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Reports
ON THE
GEOGRAPHY OF THE PROVINCE OF PEGU
AND ON THE
WORKING OF THE TOPOGRAPHICAL SURVEY.

Report
ON THE
DISTRICT OF TOUNGHOO.

Journal
OF A
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Papers
REGARDING
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Calcutta:
JOHN GRAY, "CALCUTTA GAZETTE" OFFICE.
1856.

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PEGU:

ITS

GEOGRAPHY, DESCRIPTIVE AND PHYSICAL.

BY

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SUPERINTENDENT TOPOGRAPHICAL SURVEY.

PEGU:

ITS

GEOGRAPHY, DESCRIPTIVE AND PHYSICAL.

The Province and its area.

THE Province of Pegu comprises a portion of the Territories wrested from the Burmese during the war in 1852, and annexed, in December of that year, to the British Dominions in the East, and that portion of Arracan, South of the Keintalee Khyoung. The area of the former is about 30,450, of the latter 1,800 square miles, the aggregate of which is 32,250 square miles.

It is bounded—

Boundaries

On the North, by a line running East and West 6 miles North of Meaday, and along which pillars have been erected at intervals.

On the West, by the Arracan Mountains, and below the Keintalee Khyoung, by the Bay of Bengal, which latter also forms the *Southern* boundary.

On the East, by the Sittoung River, as far North as the Youkthwa Khyoung, one of its affluents from the East, in Lat. 18° 33′ N., and above that the boundary is as yet undetermined; independent States, the limits of which are undefined, being there impinged upon.

Bounding parallels and meridians.

All its parts lie within the tropics and are embraced between the parallels of N. Lat. 15° 44′ and 19° 27′ and the meridians of E. Long. 94° 13′ and 96° 52′.

The Fiscal Divisions of the Province.

As the Fiscal Divisions will hereafter be referred to, it is necessary to enumerate them. They are six in number. The South-easterly is the "Rangoon," above which, and extending to the Frontier on the North, is the "Tounghoo;" the North-westerly, the "Prome;" the South-westerly, the "Bassein." Intermediate, between the two last-mentioned and lying entirely in the valley of the Irrawaddy, are "Henzada" on the West of that river, and "Tharrawaddy" on its East.

	Sq. Miles.
Rangoon	9,800
Bassein	8,900
Prome	5,500
Henzada	2,200
Tharrawaddy ...	1,950
Tounghoo	3,900

Frontier boundary.

The Frontier boundary, throughout its entire length, passes over a succession of hill and dale. Leaving the main ridge of the Arracan Mountains just below the "Ever-visible Peak," it crosses the Irrawaddy River at the 53rd mile, the Yoma Range at the 93rd, the Sittoung or Poun-gloung River at the 126th, and after 12 or 13 miles, ceases in the mountains East of this river. It thus passes transversely, over the contiguous valleys of the two main streams of the Province, and their intermediate water-shed, having its extremities resting on other two mountain chains, and has a total length of about 140 miles.

Natural divisions.

The mountains and rivers alluded to cease with the Southern limits of the Province, the surface of which may therefore be described as distributed in two valleys and their bounding chains of mountains.

Geological features.

The Yoma Range, from the Frontier to Lat. 17° 15′ is composed of brown or grey slate-clay, with thin layers of bituminous limestone, containing fossil testaceous remains, frequently alternating with, and passing into, beds of argillaceous sandstone, generally soft and friable, though indurated in places, especially in the higher ridges, where it assumes, at times, a basaltic character—so much so, towards the North, in the Prome District, that basaltic trap frequently occurs in the main ridge. Overlying the slate clay and sandstone, and folding round the base of the high hills is a bed of laterite, forming an undulating dry tract 10 to 30 miles wide, always, when on the surface, covered with trees or bamboos. Leaving the "Shuay Dagon Pagoda," this bed extends to Kyouktan, on the Hmau-woon River on the South-east and on the South-west, probably to the mouth of the China Bukeer. River, passing under the rich alluvium of the plains within these limits. The laterite bed is wanting at the base of the hills on their West, above the Shualay Khyoung, to a certain extent; but below this, it apparently passes under the alluvial valleys of the Hleing and Irrawaddy, appears in slight undulations in the Henzada and Bassein Districts, and folds round the base of the Arracan Mountains, covered in the plains with river deposit, the depth of which, towards the South, is indicated by the necessity for tanks, in places, in lieu of wells. The Arracan Range abounds in limestone, with a good freestone towards the South. In Henzada District, granite, greenstone, and hornblende are met with,

