long-ti (route from Tchimpou) . .	23.38	,,	30.11	60°.80	,,	6,942
,, ,,	Tayang-Ka	24.80	71°.60	,,	,,	,,	5,497
17 ,,	Highest point on route, Tayang-ka to Tchekou .	23.58	46°.40	30.27	50°	,,	6,733
,, ,,	Tchekou	24.25	,,	,,	,,	,,	6,053
18 ,,	Col crossing chain of separation between the Red River and the Nam-na .	23.38	52°	30.23	53°.60	,,	7,073
,, ,,	Banks of the Nam-na . .	24.80	71°.60	,,	,,	,,	5,569
19 ,,	Chain separating the Nam-na from the Ni-lung Ho .	23.70	47°	30.19	64°.40	,,	6,666
,, ,,	Passage of the Ni-lung Ho	25.31	68°	,,	,,	,,	4,957
20 ,,	Col in the chain dividing the Ni-lung Ho from the La-ka Ho . . .	23.11	57°.20	30.15	66°.20	,,	7,445
,, ,,	Passage of the La-ka Ho .	25.98	68°	,,	,,	,,	4,226
22 ,,	Col between the La-ka Ho and the Laniou Ho .	24.96	64°.40	30.11	60°.80	,,	5,278
,, ,,	Passage of the Laniou Ho .	26.73	,,	,,	,,	,,	3,354
,, ,,	Col between the Laniou Ho and the Pa-san Ho .	24.21	62°.60	,,	,,	,,	6,125
24 ,,	Passage of the Pa-san Ho	26.41	78°.80	29.88	68°	,,	3,541
25 ,,	Col between the Pa-san Ho and the Lysien Kiang (Black River) . . .	25.94	80°.60	29.92	69°.80	22°	4,114
,, ,,	Passage of the Black River .	28.03	89°.60	,,	,,	,,	1,890
26 ,,	Tian-si	25.43	75°.20	29.88	,,	,,	4,624

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Hong-Kong.	Temperature (Fahr.) Mean at Hong-Kong.		
1895.							Feet.
27 March	Col between Tian-si and the Mote Ho, large affluent of Black River . .	24.48	75°.20	29.88	73°.40	22°	5,734
,, ,,	Passage of the Mote Ho .	26.10	68°	,,	,,	,,	3,867
28 ,,	*Muong-Le*	26.25	75°.20	30.07	57°.20	,,	3,845
30 ,,	Col between Muong-Le and Pi ma tchaï . . .	25.70	60°	30.19	68°	,,	4,486
,, ,,	Passage of the Mote Ho or Mong-ie-tsin Ho .	27.12	75°.20	,,	,,	,,	3,044
1 April	Ta-chai (banks of the Menling Ho) . . .	26.22	69°	30.07	,,	,,	3,902
2 ,,	Col crossing the chain dividing the basins of the Red River and the Mekong .	25.39	77°	30.00	71°.60	23°	4,799
,, ,,	Highest point on route Impoutsin to Kale . .	24.21	64°.40	,,	,,	,,	6,096
3 ,,	Near Chen-Lao (passage of the Cheun-long Ho) .	26.69	80°.60	29.96	73°.40	,,	3,344
5 ,,	Col between the Cheun-long Ho and the Man-lo Kiang	24.96	86°	29.80	75°.20	,,	3,867
6 ,,	*Ssumao*	25.59	84°.20	29.92	78°.80	,,	4,568
11 ,,	Undulating plateau near Tchin-oue (mean altitude)	,,	73°.40	30.11	69°.80	,,	4,667
13 ,,	Passage of the Lan-gan Ho	26.57	82°.40	,,	73°.40	,,	3,630
14 ,,	Breach in Talo Mts. . .	25.39	78°.80	30.00	75°.20	,,	4,825
15 ,,	*Long-Tang*	26.37	,,	29.92	71°.60	,,	3,633
16 ,,	Col between Long-Tang and the Long-Tang Ho .	26.06	84°.20	,,	77°	,,	4,025
,, ,,	Col between the Long-Tang Ho and the Tiou-fan Ho	25.27	82°.40	,,	,,	,,	4,911
17 ,,	Col between the Tiou-fan Ho and the Mekong .	25.03	81°	,,	80°.60	,,	5,197
18 ,,	Bank of the Mekong at Tian-pi	27.55	75°.20	29.96	77°	,,	2,419
,, ,,	Ta Choui-chong . .	24.33	80°.60	30.00	,,	,,	4,706
19 ,,	Lapatchin	26.33	73°.40	29.96	,,	24°	3,685
23 ,,	Passage of the Heu Ho .	27.48	78°	29.88	,,	,,	2,441
,, ,,	Lalichin	25.47	82°.40	,,	,,	,,	4,648
,, ,,	Col between Lalichin and Meng-pou . . .	24.40	78°.80	,,	,,	,,	5,405

APPENDIX A

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Hong-Kong.	Temperature (Fahr.) Mean at Hong-Kong.		
1895.							Feet.
23 April	*Meng-Pou*	25.19	77°	29.88	77°	24°	4,937
24 ,,	Col between Meng-pou and Chouen-lo	24.21	,,	,,	71°.60	,,	6,059
25 ,,	Col between Chouen-lo and the Mekong . . .	24.17	,,	,,	68°	,,	6,085
,, ,,	Bank of the Mekong near Nampe	27.44	80°.60	,,	,,	,,	2,454
26 ,,	Col whence the plain of Mong-Pan came in view .	25.27	71°.60	29.92	73°.40	,,	4,838
,, ,,	*Mong-Pan*	25.98	75°.20	,,	,,	,,	4,060
27 ,,	Col between Mong-Pan and the Lan Kiou Ho . .	24.96	78°.80	29.96	,,	,,	5,273
,, ,,	Passage of the Lan Kiou Ho	25.59	,,	,,	,,	,,	4,555
,, ,,	Col between the Lan Kiou Ho and Mang Kaï . .	24.60	77°	,,	,,	,,	5,520
28 ,,	Summit of plateau between Mang Kaï and Mong-Ka	24.72	76°	29.80	78°.80	,,	5,411
,, ,,	*Mong-Ka*	26.33	80°.60	,,	,,	,,	3,597
30 ,,	Col between Mong-Ka and the Mekong . . .	23.38	73°.40	29.92	80°.60	,,	6,543
1 May	Bank of the Mekong at Tapong	27.36	78°.80	,,	,,	,,	2,603
,, ,,	Col between the Mekong and the Latung Ho .	24.33	72°	,,	,,	,,	5,760
,, ,,	First passage of the Latung Ho near Latung . .	25.55	73°.40	,,	,,	,,	4,571
2 ,,	Touko	24.40	75°.20	29.88	,,	,,	5,869
,, ,,	Col between Touko and Pochan	23.34	77°	,,	,,	,,	7,172
,, ,,	*Pochan*	24.29	,,	,,	,,	,,	6,020
25 April	Chouen-lo	25.86	,,	,,	68°	,,	4,137
,, ,,	Passage of the Tatchio-tou Ho	24.88	80°.60	,,	,,	,,	5,242
,, ,,	Col between the Tatchio-tou Ho and Tachin . .	24.52	,,	,,	,,	,,	5,692
26 ,,	Col between Tachin and Tiou-pou-fang . .	23.38	73°.40	29.92	73°.40	,,	7,086
28 ,,	Passage of the Sekiang near the Mekong . . .	23.42	78°.80	29.80	78°.80	,,	2,496

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Amoy.	Temperature (Fahr.) Mean at Amoy.		
1895.							Feet.
29 April	Col between the Sekiang and the Tchen-chi Ho .	23.50	78°.80	29.88	75°.20	24°	6,952
30 „	*Tamano*	24.17	73°.40	29.92	80°.60	„	6,178
1 May	Col between Tamano and the district of Linguen .	23.07	„	„	„	„	7,531
„ „	Passage of the Linguen Ho	24.56	78°.80	„	„	„	5,740
3 „	*Mienning*	25.07	77°	30.00	„	„	5,207
7 „	Col crossing the chain of separation between the Salwen and Mekong basins	22.79	70°	29.84	„	„	7,776
8 „	Col crossing the great chain directly overhanging the Mekong . . .	22.40	62°.60	29.92	77°	25°	8,262
9 „	Pan-tong-ka . . .	25.31	75°.20	29.88	78°.80	„	4,803
10 „	Ta-cheu-tou-kai . . .	24.68	71°.60	„	75°.20	„	5,565
11 „	Manto (banks of the Mong-ma Ho) . . .	24.88	73°.40	29.96	71°.60	„	5,445
12 „	Tcheya (banks of the Mong-ma Ho)	24.60	„	29.80	80°.60	„	5,549
14 „	Col between the sources of the Mong-ma Ho and Yünchou . . .	23.03	82°.40	„	„	„	7,531
15 „	*Yünchou*	26.10	84°.20	„	„	„	3,834
16 „	*Lotan*	25.07	80°.60	29.71	„	„	4,957
17 „	*Chunning-Fou* . . .	24.48	77°	29.64	86°	„	5,584
18 „	Col crossing chain whence the Pe Hsiao Ho descends	22.71	62°.60	29.92	71°.60	„	7,818
20 „	Bank of the Mekong (bridge of the Tilung Kiang) .	26.37	78°.80	29.88	73°.40	„	3,604
„ „	Col crossing the chain which bounds the Mekong on the N.	22.00	62°.60	„	„	„	8,688
21 „	Mon-tian-cho . . .	25.55	78°.80	29.76	80°.60	„	4,443
23 „	Col in the chain on left flank of the Yang-pi-kiang .	23.18	80°.60	29.92	68°	„	7,340
„ „	Passage of the Kou-lo Ho .	24.60	66°.20	„	„	„	5,549
24 „	Col in the chain above the plain of Mêng-hua-ting .	22.44	„	„	„	„	8,294

APPENDIX A

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Amoy.	Temperature (Fahr.) Mean at Amoy.		
1895.							Feet.
25 May	Ta Chang (plain of Mêng-hua)	24.09	78°.80	29.76	69°.80	25°	6,087
26 „	Col separating plains of Mêng-hua and Tali-Fou .	21.88	57°.20	29.60	78°.80	„	8,589
27 „	*Tali-Fou*	23.34	69°.80	29.80	75°.20	„	7,007
18 June	Col between Teng-chouan-cheou and Fong-Yu .	21.81	68°	29.88	89°.60	„	9,150
19 „	Col between Fong-Yu and Kiang-pin . . .	20.59	59°	29.76	„	„	10,556
21 „	Kiang-pin	23.54	75°.20	29.80	86°	26°	6,784
„ „	Col between the Yang-pi and Kouang-pin . .	21.41	62°.60	„	„	„	9,447
				Barometer Mean at Amoy or Shanghai.	Temperature (Fahr.) Mean at Amoy or Shanghai.		
22 „	Col between Kouang-pin and the Pi-kiang . .	22.08	68°	29.80	82°.40	„	8,607
23 „	*Yün Long Cheou* . .	24.64	80°.60	29.71	87°.80	„	5,504
25 „	Col between Yün Long Cheou and the Mekong .	21.41	59°	29.52	86°	„	9,213
„ „	Bank of the Mekong at Fey-long-kiao . . .	25.66	75°.20	„	„	„	4,082
27 „	Col in the chain of separation between the Mekong and Salwen basins . .	20.98	55°.40	29.71	84°.20	„	9,937
30 „	Bank of the Salwen at Loukou Lotsolo . .	26.77	84°.20	29.56	89°.60	„	2,872
8 July	Lotsolo	24.01	71°.60	29.80	82°.40	„	6,250
12 „	Col in the chain of separation between the Mekong and Salwen basins . .	19.21	66°.20	29.76	86°	„	11,823
14 „	Bank of the Mekong at Piaotsen . . .	25.31	68°	„	89°.60	„	4,703
15 „	Tonô	24.88	77°	29.71	87°.80	„	5,216

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Amoy or Shanghai.	Temperature (Fahr.) Mean at Amoy or Shanghai.		
1895.							Feet.
17 July	Hekipa	22.75	77°	29.68	87°.80	26°	7,821
18 ,,	Tatsasu	25.00	82°.40	,,	,,	,,	5,054
23 ,,	Ta Hsiao Chouan . .	23.58	78°.80	29.64	82°.40	,,	6,672
24 ,,	Tsiten	21.65	75°.20	29.68	84°.20	,,	8,818
25 ,,	Keuntinkien . . .	22.51	77°	29.84	86°	,,	8,225
26 ,,	Feoutsen	23.50	82°.40	29.80	84°.20	,,	6,961
28 ,,	Tié Ho	23.70	69°.80	29.71	87°.80	,,	6,575
30 ,,	In Chouan . . .	23.22	77°	29.88	86°	27°	7,348
31 ,,	Sin-tchan-pin . . .	23.74	84°.20	,,	,,	,,	6,698
				Barometer Mean at Shanghai.	Temperature (Fahr.) Mean at Shanghai.		
1 Aug.	Toti	23.54	75°.20	29.88	87°.80	,,	6,926
2 ,,	Tolo	23.97	78°.80	29.84	82°.40	,,	6,382
5 ,,	Bank of the Mekong near Sianpin-chouan . .	24.64	77°	29.68	89°.60	,,	5,456
7 ,,	Lameti	23.97	80°.60	29.71	86°	,,	6,301
8 ,,	Lometi	24.52	73°.40	29.68	,,	,,	5,552
9 ,,	Loza	23.50	75°.20	29.60	87°.80	,,	6,740
12 ,,	Lo Kieou (banks of Mekong)	24.29	78°.80	29.80	78°.80	,,	5,941
17 ,,	Banks of the Mekong near Gocha	24.17	84°.20	29.76	80°.60	,,	6,100
,, ,,	Dekou	24.05	69°.80	,,	82°.40	,,	6,155
20 ,,	Tsekou	23.85	80°.60	29.84	86°	28°	6,559
24 ,,	Gotra	23.46	75°.20	29.64	84°.20	,,	6,801
26 ,,	Kiuchu	20.90	62°.60	29.80	78°.80	,,	10,135
27 ,,	*Atentsé*	20.27	51°.80	29.92	86°	,,	11,060
28 ,,	Yan-kan-go . . .	23.07	69°.80	29.88	73°.40	,,	7,373
14 Sept.	Col in the chain of separation between the basins of the Mekong and the Salwen (beneath Peak Francis Garnier) . .	18.89	37°.40	29.96	80°.60	,,	12,860

APPENDIX A

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	At same Date.		Latitudes.	Altitudes.
				Barometer Mean at Shanghai.	Temperature (Fahr.) Mean at Shanghai.		
1895.							Feet.
16 Sept.	First passage of the river Donyon	22.55	57°.20	29.92	75°.20	28°	7,998
18 ,,	Meuradon (banks of the Donyon) . . .	23.74	66°.20	30.07	73°.40	,,	6,751
19 ,,	Col between the Donyon and the Salwen . .	21.92	71°.60	30.11	,,	,,	9,101
20 ,,	Banks of the Salwen near Tionra	25.11	75°.20	30.15	69°.80	,,	5,193
24 ,,	Banks of the Salwen at Djewan	,,	71°.60	29.92	73°.40	,,	5,019
28 ,,	Col in the chain separating the Salwen from the Poula Ho	18.93	50°	30.03	71°.60	,,	12,896
29 ,,	Tamalo	23.42	64°.40	30.00	64°.40	,,	6,886
5 Oct.	Col in the Mongon-ko chain	19.96	51°.80	Barometric and Thermometric Mean for the Month of October at Amoy.		,,	8,341
,, ,,	Banks of the Seke Lon .	21.69	,,			,,	9,295
7 ,,	Col in the chain of separation between the basins of the Salwen and the Irawadi	19.80	46°.40	29.96	77°	,,	8,406
9 ,,	Toulong	24.92	68°			,,	5,401
13 ,,	First passage of the Kiou-kiang or Tourong . .	25.62	64°.40			,,	4,460
16 ,,	Deidoum	24.29	69°.80			,,	6,027
19 ,,	Banks of the Kiou-kiang near the confluence of the Laonatsi . . .	26.25	62°.60			,,	3,762
21 ,,	Highest point on route from Deidoum to Tukiu Mu .	20.94	53°.60			,,	10,121
22 ,,	Passage of the river Tetchen	25.00	59°			,,	5,114
30 ,,	Col between Tukiu Mu and Mandoum . . .	25.59	66°.20			,,	4,512
,, ,,	Passage of the river Dublu at its confluence with the river Telo . . .	26.96	53°.60	Do. Do. for the Month of November.		,,	2,972
2 Nov.	Col in the chain separating the river Telo from the river Reunnam (Sinbinti)	22.47	57°.20	30.03	68°	,,	8,146
5 ,,	Confluence of the Wan-ou and the Reunnam . .	28.07	68°			,,	1,909

Dates.	Places of Observation.	Barometer Corrected.	Temperature (Fahr.) at Time of Observation.	Barometric and Thermometric Mean for the Month of November at Amoy.		Latitudes.	Altitudes.
1895.							Feet.
8 Nov.	Col between the Reunnam and the Tsan (Dzôn Redzi)	22.47	57°.20			28°	8,146
10 ,,	Banks of the Tsan . .	28.11	,,			,,	1,867
16 ,,	Col in the Leket chain between the rivers Tsan and Nam Kiou . . .	24.96	73°.40			,,	5,178
19 ,,	Passage of the Nam Kiou .	28.81	,,			27°	1,185
20 ,,	Khamti	,,	,,			,,	,,
26 ,,	Col in the chain separating the basins of the Nam Kiou and the Nam Lang	25.55	57°.20			,,	4,545
29 ,,	Passage of the Nam Lang .	27.79	55°.40			,,	2,179
1 Dec.	Col Nam Tsaï Boum . .	23.85	57°.20			,,	6,487
2 ,,	Col between the Ouëpoukot and the Nam Phungan .	23.30	53°.60			,,	7,063
3 ,,	Bank of the Nam Phungan	25.78	51°.80			,,	4,278
8 ,,	Col of the Phungan Boum .	20.94	37°.40	30.11	59°	,,	9,888
9 ,,	Bank of the Nam Dapha .	24.72	44°.60			,,	5,421
11 ,,	Summit of the chain of separation between the Dihing and the Dapha .	21.57	42°.80			,,	9,150
13 ,,	First passage of the Nam Dihing	28.18	60°.80			,,	1,849
17 ,,	Daphagang . . .	28.34	66°.20			,,	1,701

I. In column 1 are given the corrected barometric pressures with allowance for tide and for the error of the aneroid. The latter was obtained from hypsometric observations taken at least once a week and oftener in all important places. My two hypsometers were supplied by Baudin, and their slight zero error was measured at the start and verified at the finish. To guard against sudden variations in the aneroids, such as might be caused by a blow, I nearly always had two about me, and took simultaneous readings for every altitude. Thanks to these constant comparisons, I can vouch for the exactness of the corrected pressures to within .05905 of an inch.

APPENDIX A

At Ssumao, Tali-Fou, and Atentsé I was able to compare my altitudes with those given by other travellers, with the subjoined satisfactory result :—

	Feet.	Feet.
Ssumao	4,568	4,542 (Francis Garnier).
Tali-Fou	7,007	6,978 (Francis Garnier). 7,070 (Baber).
Atentsé	11,060	11,000 (Captain Gill).

II. Column 2 gives the temperature at the moment of the observation, taken with a sling thermometer of Baudin's.

III. Columns 3 and 4 contain the mean barometric pressure and temperature at sea-level on the same date as the observation. I selected Hong-Kong, Amoy, and Shanghai for base, according as our route lay nearest to their respective latitudes. The readings were kindly furnished by M. Bourgeois, chancellor of the French Consulate at Hong-Kong, who caused the daily meteorological bulletins of the coast of China from February to October to be forwarded to Paris; after 1st October I received only the monthly mean.

IV. In column 5 will be found the degree of latitude nearest to the place of observation which enters into the calculations for the correction of temperature.

V. Lastly, column 6 gives the altitudes calculated after the Radau Tables based on the formula of Laplace. The readings at the point of observation enter simultaneously into the calculation with the corresponding ones under the same parallel by the seashore. They are not laid down as correct to a foot, because one cannot be sure of the local variations in pressure being identical at Hong-Kong and in Yünnan; but, speaking generally, the monthly changes follow the same laws of increase and decrease,—maximum pressure in January, minimum in July,—the amplitude reaching the mean figure of .59055 inch, about 492 feet. Besides that this is the method most universally employed by travellers, it must be owned that one has no better base at one's disposal for disengaging the absolute altitude from the observed pressure. The process of calculation being clearly set forth in the preface to the Radau Tables (Paris, Gauthier-Villars), I abstain from reproducing it here.

PARIS, 17*th June* 1896.

V. REMARKS ON THE METHODS USED FOR FIXING THE PRINCIPAL POSITIONS ON THE MAP

1. MANHAO (point of departure)

Latitude = 23° 00′ 30″ N. Astronomical observations.
Longitude = 100° 54′ E. Following the map of the staff, 1/200,000, published by the Topographic Service of Hanoï (page Mongtse), showing the labours of the Frontier Delimitation Commission.

2. SSUMAO

Latitude = 22° 46′ 30″ N. Astronomical observations.
Longitude = 98° 42′ 30″ E. This longitude is the mean of the three following :—

(1) That given by my estimated distance : 98° 37′.
(2) That given by my astronomical observations : 98° 47′ 30″.
(3) That given by Francis Garnier's observations : 98° 43′.

(For the advantage of this mode of adoption, see the observations at the end of the list of longitudes, *supra.*)

3. Tali-Fou

Latitude = 25° 42′ 30″ N. Astronomical observations.
Longitude = 98° 3′ 45″ E. This longitude is the mean of the three following :—

(1) That given by my estimated distance, taking Ssumao as point of departure : 98° 4′ 30″.
(2) That given by my astronomical observations : 97° 59′.
(3) That given by Francis Garnier's observations : 97° 8′.

4. Atentsé

(No astronomical observations owing to theft of instruments.)
Latitude = 28° 28′ N. This latitude is the mean between—

(1) My estimated latitude : 28° 29′.
(2) Latitude on Gill's map *corrected* : 28° 27′.

In his map Captain Gill makes 28° 23′ the latitude of Atentsé. But as he did not take astronomical observations, I am of opinion that this should be altered 4′, for the following considerations : He places Batang on his map at latitude 29° 53′ 50″, whereas its real latitude, observed with the sextant by Father Desgodins, is 30° 00′ ; his latitude of Tali, on the other hand, is identical with that given by Garnier and verified by myself. There is thus an error of 6′ 10″ on the Batang-Tali length, and by interpolation (Batang, Atentsé, and Tali being practically on the same line) an error of 4′ on the Atentsé-Tali length ; the real latitude of Gill ought therefore to be considered as 4′ more N., which gives 28° 27′. That adopted by General Walker in his map of Thibet is 28° 30′.

Longitude = 97° 00′ E., being the mean between—

(1) My longitude estimated starting from position adopted for Tali : 97° 00′.
(2) The longitude adopted by General Walker in his map of Thibet (July 1894) : 97° 00′.

Which, as is seen, happen exactly to coincide.

5. Khamti (Padao, capital of the country)

Latitude = 27° 22′ 30″ N. Observed by Colonel Woodthorpe. (My own latitude, estimated after two months and a half without any guiding marks, was 27° 28′ 30″, or only 6′ difference. The most recent maps of Assam place Khamti in 27° 24′ N. latitude. But I have thought it better to maintain that of Col. Woodthorpe.)

Longitude = 97° 30′ 45″ E. of Greenwich, or 97° 31′ (95° 11′ E. of Paris). I have adopted this figure from the following considerations :—

Between Khamti and Daphagang (point of arrival on my map, close to the confluence of the Dihing and the Dapha, which appears in the geodesic survey of the positions in Assam) the distance estimated by Col. Woodthorpe is . . 55′ 35″
According to my own estimation this same distance should be . . . 1° 00′ 35″

Mean . 58′ 05″

By carrying this mean difference to the east of Daphagang (96° 32′ 40″) I obtain 97° 30′ 45″, the longitude adopted.

(On arrival at Khamti after two and a half months' march, my estimated longitude was 97° 33′ 15″ E. of Greenwich, while that of Col. Woodthorpe, starting from Assam, was 97° 28′ 15″ ; or only 5′ difference at the point of coincidence on a total route of 3° 30′ in longitude.)

6. Daphagang (point of arrival)

Latitude = 27° 29′ 10″ N.
Longitude = 96° 32′ 40″ E. (Greenwich). Following Col. Woodthorpe and the maps of Assam.