also lime and sandstones; further North, in the Prome District, either granite, or greenstone, or gneiss the stratification of which may have escaped observation. Quartz nodules are common, and with clay-slate make up the grauwacke formation, which, with the limestone beds and fossil remains of molluscs and fishes which abound, would denote the silurian or transition system. Coal is found in small quantities near Thayetmyo, as also sandstone, basaltic in places, and clay iron-stone. The Poung-loung Hills East of Tounghoo are of gneiss, or a soft granite, with laterite at foot, extending to the river, but covered with alluvium for 4 or 5 miles, in the vicinity. Patches of limestone also exist.*

Mountain chains.

Of the mountain ranges, the Arracan and Poungloung are off-shoots from the mountains that come from beyond the Himalayas, on the left bank of the Berhampooter. The Yoma appears to be a spur of the latter, thrown out in latitude 22° North.

The Arracan Range.

The general direction of the Arracan Range, between the Frontier and latitude 17° 35′, is 5° E. of S. below that 15° W. of S. Its main ridge is crooked and irregular, and the greatest height attained below the Frontier is about 4,000 feet. In the North part of the Province, it presents to the view a serrated ridge of black, bold, barren, blasted peaks, connected by saddles, of much less altitude, which, on their precipitous sides and the abrupt spurs thrown out from them (mostly in a South-easterly direction), are covered with dense and impenetrable jungle. Progressing Southwards, the mountains, though retaining their rugged character, degenerate into hills, with an unbroken coating of green, chiefly consisting of magnificent wild mangoe and wood-oil trees, until at length the ridge dips into the Bay of Bengal, at the mouth of the Bassein River, and may be traced even farther South at Diamond Isle and the Alguada Reef. There are many passes, but the routes leading to them are generally mere foot-paths along the bed of a torrent, with occasional short cuts across intervening spurs, impracticable for any thing but a bullock, buffalo, horse, or foot passenger, and indifferently supplied with water. Towards the North, these passes are of importance, and the best yet investigated appears to be that leading from Kangaen to Alegyo, which mounts by a long

* McClelland, O' Riley, and the Survey Officers.

unbroken spur free from declivities. A Military road is now being made across these mountains by a spur behind Padoung, which happens to be the shortest known.

The Yoma Range.

The Yoma Range forms the back-bone of Pegu, and divides the valleys of the Irrawaddy and Sittoung. Its general direction, previous to entering the Province, is S. by W., and thereafter about 5° E. of S. Its maximum elevation is about 2,000 feet, which it attains in Lat. 17° 55′ N., where the main ridge forks out into several radiating spurs, forming the Pegu and Puzendoung Valleys, and others of less importance, connected with them and the Hleing River. Between this point and the Frontier, the height averages from 8 to 1,200 feet. Considering the low elevation attained, the slopes of these hills are steep and difficult. The main water-shed is continued in the low ridge that extends to Rangoon. The whole range is densely wooded, and teak abounds, particularly in the Southern and Western declivities. Three passes have been explored in the Northern part. The routes to them are much the same as those described over the Arracan Mountains. Others exist in the centre part, but are next to impracticable for any but a Burman.

The Poungloung Range.

Of the mountains East of the Sittoung River, little is known. The main water-shed is said to attain a height of 7 or 8,000 feet, and to be a considerable distance beyond the Koonoung Range, which runs parallel to the river at a distance of 14 or 15 miles, until turned by the Youkthwa Khyoung. It divides the valleys of the Sittoung and Salween and extends on the South to Martaban.

Other hills.

Besides the chains just described, there are a few isolated ranges of hills, of no great elevation or extent, such as the Prome Hills, stretching on the South towards Engma; the rising ground on the East of the Pegu River near the Pyne Kewn Creek; that between Thanlyengmyo and Kyouktan; that to the South of Twantay; and that to the South of Myoungmya.