APPENDIX A

METEOROLOGICAL TABLES AND DAILY LOG

OF

M. ÉMILE ROUX

ENSEIGNE DE VAISSEAU

PART I. TONKIN TO TALI-FOU

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.[1]	Min.[1]	Direction.	Force.[2]		
1895.							
7 Feb.	Bac-Sat (Red R. Tonkin)			S.E.	2	Overcast.	Junk on Red R. Laokay to Manhao.
8 „	On Red R. .	69°	59°	„	3	Very fine; overcast at night.	...
9 „	...	75°	62	N.E.	2	...	...
10 „	Manhao (Yün-nan)	71°	66°	E.	4	Cloudy.	10th to 13th, stay at Manhao.
11 „	...	„	„	S.E.	„	Light clouds.	
12 „	...	77°	64°		0	Very fine.	
13 „	...	82°	66°	E.	2	Overcast at night.	
14 „	Kan-tan-tse .	„	51°		0	Very fine.	Manhao to Kan-tan-tse, 2 m. beyond Ho-Teou.
15 „	Sin-chaï . .	„	50°	S.	2	„	Kan-tan-tse to Sin-chaï.
16 „	Mongtse .	77°	„	S.E.	3	„	Sin-chaï to Mongtse. 16th to 26th, stay at Mongtse.
17 „	...	73°	„	„	4	„	[Obs.—On the plateau of Mongtse the wind blows chiefly from the S. and S.E., weakly in the morning, more strongly at night. Climate in winter very fine and dry. Temperature equable.]
18 „	...	77°	51°	„	3	„	
19 „	...	73°	53°	„	„	„	
20 „	...	75°	„	S.W.	4	Fine.	
21 „	...	„	„	S.E.	2	„	
22 „	...	73°	„	S.	4	„	
23 „	...	75°	„	E.N.E.	„	„	
24 „	...	„	51°		0	„	

[1] Maximum represents highest temperature recorded during day; Minimum shows lowest do., in place where the night was passed, as marked in parallel column against the date.

[2] The values of the force of the wind are those in use in seacoast and meteorological returns: from 0 (calm) to 10 (hurricane).

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895.							
25 Feb.	...	75°	55°	S.	2	Fine.	
26 „	...	73°	53°	S.W.	4	„	
27 „	Long-chouitieou	„	50°	S.	3	Cloudy; heavy showers.	Mongtse to Long-choui-tieou.
28 „	Ho-teou	„	57°		0	Very fine.	Long-choui-tieou to Ho-teou.
1 March	Panther Camp	„	60°		„	„	Cross Red R. by ferry.
2 „	Lou-tche-hsien	„	44°	S.W.	3	Fine day. Thick fog at night.	Lou-tche-hsien, a Poula village, 12 miles.
3 „	Sha-ha-te	„	46°		0	Fog.	Sha-ha-te, Chinese village, 3 m.
4 „	Fong-chen-lin	„	50°		„	„	Chinese village, 15 m.
5 „	Sinka	„	„	E.	4	Fog till noon; then fine.	Chinese village, 11 m.
6 „	Ouong-choupe	„	„	N.W.	3	Fog till 10 a.m.; then fine.	Chinese village, 9 m.
7 „	Tamatolo	„	„		0	Very fine.	Chinese village, 7 m.
8 „	...	„	„		„	„	Halt at Tamatolo.
9 „	Sin-chaï	91°	51°	S.E.	4	Burning sky, and wind like sirocco.	T. to S., 7 m. Chinese village.
10 „	Pin-ngan-chaï	82°	59°	„	5	„	P. (Païs or Laotians), 9 m.
11 „	Louping	98°	66°	„	1	Very fine.	P. to L. (Chinese), 15 m.
12 „	Tou-te	„	62°		0	Very fine. Lowering; storm at night.	L. to T. (Chinese), 17 m.
13 „	Isa	84°	60°	W.	2	Very fair.	T. to I. (small Chinese town; about 2000 inhabitants).
14 „	Souto	82°	57°	„	1	„	I. to S. (Chinese), 8 m.
15 „	Long-ti	80°	„		0	„	S. to L. (small Chinese town, about 1500 inhab.), 12 m.
16 „	Ta-yang-ka	75°	46°		„	„	L. to T. (Chinese), 8 m.
17 „	Tchekou	51°	50°		„	Thick fog.	Ta. to Tch. (Lolos), 8 m.
18 „	Lami	„	48°	S.	3	Cold, damp fog.	Tch. to L. (Hou-Nis), 11 m.
19 „	Sou-tchou-saï	68°	50°		0	Fog.	L. to S. (Chinese), 13 m.
20 „	Malo	71°	57°	S.S.W.	2	„	S. to M. (Lolos), 9 m.
21 „	...	68°	59°	„	1	Stormy, showery.	Halt at M.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895. 22 March	Pitchu . .	64°	50°		0	Rain.	M. to P. (Hou-Nis), 9½ m. Time, 3 hrs. 47 min. By col above Malo. Across the Laniouho; ford difficult. Across an affluent of the Laniouho.
23 „	Sama . .	„	53°	S.	3	Overcast.	P. to S. (Hou-Nis), 9 m.; 3 hrs. By Loko-sai (Chinese hamlet) and Niho (Hou-Ni village).
24 „	Pan-hou-tse .	86°	57°		0	Very fair.	S. to P. (Hou-Nis), 13½ m.; 4 hrs. By Kampi Yangtse and Loma (Hou-Nis). Cross the Pasan-Ho.
25 „	Li-sian-pou-tou	89°	60°		„	„	P. to S. (two Hou-Ni houses), 9 m.; 3¼ hrs. By Katchou (Hou-Nis) and Matran (Hatous). Cross the Black R. (Lysien-kiang) in sampan.
26 „	Tian-si . .	87°	„	S.W.	2	„	L. to T. (Hou-Nis), 9½ m.; 3¼ hrs. By Kou-ta-fan (Hou-Nis) and Yutaïpo.
27 „	Mote . .	84°	„	S.S.W.	„	„	T. to M. (Chinese), 17 m.; 3¾ hrs. By Leang-sou-tchaï (Hou-Ni). Cross the Lo-ma-ho by ford (affluent of Lysien-kiang, shallow, wide bed, important in rainy season). Over chain between the Lo-ma-Ho and the Mo-te Ho (source of the Mong-ie-tsin Ho, considerable affluent of Lysien-kiang).
28 „	Muong-le .	„	55°		„	„	Mo. to Mu. (small Chinese town, about 2000 inhab.), 4¾ m.; 2 hrs. Cross the Mo-te Ho. By Mali-sou-tchaï (Chinese) and Patchi (Chinese).
29 „	...	77°	„		„	„	Halt at Muong-le.

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895. 30 March	Keu-ma-tse .	68°	57°	W.	2	Fair.	M. to K. (Chinese), 11 m.; $3\frac{3}{4}$ hrs. By Pima-tchaï (Chinese village). Ford, depth 15 in., over the Mong-ie-tsin Ho, called here the Mong-ou-kiang. Country little inhabited.
31 „	Ta-koue-lin .	71°	60°		0	Fine, hazy.	K. to T. (Païs), 12 m.; $4\frac{1}{4}$ hrs. Ford over the Men-ling Ho, affluent of the Mong-ie-tsin Ho. By Tsoun-chaï (Païs), followed the Men-ling Ho to Hatien (Païs).
1 April	Ta-tchaï .	77°	55°	„	2	Cloudy. Lightning; much hail.	Tak. to Tat. (Chinese), 8 m.; 3 hrs. Up the Men-ling Ho, which crossed several times. By Soun-tchaï (Païs).
2 „	Blue Bird Camp	82°	48°	W.S.W.	„	Very fair.	T. to Camp B. B., $13\frac{1}{2}$ m.; 5 hrs. Follow up the Men-ling Ho past three Païs villages. Crossed chain dividing the Men-ling Ho and the Nam-bang, also the basins of Me-kong and Red Rivers. By Impoutsin (large Chin. vill.).
3 „	Tchen-lao .	88°	47°		0	Fair. Oppressive.	Camp B.B. to T. (Païs), 10 m.; $3\frac{1}{2}$ hrs. Across chain above the Chen-long Ho or Nam-bang. Up left bank by Ho-Kale (Chinese).
4 „	Camp, Fen-chiu-lin	91°	51°	„	4	Very fair.	T. to Camp F. (Païs), 9 m.; 3 hrs. Across the Chen-long Ho. Right bank, narrow gorge. Rich valley of Ta-ping, thickly populated (Chinese).
5 „	Potso . .	87°	„	„	2	„	Camp F. to P. (Chinese), 14 m.; 5 hrs. Traversed chain between the C. Long Ho and the Poueul Ho. By Moun-pa-to-lo (large Lolo village). Country well wooded and watered.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895.							
6 April	Ssumao . .	86°	51°		0	Very fair.	P. to S. (Chinese town, of 10,000 inhabitants), 19 m.; 5½ hrs. Entered plain of Ssumao, p.m.
7 „	...	87°	„		„	„	From 6th to 10th, halt at Ssumao.
8 „	...	86°	60°		„	„	
9 „	...	„	59°		„	Storm, 5 p.m.	
10 „	...	78°	„		„	Storm, 6 p.m.	
11 „	Tchin-oué .	„	55°	W.	2	Rain.	S. to T. (Chinese), 8½ m.; 3 hrs. Crossed the Touti-tchiao by stone bridge, crossed the Mole Ho, affluents of the Poueul Ho and Nam-bang respectively. Left the plain.
12 „	Ta-ou-tse-son .	„	„		0	Overcast.	Tch. to T. (Chinese), 6 m.; 2¼ hrs. Undulating plateau, fir forests.
13 „	Ko-tchien-to .	82°	57°		„	Fair.	T. to K. (Chinese), 11 m.; 3½ hrs. Crossed the Lanngan Ho, affluent of the Poueul Ho. By Ouït-tse-chaï (Chinese).
14 „	Kouen-fong .	78°	53°	„	1	Very fair.	K. to Kouen (Païs), 5 m.; 1½ hr. Across great limestone chain of Talo Mountains by a depressed col 656 yds. wide and 1 m. long.
15 „	Long-tang .	86°	60°		0	Fair. Oppressive.	K. to L. (two large Païvillages), 7 m.; 2⅕ hrs. Waterless desert.
16 „	Tiou-fan .	91°	62°	S.W.	1	„	L. to T. (Chinese name, Ssen-song), 10 m.; 3½ hrs. Crossed the Long-tang-ho. By three or four Chinese villages; country bare.
17 „	No-tcha . .	87°	„	„	4	Fair. Cloudy.	T. to N. (Chinese), 10 m.; 1½ hr. By Chiaotse (Chinese). Fir forests.

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895. 18 April	Ta-choui-chong	96°	66°	S.W.	3	Fair.	N. to T. (Chinese), 8 m.; 3 hrs. Steep descent to the Mekong, crossed by ferry—mean width, 153 yds.; current, 2 m. an hour; temp., 66°; no rapids in sight; depth uncertain, but considerable.
19 „	Lapatchin .	„	„	„	„	„	T. to L. (Chinese), 17 m.; 5¼ hrs. By Dayakeu (small Chinese town, 700 inhabitants; residence of a mandarin).
							19th to 22nd, halt at Lapatchin. No observations.
23 „	Meng-pou .	82°	„	„	„	„	L. to M. (Lokaïs), 20 m.; 6½ hrs. Cross the Heu Ho, affluent of Mekong, by wooden bridge—width, 21 yds.; current, 1 knot; depth, 10 ft. By Lalichin (Lolos).
24 „	Meng-ton .	78°	„	„	„	„	Meng-ton (Lokaïs), 13 m.; 5 hrs. By several Lokaï villages. Cross the chain between the Lokaï Ho affluent and the Mekong. By Chuen-lo (small Chinese town; residence of mandarin and a Lokaï chief).
25 „	Nampe . .	95°	75°	S.	2	„	M. to N. (Chinese), village above Mekong right bank, 9 m.; 3¼ hrs. By Tocan (Chinese and Poula), one mile before Nampe, very strong rapid; navigation impracticable. Soundings, Mekong, 131 ft.; no bottom.
26 „	Mong-pan .	87°	„	„	„	Fair. Sultry.	N. to M. (Paï and Chinese), 20 m.; 6½ hrs. Across river by ferry. By Ta-Nampe (Lokaïs). Entered plain of Mong-pan. By Pali and Song-yu-tan (Paï village).

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895.							
27 April	Lotchi-sun .	86°	66°		0	Fair.	M. to L. (Chinese), 12 m.; $4\frac{1}{4}$ hrs. Great fir forests. Crossed the Lan-kiou Ho near Pampo-tchaï (Chinese).
28 „	Mong-ka .	89°	68°	S.	„	„	L. to M. (Païs and Chinese), 21 m.; $6\frac{1}{4}$ hrs. Fir forests. Crossed crest of bluff separating the Lan-kiou Ho from plain of Mong-ka, which entered near Chien-mao (Païs). Cut the Mong-ka Ho several times.
29 „	...	...	...	...	...	...	Halt at Mong-ka.
30 „	Ta-pong .	78°	...	S.W.	2	Fair. Slight showers.	M. to T. (Chinese), by right bank of Mekong, 27 m.; $8\frac{1}{2}$ hrs. Firs. Hota-ho (Chinese) and Ta-mo-ta-ho (Lokaïs). Ferry over Mekong.
1 May	Kansa . .	„	66°	W.	2	...	T. to K. (Chinese and Païs), 12 m.; $4\frac{1}{4}$ hrs. Stiff ascent, by Nan-kan and Païs-yuen (Chinese). Crossed the Latung Ho, affluent of Mekong-Latung.
2 „	Pochan . .	„	„		0	Very fair.	K. to P. (large Chinese town), 18 m.; 6 hrs. Ascended the Latung Ho. Valley narrow and wooded. From Touko (large Chinese village) valley open, cultivated, and populated. Crossed chain between Mekong and the Salwen, and descended into valley of Pochan.
3 „	Mienning .	„	62°	S.W.	1	Fair to rainy.	P. to M. (Chinese town of 5000 inhabitants; residence of sub-prefect), $10\frac{1}{2}$ m.; $5\frac{1}{2}$ hrs. Continued descent of valley of the Pochan Ho (source of the Nansing Ho, large affluent of Salwen). By Poman-tsun and Chui-poun.

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895. 4 May	...	...	...	...	...	...	Halt at Mienning.
5 „	Camp False Route	78°	62°		0	Very fair.	M. to Camp F. R., 10½ m.; 3½ hrs. Descent of valley of Nansing Ho; at first broad and cultivated, enclosed and wild later. Camped by river.
6 „	Pintchou .	87°	59°	S.W.	„	„	Camp F. R. to P., 12 m. Retraced steps to bridge over Nansing Ho near Mienning; thence to edge of plain.
7 „	Camp of the Two Basins	„	51°	„	„	„	P. to Camp T. B., 14 m.; 4¾ hrs. Crossed the chain of separation between Mekong and Salwen.
8 „	Tchong-tchun	„	60°	W.	4	Cloudy. Rain, p.m.	Camp T. B. to T. (Chinese), 7 m.; 2½ hrs. By the Paï Ho. Crossed large chain of hills overhanging Mekong: mean altitude, 8887 ft.
9 „	Pan-tong-ka .	„	66°		0	Very fair. Rain at night.	T. to P. (Chinese), 13 m.; 4 hrs. Followed Mekong valley at mean altitude of 5925 ft.; height above river, 2800 ft. By Tamelan, Mempo, and Nakan.
10 „	Ta-cheu-tou-kaï	„	64°	„	2	Cloudy.	P. to T. (Chinese), 13½ m.; 4½ hrs. As yesterday, by Pa-nong-kaï.
11 „	Manto . .	„	„	„	3	Overcast.	T. to M. (Chinese), 13 m.; 4 hrs. Descent into valley of the Mong-ma Ho, affluent of Mekong. Followed right bank by Ta-tseu-kaï (large Paï and Chinese townlet). Rice-fields.
12 „	Tcheya . .	84°	69°		0	Fair. Rain at night.	M. to T. (Chinese), 8 m.; 2½ hrs. Continued ascent of the Mong-ma Ho.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895. 13 May	Lao-Kaïtse .	85°	66°	W.	0	Fine day. Heavy showers at night.	T. to L. (Chinese), 2½ hrs. Up valley of the Mong-ma Ho to one of its sources. By Tcha-fang-kaï.
14 „	Yünchou .	„	73°	„	3	Fair.	L. to Y., 16½ m.; 6 hrs. Fir forests. Crossed the Lancho Ho, affluent of Mekong, by bamboo bridge — breadth, 43 yds.; depth, 3 ft. Bed of stream five times larger.
15 „	...	91°	71°		0	Cloudy. Oppressive.	Halt at Yünchou.[1] Important commercial centre, about 7000 inhabitants; residence of sub-prefect.
16 „	Lotan . .	95°	62°	„	3	Fair. Rain at night.	Y. to L. (large Chinese township), 13½ m.; 4½ hrs. Ascent up right bank of the Pe Hsiao Ho.
17 „	Chun-ning-Fou	84°	66°	E.S.E.	„	...	L. to C. (Chinese prefecture, about 6000 inhabitants). Continued up the Pe Hsiao Ho. By Chiang-chouan.
18 „	Ta-lo-oue .	80°	60°	E.	„	Cloudy. Light rain	C. to T., 10 m.; 3½ hrs. Crossed two rivers, sources of the Pe Hsiao Ho. By Tampao. Over col in the chain of hills.
19 „	Hsiao-tiou-fan	„	69°	W.	„	Rain.	T. to H., 9½ m.; 3½ hrs. By Chin-chouen to the Mekong valley.
20 „	Salatang .	„	57°		0	„	H. to S., 13 m.; 4½ hrs. Followed Mekong right bank. Crossed river by fine hanging bridge. Zigzag ascent to col, 8556 ft. By Loma.
21 „	Mon-tian-cho .	„	66°		„	„	S. to M., 11 m.; 3¾ hrs. By Halo-cheu (small town, about 1500 inhabitants). Along crest to an affluent of the Yang-pi-kiang, whence into valley.

[1] From Yünchou as far as Tali the country is exclusively inhabited by Chinese.

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895.							
22 May	Tsa-fa-se .	80°	66°		0	Overcast.	M. to T., 13½ m.; 4½ hrs. Down affluent to the Yang-pi-kiang, which crossed by raft. Depth, 12 ft.; current, 1 knot. By Hsiao-pin-kaï.
23 „	Koulo Ho .	„	62°		„	„	T. to K., 15 m.; 4¾ hrs. Across chain forming left flank of the valley of the Yang-pi. Fir forests. By Niou-ka and Ouafoulou. Traversed chain separating waters of Mekong and Red Rivers.
24 „	Chantitang .	84°	55°	W.	3	Cloudy, but fine.	K. to C., 16 m.; 6½ hrs. By Chi-tsou-kaï. Over col 8229 ft. dominating plain of Mêng-hua-ting.
25 „	Ta-chang .	„	62°	„	2	Fair.	C. to T., 22½ m.; 7½ hrs. Reached Mêng-hua-ting plain at Oupalan village. Crossed an insignificant source of Red River. Rejoined paved road from Mêng-hua to Tali at Poutcha-chou. By Miao-kaï and Ming-cheu, large villages. Plain fertile. Population dense.
26 „	Tali-Fou .	„	55°	„	3	Overcast. Rainy.	T. to Tali-Fou (town of first rank; residence of a Taotaï and a Tchentaï. Chief commercial centre of W. Yünnan; 20,000 inhabitants; Catholic Mission), 25 m.; 9 hrs. From Mêng-hua plain to that of Tali by col. Through town of Chia-Kouan, 5000 inhabitants.
27 „	...	68°	53°	„	2	Continuous rain.	From 26th May to 16th June, halt at Tali-Fou.
28 „	...	69°	55°	„	„	„	
29 „	...	68°	60°	„	0	Overcast.	
30 „	...	„	57°	„	„	Fair.	
31 „	...	69°	61°	„	„	„	

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).		Wind.		Weather.	Remarks.
		Max.	Min.	Direction.	Force.		
1895.							
1 June	...	69°	57°		0	Rain.	
2 ,,	...	66°	55°		,,	Fair.	
3 ,,	...	68°	59°		,,	Rain.	
4 ,,	...	66°	,,		,,	Overcast.	
5 ,,	...	68°	57°		,,	Rain.	
6 ,,	...	,,	55°		,,	Fair.	
7 ,,	...	67°	,,		,,	Very fine.	

OBSERVATIONS ON THE CLIMATE OF SOUTH-WEST YÜNNAN

As throughout the whole of Central Asia, Yünnan has a dry season and a rainy season, influenced by the N.E. and S.W. monsoons. The dry season lasts from the 1st or 15th of October to the 1st or 15th of May. August and September are the two wettest months; during which swollen torrents and torn-up roads often render travelling wholly impossible. Many routes are only to be followed by caravans during the dry season, amongst which was the one taken by us from Tayang-ka to Muong-le.

But this general rule is subject to many natural modifications caused by the trend of the mountain chains, altitudes, etc. In winter, for example, the valley of the Red River is completely arid, as also the mountains which dominate it, to a height of 3000 feet; whilst the same ranges from 3000 feet to 8000 feet are thickly wooded and frequently enveloped in mists and rain.

The direction of the wind varies, as shown in the foregoing tables. Generally speaking, it blows from the south-east during the dry months, and from the west in the wet. I never experienced a north wind, but was told that in the winter it often blows hard from this quarter over the plain of Tali, causing wrecks upon the lake.

In a country so mountainous as Yünnan the climate alters much according to altitude. In summer the valleys of the Red River, the Mekong, and the Salwen, the plains of Muong-le, Ssumao, Yünchou, and the portion of Yünnan formed by the basin of the Yang-tse-kiang, *i.e.* the lower districts from 2000 feet to 4000 feet, are subject to high temperature, 91° to 100° in the daytime, and 76° to 86° at night; whereas in the mountainous regions and higher plains such as those of Tali, Mêng-hua-ting, Chunning-fou, etc., from 4000 feet to 7000 feet, the temperature remains within the extremes 53° and 82°. The climate of the plain of Tali (6929 feet) is particularly bracing.

In this part of Yünnan we met with no snow, nor did we sight it on any summits save those of the Tsang Mountains on the 29th May. Certainly we were only there between February and June. The Lolos informed us that in the end of November and in December snow falls almost every year on the chain separating the Red River from the Black River, but that it never lies for more than a few days at a time. The Tsang Mountains are the highest in South-West Yünnan. They rise on the west of the plain of Tali to an average height of 11,500 feet, with some peaks of 12,500 feet and 13,000 feet, and are covered from November to April. Snow also falls every winter in the plain of Tali, but does not lie.

PART II. TALI-FOU TO INDIA

My notebook containing meteorological observations and details of our march from the time of leaving Tali (16th June) having been stolen on the 21st of July, Part II. must be taken up at the latter date. Between June 16th and July 5th the weather had been fine with cloudless sky (an unusual condition at the height of the rains), rainy from July 5th to 14th, and fair again from the 14th to the 21st. My maximum and minimum registering thermometers were stolen at the same time; thenceforth I took the temperatures at 7 a.m., 2 p.m., and 9 p.m.; and their mean will give as nearly as possible that for the day.