Valleys.

In addition to the two main valleys of the Irrawaddy and Sittoung, there are, towards the Southern part of the Province, two smaller ones, intermediate between them, the Pegu and Puzendoung or Phoungee, and identical with that of the Irrawaddy is that of the Hleing, which river has a parallel course with the former.

The Irrawaddy Valley.

For 60 miles South of the Frontier on the East of the Irrawaddy, and for 90 miles on its West, the valley has an exceedingly rugged appearance, and so irregular is the country, that cultivation can only be carried on, on the banks of the various small streams and on the cleared patches on the sides of the hills. On the West, the spurs rise very rapidly and abruptly, and are covered with tree and bamboo forests. On the East, the country is equally jungly and very difficult, and from the absence of the laterite bed, that lower down folds round the base of these hills, is dry and parched in the hot season. Below the above limits, the hills recede, developing gentle undulations at their bases, and subsiding in the vicinity of the river into alluvial plains, the breadth of which increases as the water-sheds diverge and their altitude diminish, until the valley may be said to be lost in the Delta or to have united in forming, with that of the Sittoung River, one vast valley from the Arracan Mountains on the West to the Martaban Hills on the East. The integral width of this valley is about 80 miles, which is divided nearly equally by the river. The scenery of the upper part, both on the banks and in the interior, is varied and beautiful—of the lower part and Delta as monotonous and uninteresting as that of the Northern is the reverse.

The Valley of the Hleing.

The Valley of the Hleing, which commences about 70 miles below the Frontier, is identical with that of the Irrawaddy.

The Puzendoung and Pegu Valleys.

The Puzendoung and Pegu Valleys are very similar in their nature, being deep and canal like, and having water in them throughout the year. Twenty miles North of Rangoon they unite and form one with that of the Sittoung, for though they preserve their integrity until their waters are discharged into the Rangoon River, close to the city of that name, the country below that limit is a vast plain, highly cultivated in parts, and submerged in others to a depth of 3 feet and more, during the monsoon. Their breadths, in the hills, on issuing out from which they gradually converge, are respectively 10 to 15 and 15 to 20 miles.

The Valley of the Sittoung.

In the Valley of the Sittoung, the country to the West of the River, and near the Frontier, resembles the North-eastern portion of the Irrawaddy Valley. A few miles

below, the hills recede, giving place to plains in the vicinity of the river, which gradually widen as Tounghoo is approached, carrying with them a continuous level strip, on the opposite bank, of 4 or 5 miles in width, beyond which the mountains rise with great rapidity. To the South of Tounghoo, the plains increase in breadth by the diverging course of the river. A large tract of wild country, about 25 miles in width, is thus left on their West, extending to Baunee; an ocean of hills, themselves sufficient to render penetration next to impracticable, independent of their covering of dense and generally impenetrable jungle, which, intermingled with thorns and prickly bamboos, stretches over the plains, giving place, below Shuay-gheen and Baunee, to tall elephant-grass and cane. The valley is very sparsely inhabited; but little ground has been cleared for cultivation, and that only in the vicinity of, and for the immediate wants of, the different villages. In the wild parts of the hilly tract, the silk-worm is raised. (The above description refers more particularly to the west side of the valley).

Plains.

The plains are either densely wooded, or covered with tall grass and cane, almost universally, save where the hand of man has cleared for his own purposes, which necessarily has been most extensively done in parts where the population has most thickly segregated. In some places, the plains are, on one side, diversified by gentle undulations of a few feet in height (generally of laterite), prettily wooded, and affording a pleasant, cool prospect of ever-varying shade for the eye to turn to, from the glare of the parched and light-colored soil, a boundless expanse of which is, on the other side, spread before it, with nought to break its continuity, save the occasional low line of stunted jungle, fringing some nullah, the meandering course of which indicates the otherwise imperceptible undulations. These rich and fertile plains are cultivated with rice and constitute the wealth of Pegu.

Coast line.