Date.	Place of Observation.	Thermometer (Fahr.)			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 21 July	Robbery Camp					0	Lowering.	From Camp at Jeyang-sen to R. Camp, 6 m.; 2¼ hrs. On the heights of the Mekong right bank. By Patan (Lissous) and Fecumoto (Lamasjen).
22 „	...					„	„	Halt.
23 „	Ta Hsiao Chouan	75°	82°	78°		„	„	R. Camp to T., 9 m.; 3½ hrs. By Tchen-kioue-(Lamasjen). Peak above Mekong, here rolling in deep gorge. Across two torrents, affluents of the M.
24 „	Tsiten . .	71°	„	68°	S.W.	3	Fair.	5 m.; 2½ hrs. Route very bad and dangerous, with steep slopes. Torrent.
25 „	Keuntin Kien	73°	80°	69°	„	„	„	4 m.; 2 hrs. Torrent. K. (Lamasjen village).
26 „	Feoutsen .	77°	„	78°		0	Lowering.	11 m.; 4 hrs. Torrents. Lamasjen natives.
27 „	Koutsen .	„	„	73°		„	Heavy rain at night.	6 m.; 2 hrs. Torrents. Lamasjen.
28 „	Tié Ho . .	75°	71°	68°		„	Rain.	7 m.; 3 hrs. Route very bad. By Jo Ho (Lamasjen). Torrents large.
29 „	Se-tchong .	77°	82°	71°		„	„	7 m.; 3 hrs. Torrents. Natives Lamasjen. By La-tchi-in.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895.								
30 July	In-chouan .	68°	84°	75°		0	Fair.	6 m.; 2½ hours. Torrents. Lamasjen.
31 „	Sin-tchan-pin .	71°	80°	68°		„	Very fine.	13 m.; 4½ hrs. By Tatsou (Lissous). Three large torrents. Camp S. (Lamasjen).
1 Aug.	Toti . .	73°	84°	„		„	Fair. Rain at night.	12 m.; 4¼ hrs. Followed brink of Mekong one hour. Crossed river midday. By Petia. Large torrent. T. (Lamasjen).
2 „	Tolo . .	„	77°	62°	S.	1	Rain.	Crossing torrents all day. 8 m.; 3½ hrs. By Heseleou (Lissous), Tolo (Lamasjen).
3 „	Fong-chouan .	„	84°	71°		0	Very fine.	11 m.; 4 hrs. Bad wooden bridge over large torrent. Long very steep climb to crest. By Tsiki (Lissous) to F., large village near river (Lamasjen and a few Chinese).
4 „	...	75°	82°	71°	„	2	Rain.	Halt.
5 „	Camp at Sian-pin-chouan	77°	84°	73°		0	Fair.	6 m.; 1¾ hr. Kept on near Mekong bank. Route very bad. By Tsipou (Lissous) to camp beside river. Sian. (Lamasjen).
6 „	Feast Camp .	71°	„	„		„	„	5 m.; 2 hrs. Torrent. By Poumeu (Lissous). Camped in wood by river; bad ground.
7 „	Lameti . .	68°	82°	„		„	„	6 m.; 2¼ hrs. Followed river; then climbed. By Ouapoumé (Lissous) to L. Torrents as usual. No track; we cut one.
8 „	Lometi . .	69°	80°	71°		„	„	L. (Lissous), 4¼ m.; 2 hrs. Slept by river.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 9 Aug.	Loza . .	68°	77°	64°	S.	1	Rain.	8½ m.; 3¼ hrs. Steep climb at start. Crossed high cliff falling abruptly to river. Five torrents; two villages to L. (Lissous).
10 „	Long-ka . .	69°	80°	71°		0	Fair.	To L. (Lamasjen, a few Chinese), 9 m.; 3¾ hrs. By Topa, Mioua-ki, Chan-chia-la-he, and Tilo, all Lissou villages. By Kitcha, large Mosso village by river bank, which followed. Three torrents.
11 „	Into . .	73°	82°	73°		„	„	8½ m.; 3 hrs. Followed river bank by Noko, Lot-chan, to Into (Lamasjen and Chinese). Opposite Hsiao Ouisi, with *Catholic Mission*.
12 „	Lokieou .	68°	„	„		„	„	6 m.; 2 hrs. Still along river by Pe-lang-tong to L. (Lamasjen).
13 „	Haiwa . .	„	78°	75°		„	Cloudy.	3 m.; 1 hr. By Gaisewa to H.(Lamasjen and Chin.).
14 „	...	„	„	„		„	„	Halt.
15 „	Halo . .	„	„	„		„	„	7 m.; 2½ hrs. Wooden bridge over torrent. By Pintse to H. (Lamasjen).
16 „	Lamaserai of Kampou	„	„	„		„	„	8 m.; 3 hrs. Crossed river (Mekong) by boat. Followed broad route on left bank by Tang-chan, and Kouan-tso-pa to Kampou (two large villages; residence of a Mosso chief or Mokoua). Quitted main road. Up through pine forests to the Lamaserai.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 17 Aug.	Dekou . .	68°	78°	75°		0	Showery.	9 m.; 3¼ hrs. By Sintong, Gocha, and Yetche (residence of Mosso grand chief, the Yetche Mokoua) to Dekou. Country Mosso.
18 „	Landou . .	69°	82°	71°		„	Fair.	18½ m.; 7 hrs. By Mosso village of Ngaïwa, Palotso, and Dzeti; large Chinese village of Poutie, to Landou (Chinese-Mosso).
19 „	Tsekou . .	71°	84°	73°		„	Slightly overcast.	16 m.; 6 hrs. Crossstream by Lota (Thibetans). Narrow gorges as far as Ouoloulon opposite Tsekou. Passed river (Mekong) by rope bridge at Tsedjrong. *Catholic Mission* in Tsekou, right bank, 330 feet above river.
20 „	...	75°	86°	77°		„	Rain.	From 19th to 23rd, halt at Tsekou.
21 „	...	„	„	„		„	„	
22 „	...	„	„	„		„	„	
23 „	...	„	„	„		„	„	
24 „	Gotra . .	73°	80°	73°		„	Fair.	13 m., reckoned from Tsedjrong; 5 hrs. By Kiou-do-lon, Séré, and Tinango to Gotra. Here a hot sulphur spring, temp. 118°.[1]
25 „	Itsi . .	68°	82°	71°	N.	1	Very fair.	14½ m.; 5 hrs. Crossed to left bank of Mekong by double-cord bridge. By Tsereton, Latsa, and Itsi. Slept in an isolated building between Latsa and Itsi. River ran in long defiles. Route narrow and dangerous.

[1] From Tsekou to Atentsé all villages passed were Thibetan.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 26 Aug.	Kinchu . .	71°	78°	59°	N.	2	Very fair.	21½ m.; 7½ hrs. By Gonia. Scaled high cliffs by Ki-ape. Left Mekong valley for that of the Atentsé R., which ascended.
27 „	Atentsé . .	55°	71°	51°		0	„	1¾ m.; 40 min.
28 „	Lon-kon-gon .	50°	75°	71°	S.	2	Hazy.	Return to Tsekou. Route already described.
29 „	Latsa . .	69°	80°	73°	„	3	Fair.	
30 „	Tsekou . .	„	„	„		0	„	
								From 1st to 9th Sept., halt at Tsekou. No observations. Weather overcast and threatening, with showers. Temp. 73° to 86°.
10 Sept.	Séré . .		69°					
11 „	Last camp on the Mekong	57°	75°	69°	S.E.	2	Rain in morning.	After leaving Gotra, followed river bank by narrow, thickly wooded (larch) valley to camp on left bank of large torrent, the Lili. 9 m.
12 „	Four Tent Camp	62°	71°	60°	S.W.	3	Cloudy, showery.	5½ m.; 2½ hrs. From mouth of valley of R. Lili to Londjre (Thibetans). Thence ascent of left bank, south branch of that river.
13 „	Tululu Camp .	55°	51°	50°		0	Rain.	5½ m.; 2½ hrs. Followed stream at first at a distance, afterwards close. Crossed left to right bank by wood bridge. Mighty forests.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 14 Sept.	Camp of the Pass	48°	50°	37°		0	Rain.	6½ m.; 3 hrs. Gentle ascent, right bank. Then very stiff climb through forests. Camped on crest of chain separating the Mekong and the Salwen at 12,837 ft., near Thibetan hut. Fine pastures.
15 „	Rhododendron Camp	39°	55°	55°		„	Fine day. Wet night.	3½ m.; 1½ hr. Passed two affluents of R. Donyon. Descended through high grass and trees.
16 „	R. Donyon Camp	50°	62°	„		„	Fair.	5 m.; 2¼ hrs. Reached brink of R. Donyon, which followed to near a bridge. Camped in clearing made by selves.
17 „	Crest Camp .	55°	57°	59°		„	Rain.	3½ m.; 2½ hrs. Climbed by right bank to peak. Camped on crest of range between Rs. Salwen and Donyon.
18 „	Meuradan .	57°	66°	62°		„	„	6 m.; 2¼ hrs. Followed crest. At branch route to Tchamoutong took left track. Steep descent to R. Donyon through bamboo woods and long grass. Cross Donyon to Meuradan (Loutses).
19 „	Tionra . .	59°	71°	73°		„	Fair.	11 m. Reascended yesterday's path. Crossed crest, and descended towards the Salwen through high grass. Slept at Tionra (Loutses), 40 ft. above river.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895.								
20 Sept.	...	75°	84°	71°	S.	1	Very fair.	Halt at Tionra.
21 ,,	...	71°	,,	73°	,,	,,	Fair.	,,
22 ,,	Tchoton .	73°	80°	71°	,,	2	,,	Passage of the Salwen by boat. Camp opposite shore near Tchoton (Loutses).
23 ,,	Londse . .	68°	78°	69°		0	Cloudy.	11 m.; 4 hrs. Followed right bank of river, by Tchatsa. Hydraulic mill (Loutses).
24 ,,	Djewan . .	69°	77°	,,	,,	1	Fair.	6½ m.; 2 hrs. Continued by Salwen right bank. By Guisa to Djewan (Loutses).
25 ,,	Nidji . .	71°	,,	64°	,,	,,	,,	2 m. Up course of stream, affluent of Salwen. Slept in single dwelling at Nidji (Lissous).[1]
26 ,,	Big Cliff Camp	66°	80°	°	S.W.	2	Rain.	3 m.; 2 hrs. Left bank, torrent, steep gradient, high grass. Camp on narrow platform above torrent.
27 ,,	...	59°	73°	,,	,,	1	,,	Halt.
28 ,,	Snow Camp .	,,	59°	46°		0	Fair. Brief storm.	7 m.; 4 hrs. Abrupt scramble. Thick forest. Camp on bare plateau near huge snow mass. Route severe and dangerous.
29 ,,	Tamalo . .	46°	68°	68°	N.W.	1	Fair.	8½ m.; 4¼ hrs. Stiff climb to col, 12,830 ft., surmounted at 1.47 p.m. Stunted shrubs and moss on crest. Descent into bamboo brake, then long grass.. Tamalo (Lissous and Loutses).

[1] From leaving the Salwen until reaching India, tracks impracticable for animals loaded or not, except in the plain of Khamti.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895.								
30 Sept.	...	68°	73°	64°	N.W.	1	Fair.	Halt 30th Sept. to 3rd Oct. Tamalo.
1 Oct.	...	62°	69°	59°	N.	,,	Cloudy.	
2 ,,	...	57°	68°	60°		0	Rain.	
3 ,,	...	59°	66°	,,		,,	,,	
4 ,,	Camp of the Loutse Lady	60°	50°	50°		,,	,,	2 m.; 2 hrs. Crossed the Poula Ho. Hard climb, high grass and forest. Bad camping ground beside the only spring met on this march.
5 ,,	Shingle Camp	46°	55°	48°	W.N.W.	2	Uncertain.	4 m.; 2¾ hrs. Passed col traversing Mangon Ko chain. Descended into forest to camp beside R. Seké.
6 ,,	Morass Camp	50°	51°	46°	W.	1	Changeable. Showery.	5 m.; 3 hrs. Reascended left bank R. Seké; moderate slope.
7 ,,	Camp Bellevue	44°	42°	35°	N.W.	2	Very fair.	9 m.; 4½ hrs. Level ground, with pools and swamps. Later, sharp gradients to col crossing chain of separation between upper waters of Salwen and Irawadi. Surmounted second higher col in lesser range before beginning descent towards the Kiou-kiang.
8 ,,	Dead Men Camp	41°	68°	53°	N.E.	1	,,	7 m.; 3½ hrs. Downwards into forest and long grass. Camped by deserted Kioutse hut.
9 ,,	Toulong	48°	71°	51°	,,	,,	,,	1½ m. Tillage began at about 1000 feet above the Kiou-kiang. Kioutse huts scattered apart on hillsides.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895.								
10 Oct.	...	50°	73°	50°		0	Very fair.	Halt at Toulong till 12th.
11 ,,	...	48°	71°	,,		,,	,,	
12 ,,	...	50°	,,	51°		,,	,,	
13 ,,	Mosquito Camp	,,	73°	64°	N.E.	2	,,	Descent to the Kiou kiang.
14 ,,	Aruikan. .	59°	71°	59°		0	Overcast. Light rain.	1½ m.; 1 hr. Crossed the Kiou-kiang by cord bridge. Thence climbed through long grass to isolated dwelling, Aruikan.
15 ,,	Anniversary Camp	55°	68°	60°	S.E.	1	Very fair.	3 m.; 2 hrs. Redescended and pitched by river. High grass.
16 ,,	Deidoum .	59°	,,	55°	S.W.	,,	,,	3 m.; 2½ hrs. Up cliff. Half an hour steep descent to R. Tatei, which crossed. Lay at Deidoum (Kioutses) for night. Track very bad and perilous.
17 ,,	Great Slide Camp	53°	69°	,,	S.	,,	,,	4 m.; 2½ hrs. Stream. Scarp. Col. Surmounted, and camped below by river.
18 ,,	Ladder Camp	51°	71°	53°		0	,,	3½ m.; 2 hrs. Skirted edge of the river among rocks or a little above in the woods. Camped on sand spit.
19 ,,	Hollow Rock Camp	55°	,,	,,		,,	,,	1½ m.; 1½ hr. By the river.
20 ,,	Nine Fire Camp	50°	68°	48°		,,	,,	4 m.; 2¼ hrs. Crossed River Madoumadon. Climbed through forests and high grass to crest between this river valley and that of the Kiou-kiang. No water from R. Madoumadon till camp.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 21 Oct.	Moss Camp .	51°	64°	42°		0	Fair.	3 m.; 2 hrs. Forests. Camped a little short of col.
22 „	Camp of the River Tetchen	46°	„	57°		„	Drizzle.	4 m.; 2 hrs. Over col. Down through forests. No water till river reached.
23 „	Tukiu Mu .	59°	66°	„	S.W.	2	„	5 m.; 3 hrs. Crossed several hills and streams in descent to the Kiou-kiang brink. Leaving river, ascended, and passed night in one of scattered Kioutse dwellings.
24 „	...	55°	68°	59°	„	1	„	Halt till 26th.
25 „	...	57°	69°	„	„	„	„	
26 „	...	55°	68°	57°	„	2	Heavy rain.	
27 „	Deluge Camp	53°	69°	„	„	„	„	3 m.; 1½ hr. Passed the R. Geling by self-made bamboo bridge. Scaled crest between the Geling and the Tukiu Mu. Followed to confluence of latter with Kiou-kiang.
28 „	Safety Camp .	59°	73°	„		0	Fair.	½ m. Crossed the Tukiu Mu by cord bridge. Followed course of Kiou-kiang.
29 „	Camp of the Leeches	57°	71°	59°		„	„	4½ m.; 4 hrs. Continued by river. Camp on small beach.
30 „	Camp of the R. Dublu	59°	73°	60°		„	„	6½ m.; 4½ hrs. Along the Kiou-kiang for 1½ hr. Then mounted chain separating it from R. Dublu. Camped by confluence of Dublu and Telo.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 31 Oct.	Mandoum .	53°	68°	59°		0	Cloudy.	1 m.; 1 hr. Bridged the Dublu with bamboos. Also liana bridge. Ascended left bank of R. Telo. Camped in bamboo brake near Mandoum (Kioutses).
1 Nov.	Camp of the R. Telo	55°	64°	,,		,,	Fair.	1½ m. Rafted over Telo. Up right bank. Crossed Telou torrent.
2 ,,	Terrace Camp	53°	60°	55°		,,	Very fair.	4 m.; 3¼ hrs. Climbed along right flank crest of Telou valley. No water.
3 ,,	Camp of the R. Reunnam	48°	64°	60°		,,	Overcast.	4½ m.; 3 hrs. Forests. Crossed col. Camped by R. Reunnam.
4 ,,	Camp of Diamai's Death	53°	69°	,,		,,	Heavy rain.	3½ m.; 4 hrs. Marched in water. Bed of torrent.
5 ,,	Duma . . (No. 1)	57°	71°	,,		,,	Continuous rain.	4½ m.; 3¼ hrs. Followed the Reunnam to confluence of the Wan Ou. Struck off on left bank to interior. Slept at Duma (Kioutses).
6 ,,	...	59°	68°	64°	S.W.	3	Incessant rain.	Halt.
7 ,,	Duma . . (No. 2)	57°	60°	57°		0	Fair.	5 m.; 3 hrs. Brink of Sinbin to its confluence with Reunnam, which crossed. Mountain, forest, stream. Slept at another Duma (Kioutses).
8 ,,	Dzôn Redzi Camp	55°	59°	55°		,,	,,	4 m.; 2½ hrs. Same struggles.
9 ,,	Long Crest Camp	,,	59°	,,		,,	Cloudy. Showery.	7 m.; 3½ hrs. After crossing two streams, kept on long spur. Better forest track.

APPENDIX A

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 10 Nov.	Camp of the R. Tsan	57°	68°	60°		0	Fair.	6 m.; 3 hrs. Descent beside the Pinti to its confluence with R. Tsan.
11 „	Big Dam Camp	55°	69°	59°		„	„	6 m.; 4 hrs. Up left bank of Tsan, first wooded, then rocky. Crossed it by a large fish-dam (Kioutses).
12 „	Pandam. .	57°	66°	„	W.	2	„	5 m.; 4 hrs. Remounted right bank of Tsan to its confluence with the Pandam, which followed to village of same name among rice-fields (Kioutses).
13 „	...	„	62°	60°	.	0	Heavy rain.	Halt.
14 „	...	„	68°	„	N.	1	Fair.	
15 „	Melekeu .	59°	71°	„		0	„	5½ m.; 2 hrs. Followed Pandam to its junction with Nam Lian. Quitted stream for woods on left. To Melekeu (Kioutses). Good forest track.
16 „	Delou . .	57°	73°	55°		„	„	11 m.; 4½ hrs. Recrossed Nam Lian. Over col in Leke chain, to D. (Kioutses).
17 „	Tobacco Camp	55°	77°	60°		„	„	2 m.; 1 hr. Torrent, above right bank of which camped.
18 „	Camp of the Plain	60°	75°	„		„	„	10 m.; 4½ hrs. Descent to brink of the Nam Chom. Along valley, path opening. Emerged from forests, and debouched on great plain of Khamti.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force		
1895. 19 Nov.	Khamti (Padao)	57°	77°	57°		0	In plain of Khamti, fog every morning till 9 a.m., then splendid day.	8½ m.; 2½ hrs. On the flat. Crossed the Nam Kiou near Tsan Kan (large Khamti village); again by boat (width, 130 yards; depth, 10 feet; current sluggish). Forded the Nam-Saï. By boat across the Nam Pela (could be forded). Several villages. Crossed the Nam Toun, and reached Padao or Putau, the capital of Khamti.
20 „	...	53°	75°	59°	N.N.W.	1		Halt at Khamti.
21 „	...	51°	77°	„	N.	„		
22 „	...	50°	75°	„		0		
23 „	...	51°	77°	57°	N.N.W.	2		
24 „	...	50°	75°	„	„	1		
25 „	Signal Camp .	48°	73°	„		0		6 m.; 2 hrs. In the plain. Confluence of the Nam Taheu with the Nam Pela. By Lomking.
26 „	Singleng	50°	59°	51°		„	Very fair.	9 m.; 4½ hrs. From bank of the Nam Kokao began to ascend at first gently. After crossing Nam Taheu, steep to col. Torrents and slight descent to Singleng (Kioutses).
27 „	...	46°	68°	55°		„	„	Halt.
28 „	False Start Camp	48°	71°	57°		„	Fair to overcast.	3 m.; 1½ hr. Passed Cheulemi, last Kioutse hamlet.
29 „	Camp of the Nam Lang	50°	59°	55°	.	2	Cloudy. Slight sleet.	5 m.; 3 hrs. The Nam Lang joined by the Nam Sanglian. Followed left bank and crossed by raft.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895.								
30 Nov.	Camp of the Nam Tsaï	53°	57°	51°		0	Cloudy. Slight sleet.	4 m.; 4 hrs. Confluence of Nam Lang and Nam Tsaï. Ascended bed of Nam Tsaï in the water.
1 Dec.	Camp of the Ouépoucot	51°	,,	50°		,,	Fair.	5 m.; 4 hrs. Quitted the Nam Tsaï after 1½ hr. Up through woods over col Nam Tsaï Boum. Camped by the Ouépoucot.
2 ,,	Camp of the Nam Phungan	48°	59°	51°		,,	,,	5 m.; 3½ hrs. Traversed col separating Ouépoucot from the Nam Phungan.
3 ,,	Hornbill Camp	46°	57°	50°		,,	,,	5 m.; 3½ hrs. Held on up the Nam Phungan, cutting affluent Nam Moï. Camped by the Nam Phungan.
4 ,,	...	48°	55°	42°		,,	,,	Halt.
5 ,,	...	42°	50°	46°	N.W.	1	,,	
6 ,,	...	,,	46°	41°		0	,,	
7 ,,	Camp of the Altars	37°	42°	33°		,,	,,	4½ m.; 4 hrs. Course of the Nam Phungan.
8 ,,	India Camp .	32°	37°	35°		,,	,,	4 m.; 4¼ hrs. Climbing the col separating the waters of the Brahmaputra and the Irawadi. Crossed it at 9875 ft. in 2 ft. of snow. Began descent by spur. Camped in forest. Water rare and brackish.
9 ,,	Camp of the R. Dapha	37°	44°	44°		,,	Cloudy.	6 m.; 3 hrs. Continued descent of spurs. Passed confluence of two sources of R. Dapha, which then followed down.
10 ,,	Fever Camp .	41°	51°	,,	W.	1	Fair.	4 m.; 2 hrs. Quitted the Dapha valley for ascent through woods on left. Camped in clearing.

Date.	Place of Observation.	Thermometer (Fahr.).			Wind.		Weather.	Remarks.
		7 a.m.	2 p.m.	9 p.m.	Direction.	Force.		
1895. 11 Dec.	Summit Camp	37°	48°	42°		0	Snow.	3½ m.; 2½ hrs. Climbed in forests. Camped on summit of chain dividing the Dihing and the Dapha. Waterless route; a few muddy pools on crest.
12 „	Coolie Camp.	39°	50°	57°		„	Heavy rain.	9 m.; 5 hrs. Long descent. Camped by affluent of Dihing. Only one spring on march.
13 „	Camp of the R. Dihing	51°	62°	„		„	Fair.	6 m.; 4½ hrs. Tracked a stream to its confluence with the Dihing. Camped right bank.
14 „	Castaway Camp	50°	68°	64°		„	„	1½ m.; 1 hr. Descended the Dihing, cutting it three times. Camped left bank.
15 „	Camp of Good News	53°	71°	62°		„	„	½ m. Camped right bank. Note: Between the third ford yesterday and the crossing to-day there was also a path on right bank.
16 „	Clay Cliff Camp	50°	68°	60°		„	„	8½ m.; 3½ hrs. Down the right bank of the Dihing.
17 „	Daphagang.							8 m.; 3½ hrs. Leaving the Dihing, mounted to the right. At Bouniang (Mishmis) crossed the R. Dapha by bamboo bridge. Reached Daphagang 3.21 p.m. (first Singpho village in Assam).

APPENDIX A

From Daphagang to Sadiya, route known. From Daphagang to Bishigaom, residence of a Singpho chief, two to two and a half days' march (about 17 miles, no village on the route). After leaving Bishi, good level road.

From Bishigaom to Kagam, cir. 6 miles. Kagam to Mounan, 10 miles. (At N'ling, half-way, route practicable for elephants.)

From Nounan to Ninglou, cir. 18 miles (residence of principal Singpho chief). Ninglou to Sadiya by water (Dihing and Brahmaputra), 8 hours. Sadiya, residence of an Assistant Political Officer; first Hindu town and European post.

OBSERVATIONS ON THE CLIMATE OF NORTH-WEST YÜNNAN AND OF THE UPPER BASIN OF THE IRAWADI

In Yünnan above the 26th lat. the two seasons (dry and rainy) are much less marked than farther to the south. The upper valley of the Mekong (from the 25th to the 27th lat.) is very dry; it rarely rains there even in the summer. In the region of Hsiao-Ouïsi, Tsekou, and Atentsé (27° to 28° 30′ N.) there are two rainy seasons—one from July to the end of September, and the other (the stronger) in February. The valley of the Salwen is covered with thick vegetation, and must be damper than that of the Mekong. In the basin of the Irawadi, which shares the climatic conditions of Indo-China, the two seasons are well marked; nevertheless, the foregoing tables show that in the height of the dry season we had rain on fourteen days out of sixty-seven (from the 1st of October to the 7th of December). According to the natives, the summer rains are both long and abundant, a fact which the exuberance of the vegetation strongly confirms.

In all these regions (at any rate in the seasons when we traversed them) the winds are rare and light in force. In the upper basin of the Irawadi a perpetual calm reigns throughout the winter, the blasts from the north being stopped by the lofty range which separates this basin from the high ground of Thibet.

Except on a few crests (the summits of Likiang, Dokerla, Pemachou, etc.), there are no perennial snows on the mountains of North-West Yünnan. But the great chains which divide the Mekong from the Yang-tse-kiang, the Mekong from the Salwen, the Salwen from the Poula Ho, and the Poula Ho from the Irawadi, are covered with snow from December to May, and cannot (at least the three last) then be crossed. In the winter it is impossible to pass from the Mekong to the Salwen farther north than the col of Fey-long-kiao at Lao.

SUPPLEMENTARY GEOGRAPHICAL INFORMATION GATHERED ON THE MARCH

Point of Departure of Routes and Names of Rivers about which Information was collected.	
	PART I. MONGTSE TO SSUMAO
SHA-HA-TE . . .	From Sha-ha-te a route starts which joins that from Manhao to Muong-la in 2 days at Van-pou-tien. (Direction S.)
POUN-KA . . .	From Poun-ka a route starts leading to Muong-Teun on the Nam-Na (affluent of the Black River). [S. 20° W.][1]
TA-YANG-KA . . .	Route from Ta-yang-ka to Talan, 4 or 5 days' march. [N. 85° W.] *Stages*—(1) Tuca (30 lis,[2] 7½ m. cir.); (2) Tica-liang-tse (90 lis, 22½ m. cir.); (3) Sin-pin-you (50 lis, 12½ m. cir.); (4) Seu-Koue (60 lis, 15 m. cir.); (5) Talan (20 lis, 5 m. cir.).
LANTCHEU or LAMI .	Mule path from Lantcheu to Muong-la along valley of the Nam-Na. [S. 50° E.] 10 days from Lantcheu to Muong-Teun, and 10 days from Muong-Teun to Muong-la.
NILUNG-HO . .	The Nilung-Ho should be an affluent of the Black River (Ly-sien-kiang), junction near large Chinese village called Latan (?)
LA-KA-HO and LANIOU-HO	The La-ka-Ho is an affluent of the Laniou-Ho, which must itself flow into the Senan-kiang (an important affluent on left bank of the Ly-sien-kiang, according to the natives).
MONG-IE-TSIN-HO . .	The Mo-te-Ho and the Menling-Ho unite to form the Mong-ie-tsin-Ho, an important branch of the Ly-sien-kiang. Confluence with the latter is in the district of Talan.
MUONG-LE . . .	Routes starting from Muong-le :— 1. Towards Laï-chau (Pavie map). [S. 65° E.] 2. Towards Ipang and the tea districts; about 6 days. [S. 50° W.] *Stages* or principal villages *en route* — Ta-tso-bang, Tchin-seu, Eul-tong, Koua-tson-lin, Men-penting, Mou-lou. 3. Towards Ssumao. (Marked on my map.) 4. Towards Poueul, 7 days. [N. 55° W.] *Stages*—(1) Sen-kia-tsen; (2) Pouking; (3) Tchang-pin; (4) Men-ka-Di; (5) Ti-tchong-o; (6) Meng-sin-Ka.

[1] The directions in upright brackets are those of a line as the crow flies between the points of departure and arrival.

[2] In Yünnan the li is approximately equal to 439 yards.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
CHEUN-LONG-HO (NAM BANG)	The Cheun-Long-Ho has its source about 2 days N. of Muong-Hsien, a village 3 days from Tchen-Lao up the river. Down stream it flows by Xien-tong, residence of a Paï chief subject to China. A route leads from Tchen-lao to Xien-tong in 2 days (sleep at Hsiao-Teou). The Cheun-Long-Ho is the source of the Nam Bang, a large affluent of the Mekong.
SSUMAO . . .	Routes starting from Ssumao :— 1. Towards Poueul, 2 days. (Fr. Garnier and Bourne.) 2. Towards Muong-le, 7 to 8 days. (Marked on my map.) 3. Towards Ipang, 6 days. (Bourne and Colquhoun.) 4. To Xien-Houng, 9 days. (Fr. Garnier.) 5. Towards Mong-Wan, 7 days. [S. 50° W.] Follows the Dayakeu road (*v.* my map) for 4 days, branching at Long-tang. From Long-tang to Mong-Wan, 3½ days. *Stages*—(1) Lin-Koua-ten ; (2) Tchen-kong, cross the Tiouloun-kiang (Mekong) by boat ; (3) Ba-fa-po, 3½ days to Mong-Wan. Road good and frequented. 6. Route to Mong-pan, 6 to 7 days. [N. 55° W.] *Stages* — (1) Sin-keu-tsong ; (2) Ma-mon ; (3) Poueul-Ho (cross this river) ; (4) Hsiao-he-kiang (cross this river) ; (5) Pan-ha-tse ; (6) Mong-tchu ; (7) Mong-pan.
	PART II. SSUMAO TO MÊNG-HUA-TING
MONG-PAN . . .	Route starting from Mong-pan :— 1. Towards Mong-ka, 2 days. (Marked on my map.) 2. Towards Mong-tchou (30 lis, 7½ m. cir.), important centre inhabited by the same population as Mong-pan (Païs, Chinese, and Lokaïs). 3. Towards Poueul, 5 days. [S. 55° E.] *Stages*—(1) Tchang-liang-sen ; (2) Pa-te-liang ; (3) Tatien ; (4) Kan-tien ; (5) Poueul. 4. Towards Chouen-lo. (Marked on my map.) 5. Towards Ssumao ; described above.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
MONG-KA . . .	1. To Poueul, 4 long days. [E. as far as Oueï-yuen, then S. 25° E.] *Stages*—(1) Salafang; (2) Oueï-yuen; (3) Sisa; (4) Poueul. *Note.*—From confirmed information, Oueï-yuen is not in the N.E. as marked on the Chinese maps and from them copied into European maps. Oueï-yuen is a fairly important centre, near which are the two large salt mines of Hsiang-ien-Kin and Lang-chou-Kin (latter 1 day N. of Oueï-yuen). 2. There is a route from Poueul into Burmah by Têng-Yueh, passing Mong-ka and Tapong (ferry over Mekong on the Mong-ka—Mienning route). From Tapong to Têng-Yueh, about 21 days' march. [N. 8° W. as far as Kêng-Ma, then N. 35° W. approximately.] *Stages*—(1) Tamano; (2) Sang-Kaïchin; (3) Monsa; (6) Kêng-Ma; (12) Chen-Kang; (14) Passage of the Salwen; (21) Têng-Yueh. 3. There must be a route from Mong-ka to Tali-Fou of which the first stages would be—(1) Ouen-Cong; (2) Mong-Lo; (3) Taopicaï. I could not trace it farther.
CHUEN-LO . . .	1. From Chuen-Lo to Mong-Lang, 3 days, by Tachio-Ten, Mong-long-co, Sihai, and Toung-chewan. [General direction S. 70° W.] Mong-Lang is an important centre and the residence of a mandarin with the title *Ting*. 2. From Chuen-Lo a route starts W.N.W. to Ninhai, 1 day, by Ningoua and Mong-Kin. By continuing in this direction one would come upon the independent *Ié-Kawas* (?) (*ié* means wild). The Chinese account of them is that they live nearly naked and are armed with lances and poisoned arrows.
TACHIN . . .	Three days W. of Tachin are silver mines in process of working; Mona-Chang.
SUYEN-KIANG . .	At the confluence of the Sekiang and the Mekong, which here at the ferry bears the local name of Suyen-kiang. A route starts hence to Ya-Kou, Ka-Kong, Momi, and Molo, districts situated between the Mekong and the route from Mong-ka to Mong-pan.
TAMANO . . .	From Tamano to Muong-Moun, 1 day.
LINGUEU . . .	From Lingueu to Tapong (Mekong), 1 to 2 days S.W.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
MIENNING . . .	Routes from Mienning :— 1. Main road to Yünchou, 4 days at 15 m. a day. [N. 10° E.] *Stages*—(1) Lating ; (2) You-Ouan-chui ; (3) Taou-Tao-chui ; (4) Yünchou. 2. From Taou-Tao-chui there is a straight road to Chunning-Fou in 4 short days. [N. 35° W.] By this route it is 7 days from Mienning to Chunning-Fou ; thus : 4th day, Leu-peu-ten-kaï ; 5th, Lima-chin-kaï ; 6th, Mong-La ; 7th, Chunning-Fou. 3. From Ling-chin-kaï to Chunning-Fou there is a third route, making an elbow to the W., 5 days : 1st —? ; 2nd, Sila ; 3rd, Hsiao-tia ; 4th, Ouang-chen-konen ; 5th, Chunning-Fou. 4. From Mienning to Mong-Moun ; no details. 5. From Mienning to the Mekong, ferry at Kali. (Marked on my map.) 6. Another route from Mienning to the Mekong, ferry at Mata, 2 days E.S.E.
NAN-TING-HO . .	This river, which passes near Pochan and Mienning, and of which we discovered the sources above Ponchan, is a large affluent of the Salwen, which it joins a little below Mêng-Ting.
YÜNCHOU . . .	Direct route from Yünchou to Mêng-Hua-Ting and Tali-Fou, 8 days [N. 15° E.] at 15 m. a day ; thus : (1) Mong-Lan ; (2) Chao-Kaï ; (3) Chen-Tchou-Ton (cross the Mekong) : (4) Kong-Lan ; (5) Kilung ; (6) Lo-Tchiou ; (7) Tcha-fang-Sao ; (8) Mêng-Hua-Ting.
	PART III. MÊNG-HUA-TING TO FONG-CHOUAN
KIANG-PIN . . .	Is a stage on a route from Chen-chuan-cheou to Yang-pi. [Kiang-Pin to Chen-chuan N. 10° E. ; Kiang-Pin to Yang-pi S. 25° E.] *Stages*—(1) Cha-ki ; (2) —? ; (3) Kiang-Pin ; (4) Kiao-cheou (salt) ; (5) —? ; (6) Yang-pi.
YÜN-LONG-CHEOU .	Route from Yün-long-cheou to Yüng-chang-fou, 9 days. [S. 15° W.] *Stages*—(1) Hsin-Kiao-La-Tchao ; (2) Kang-haïtse ; (3) —? ; (4) Yüng-pin ; (5) Lao-Kiao (cross the Mekong) ; (6) Cha-yong ; (7) Chouïtchaï ; (8) Pan-kiao (where the route from Tali to Yüng-chang is joined) ; (9) Yüng-chang-fou.
FEY-LONG-KIAO . .	From Fey-Long-Kiao to Lou-kiang-Pa (Salwen), 7 days. [S.S.W.] *Stages*—(1) Kieoui-tcheou ; (2) Toten ; (3) Tsao-kiang ; (4) Sou-Tchoui ; (5) (6) —? ; (7) Lou-kiang-Pa (this must be the ferry of that name on the Salwen in the route from Tali to Bhamo in 25° N.).

Point of Departure of Routes and Names of Rivers about which Information was collected.	
FEY-LONG-KIAO—*cont.* .	From Kiecui-tcheou another route branches, leading in 7 days to Yüng-chang-Fou. [S.] *Stages*—(1) Tong-Kien ; (2) Loui-Tchouang ; (3) Li-Tchaï-Pa ; (4) Lo-Fou-Tchang ; (5) Siho-Loa-Tchouang ; (6) Pan-Kiao-Kaï (where the route from Yün-long to Yüng-chang is joined) ; (7) Yüng-chang-Fou.
LOUKOU . . .	1. Route from Loukou to Têng-Yueh, 8 to 10 days. [S. 40° W.] : passing (1) Moupo; (2) Souko-choui ; (3) Manyu ; (4) Man-Kouan-Kaï ; (5) Kan-tin-Kaï ; (6) Ta-tang-tse ; (7) Liou-kiang-pou ; (8) Hsiao-Kaï ; (9) Kuou-tchi-Kaï ; (10) Oueï-Kaï ; (11) Kouï-haï-tse ; (12) Têng-Yueh. 2. Route from Loukou into the country of the Poumans (?). Opened within the last few years, and only for pedestrians, it has the reputation of being very unhealthy. General direction W. The route crosses the Salwen and the great range behind, in which are tea plantations. It then cuts the Hsiao-kiang, affluent of the Long-Song-kiang, a large river that flows into Burmah (no doubt the Chouély). In this valley the natives are said to be the savage Lansous (?). Thence one reaches the country of the wild Poumans, where the My-le-kiang has its course, and farther the Lang-tchouan-kiang near English confines. From Loukou to the Poumans' territory is about 12 days. These Poumans must be the same as the Kachins or Singphos of Upper Burmah, the Lang-tchouan-kiang must be the eastern branch of the Irawadi (N'mai-Kha), and the My-le-kiang its western branch (Mali-Kha). But who can these Lansou savages be ? 3. There is a foot track up the right bank of the Salwen, by which, at 1 day's distance from Loukou, is reached Tenkeu, the residence of a toussou.
COMMUNICATIONS BETWEEN THE MEKONG AND THE SALWEN, AND NAMES OF LISSOU VILLAGES UPON THE LATTER RIVER	Routes crossing the mountain chain and only practicable for pedestrians, each from 2 to 4 days' march ; start— 1. From Tse-Ho. 2. From Teki, bordering on Tasouin (cord bridge), whence a way proceeds towards Upper Burmah. 3. From Fong-Chouan to Zali. Going northward from Tasouin are found Dapelou, Lomate, Zali, and Ketseki.
ROUTE BY THE LEFT BANK OF THE MEKONG	From Fey-Long-Kiao a mule track ascends the left bank of the Mekong.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
ROUTE BY THE LEFT BANK OF THE MEKONG —*continued*	From Fey-Long-Kiao to Hsiao-Ouïsi, 22 days. *Stages*— (1) Chout-tchan ; (2) Pe-tchi-tin ; (3) Tang-pang ; (4) Kien-tsao-teoui ; (5) Sse-tsin (salt mine) ; (6) Pê-yang ; (7) Choui-tchou ; (8) Chouen-tan-tsen ; (9) Tsin-men-Keou ; (10) Pe-ti-pin ; (11) Lakimi ; (12) Yüm-pan-Kaï ; (13) Hoan-ten ; (14) Choui-ho-ta ; (15) Chiten ; (16) Tche-i-pin ; (17) To-y ; (18) Oueïten ; (19) Tcha-Ho ; (20) Pan-ti-tuen ; (21) Pe-ki-suen ; (22) Hsiao-Ouïsi. From Pe-ti-pin (10) there is a route in the direction of Ly-kiang-Fou, 5 days, passing Chen-chuan-cheou. [N. 75° W.] This path can only join the actual river bank at Yüm-pan-Kaï.
MINES	Almost opposite Tolo on the bank of the Mekong are three mines :— 1. Near Puiten, small gold mine called Ta-fa-tchan, dependence of Ly-kiang, distant ½ a day. 2. Pi-li-ho, in the vicinity of which is a mountain named Papao, containing much gold and a little silver, af 1 day's march. 3. Kong-kiang, gold mine, 1 day's distance. Near Ouïsi there is another mine—Long-pan-tchan ; contains much silver and some gold.
	PART IV. FONG-CHOUAN TO INDIA
ROUTES FROM THE MEKONG TO THE SALWEN. LISSOU VILLAGES ON THE LATTER RIVER	Continuing N. of Zali and Ketseki are the villages of Losa, Alidi, Ladamili, Ouatoudi (cord bridge and boats). Opposite Ouatoudi there is a route leading to the Kiou-kiang (E. branch of the Irawadi). 1. A route leaves Kitcha and skirts the village of Nisa. Going from Nisa southward one finds the following villages along the river :—Ilo, Hepeti, Mecheu, Hetolo, Aleuti, Ouatchouko, Lamouti, Tayon, Chapo, Latonguie, Kalati, Fontien. From Nisa northward :—Lissa, Lamati, Ouetchedo, Nysesalo, Tcheti, Lidzenoua, Chemito, Madji, Pongnidi, Goluga, Latsati, Poulatsa, Yoko. 2 Another route starting from Haïwa reaches the Salwen at Latsa (near which is Metaka, on the height). From Latsa to Tasou from 1 to 2 days, by Ilaka and Tanda. Names of villages between Tasou and Djewan :—Right bank—Daga, Seugo, Seuke, Tadati, Dalati, Lopata, Tcheukou, Macheuda, Tsato, Djewan. Left bank—Badiama, Poladi, Litedi, Iego, Tchelanda, Yuragan (just opposite Djewan).

Point of Departure of Routes and Names of Rivers about which Information was collected.	
ATENTSÉ . . .	1. Route to Tsarong and Lhaça (practicable for mules). *1st Day*: Atentsé to Menkong [N. 60°]. From Atentsé follow the road from Yerkalo as far as Dong, then branch to the left across a small range and descend on the bank of the Mekong at Lieou-ten-kiao. *2nd Day*: Cross the Mekong by a good cord bridge, and ascend the right bank as far as Merechu. *3rd, 4th, and 5th Days*: Three days are necessary to cross the great chain (very lofty), which bears in this district the name of Milechan (from Milefou, a god worshipped in Thibet). *Evening of 5th Day*: Sleep at Latou, near the Oukio. *6th Day*: Cross the Oukio by a wooden bridge. Traverse a small chain, and sleep at Kiepo. *7th Day*: Recross the Oukio by bridge at Kiepo. Surmount a chain, and sleep at Tchrana, near the left bank of the Salwen. Opposite Tchrana there is a good rope bridge; on the other side stands the Lamaserai of Menkong. From Tchrana another route descends on Lakonra, Aben, Longpou, Songta, and Tchamoutong (Menkong to Tchamoutong, 7 days). From Menkong a mule track leads in 6 days to the prefecture of Sounga-Kieu-Dzong. A route leaves this town in the direction of Giamda and Lhaça across Pomi by Chiuden-Gomba. This Pomi (or Poyul) is a large and wholly unexplored country, which stretches to the west of the province of Tsarong as far as Giamda. It is reputed full of brigands and dangers, the refuge apparently of all the bandits of Thibet (?). The Lhaça route quits the one just described at Latou, near the Oukio, and ascends the course of that river for 20 days to Pomda (way followed by Father Desgodins from Menkong to Tsiamdo). To the west of Pomda spreads a wide plateau, the Tchan-tsao-pa, which takes 5 days to cross; after which one descends on to the Loutse-kiang (Salwen), which is spanned by a bridge, and finally the traveller joins the Imperial high road from Tatsien-lou to Lhaça at Oua-ho. 2. Route direct to Tatsien-lou, through the country of Meli or Houang-Lama, 34 days at 12 or 15 m. a day. [N. 60° E.] Practicable for mules.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
ATENTSÉ—*continued* .	*Stages*—(1) Moulouchou (pass a chain before entering on the basin of the Blue River); (2) Tapintin; (3) Guiédam, on the right bank of the Kincha-kiang (river negotiable in boats at all seasons); (4) Teke; (5) Kiao-Teou; (6) Lompa; (7) Koupi, on a lake said to be one-third the size of Tali, in the plain of Tchong-tien, which takes 2 or 3 days to traverse; (8) Tchong-tien, a small town, up to which point the population is a mixed one of Thibetans and Chinese, and after it exclusively Thibetan; (9) Piné, over a high mountain range; (10) Lo-ti-ho, cross an affluent of the Yang-tse; (11) Lopo; (12) Houja; (13) Tse-me-ka-pa; (14) Kiake; (15) Lerou (commencement of the Meli or Houang-Lama), cross the river by bridge; (16) Outia-po; (17) in the mountains, no villages; (18) Meli, on the top of a mountain, large Lamaserai (the only one on this route)—cross a river which traverses the Kien-tchan, and much lower down falls into the Yang-tse (doubtless the Yalong-kiang of Desgodins' map); (19) Tongli-ke; (20) No-han-po; (21) Tsemi-Roua (plain); (22) Chake; (23) Kint-chan (gold mine); (24) Tchen-ke-ti (large plain); (25) Giti; (26) Paoulo (in the Setchuen), rope bridge over river; (27) Tsene-keuti; (28) Oucheu; (29) Tchaoualon (large plain); (30) Mongnia; (31) Tchana; (32) Kontupo; (33) Tchelo; (34) Hatia-toung-ho, Santa, Tatsien-lou. Route easy, inhabitants peaceful, country very mountainous, save for the few plains mentioned. *Note.*—The spelling of all names on this route is given under reserve, they having been furnished me by a Chinese merchant of Atentsé; and the Chinese generally disfigure Thibetan names by their bad pronunciation.
LANDJRE . . .	This Thibetan village is situated at the confluence of two branches of the river Lili. On the right flank of the northern branch is cut a good road leading to Tsarong and touching the Salwen at Lakonra. [N. 60° W.]
TOULONG . . .	Above Toulong in ascending the Kiou-kiang the following places are found:—Mambili, Temedam, Kensoum (left bank), Serawan (right bank), Chia-keu (left bank). The inhabitants are Kioutses. From Toulong to Chia-keu, 3 days. As far as Kensoum the district pays tribute to the Yetche Mokoua. Serawan and Chia-keu are under the authority of the Kampo Mokoua.

Point of Departure of Routes and Names of Rivers about which Information was collected.	
TOULONG—*continued* .	Above Chia-keu the Kioutses pay tribute to Tsarong. From Chia-keu to the Tsarong frontier, 3 days' march. I do not know the extent of these marches, but it must be slight, as the Kioutses make only short stages, and the tracks are detestable and full of obstacles. Nor do I know to what latitude the valley of the Kiou-kiang is inhabited. While telling me there were Thibetan villages on the course of the river, the natives were unable to mention any by name. Are there any? I myself doubt it.
TAMALO . . .	From Tamalo a very fair track descends the valley of the Poula-Ho to the Salwen. [S. 40° E.]
MANDOUM . . .	From Mandoum going up the left bank of the river Telo, a route, admitted to be very bad and dangerous by the Kioutses themselves, leads in 8 days to the first village Tsetekon, passing afterwards by the following localities :—Teunnami, Dumidan, Teloulandam, Tumsepou, Hadoumlanpoun, Malaipoun, Meteupoun, Telalongpoum. The last named is said to be 28 days' (one moon) march from Mandoum, and only 7 or 8 days from the sources of the Telo. These stages are evidently very short; looking at the distance as the crow flies, I am convinced that, whatever may be the state of the track, the journey could be accomplished in 15 or 20 days.
	The natives who inhabit this region are Kioutses and Lissous. The latter, who are in the minority, must have come from the valleys adjacent to the Kiou-kiang and the Lantakou, one of its affluents. The country is cold, and only has one harvest a year. Inhabitants very wild; the Kioutses of Mandoum are so timorous that they can hardly be said to have any settled abode. There is no route communicating between the villages on the higher waters of the Telo and Thibet, and, speaking widely, none between Thibet and the upper basin of the Irawadi. The habitable zone between these two regions is of great extent, and practically impassable. It was not to be thought of to outflank Tsarong by our route in an attempt to gain directly the great unexplored tract of Pomi.
	Towards the south, a route following the left bank of the Neydu (or Tourong, or Kiou-kiang) passes the following villages:—Seloum, Dam, Terandam, Ioumtem, Zangur, Manzing, Debondam, Konglam, Maboumgam, Meyun, Panmeyin, Pisê, Delinam, Dadzoum, Habour, Seungoum, Singouhol, Sanchiêl, Teran, Gonru,

Point of Departure of Routes and Names of Rivers about which Information was collected.	
MANDOUM—*continued.*	Ouakoué, Rondam, Pombour, Loukinson, Serindanamzer, Zerta, Rekoui, Konglam, Kiangtou (at the confluence of the Lantakou, or river of the golden sands), Ouadamkon. No information farther south, except that below Kiangtou the country is said to be called Kioui, and the people are Lissous. It is difficult to know where the Kachins or Singphos begin along this branch of the Irawadi. From Mandoum to Kiangtou is 7 days' hard marching. Inhabitants Kioutses and a few Lissous.
DUMA	From Duma to the great plain of Hapon (or Apon, a Kioutse name), situated at the confluence of the Reunnam and the Tsan, and peopled by Singphos, 8 days' march down the Reunnam.
KHAMTI	From Khamti into Assam, three routes :— 1. By the col of Chaukan or Tsaukan, S. 55° W. of Padao and the sources of the Dihung ; no snow ; but some risk from Singpho robbers, who, according to the Khamti folk, take free toll of travellers. About 25 days' march to Sadiya. This is the route that has been followed by all the English expeditions that have been in Khamti (Wilcox, Woodthorpe, Gray). 2. By the col of the Phungan-Boum (marked on my map), 22 days. A good deal of snow on the col from January to March, but never impassable. It is the one most used by the dwellers in Khamti. 3. The third passes over higher, colder, and more snow-encumbered cols, and is extremely difficult in mid-winter ; moreover, for 4 days it traverses a hitherto unexplored district, peopled by independent Mishmis, who are very hostile to Europeans. *Stages*—First 4 days up the valley of the Namkiou, and that of the Nam-Yin, its most western branch [N. 30° W.] ; 5th day, pass the col ; 6th, descent ; 7th, down the valley of the Nam-Delong (?) ; 8th, *id.*, sleep at Piaon-Kong, first independent Mishmi village ; 9th, Koutika, *id.*, reach the valley of the Nam-Derao (Khamti name for the Lohit Brahmaputra) ; 10th, Tongson, independent Mishmis ; 11th, Peshouson, *id.* ; 12th, Tsantaï, subject Mishmis ; 13th, Belon, *id.* ; 14th, Kamlong-Kong, *id.* ; 15th, Mankao, Thaïs or Khamtis ; 16th, Tsong-kan, *id.* (descend the