From the Gulf of Martaban, on the East, to Baragué Point, the most Southern extremity of the Province, the direction of the Coast is South-west. Thence to Pagoda Point, about 5° N. of W. Being the boundary of the Delta of the Irrawaddy, it is necessarily low, flat, and difficult to make. The Gulf of Martaban is unnavigable on account of its numerous sand-banks, many of which are dry at low tide, and the whole Coast is unap-

proachable, within 9 or 10 miles, by vessels of large size, from the same reason, except in a few places, where channels are kept open by the streams of the rivers. The shore is free from rocks and of firm sand for about three-fourths of its extent; the remainder being of mud in patches, at short intervals, generally defined by streams on either side. The bed of the sea shelves uniformly, and consists of mud, occasionally mixed with sand, and is also free from rocks. At the Bassein River, however, the nature of the Coast completely changes, as also does its direction, which becomes N. by E. A long and dangerous reef, the "Alguada," is met with 15 miles from the land. Along the Coast, precipitous spurs, off-shoots from the Arracan Range, which runs parallel, and at no great distance, jut boldly into the sea, forming conspicuous head-lands, fenced around with rocks strewn in every conceivable disorder, and as if not sufficiently forbidding in their frowning crests, and rugged bases, rendered so by sunken and unknown rocks; and yet these have their charm, in the extensive prospect afforded from their summits, and the music of the waves ever dashing at their feet. Between them are shell-bespangled sandy bays, inviting from the quiet repose that pervades them, and doubly so from the pleasing contrast afforded by their retiring forms, and the gently undulating downs that frequently constitute their back-ground, occasionally allowing a glimpse of grander scenery, through the unexpectedly developed opening, by which some mountain stream is suffered to escape—*suffered*, for many of them betray, how, foiled in their eager endeavor to contribute their quotas to the mighty ocean, by the most direct route, they have been compelled to gather strength, by running for a short distance parallel to their goal, in order to break through the barrier of sand raised against their egress by the restless unwearying wave. Many of the rivers, however, are exceedingly wide at their mouths, and for the last few miles of their course, partake more of the nature of estuaries. The coast—a lee-shore in the S. W. Monsoon—carries its characteristics far beyond the limits of Pegu, and the fragments of wrecks, with which it is strewn, are sufficient proof that the epithet of "iron-bound" has been justly earned and justly applied.

Hydrography.

The shores are washed by the waters of the Bay of Bengal. The great tidal wave of the Indian Ocean, gradually contracted as it ascends the Bay, impinges directly

upon that portion between Pagoda and Baragué Points, and thereafter (according to Fell's chart) travels parallel to it, with a velocity at the springs, of about 4 knots per hour, towards the Gulf of Martaban. There, it meets other portions, which have not only not been retarded by friction over shallows, but have been accelerated by the accumulation caused by the wave being checked in its onward course by the Tenasserim Coast; and thus united, it rushes with a velocity varying from 6 to 7½ knots per hour, up the gulf, a funnel in shape, into which the Sittoung discharges its alluvion-freighted stream. A conflict ensues—the silt is deposited in sand-banks of enormous extent—the tidal-wave goaded, as it were, to madness, by the ever-increasing resistance presented to its course, rears on high a curling threatening crest, forming a bore of sometimes 9 feet, and sweeps up the river to Sittoung with ungovernable fury, and a noise like the distant rumbling of an earthquake, overwhelming every thing it encounters.*

The Sittoung River.

We thus see that the Sittoung River to which we have been led is unapproachable by ships or steamers; boats frequently ascend, but it is dangerous for them. At Kya-tsoo the springs pass through the Pyne-Kewn Khyoung, in small quantities, into the Pegu River. At Abyah, 6 or 7 miles below Sittoung, they rise nearly 7 feet (Login) in the dry season. *At Sittoung* the river is about ½ mile broad. *Below* it increases in width, passing at length into the Gulf of Martaban, with no clearly defined mouth. *Above* it gradually narrows, is shallow throughout its course, and is full of islands and sand-banks. Between Shuay-gheen and Tounghoo large boats go, but with the

* *Table referring to Tides on the South Coast of Pegu.*

Year.	At	Hour of high tide at noon's full and change.	Rise in Feet. Springs.	Rise in Feet. Neap.	Authority.	Remarks.
1850	Alguada Reef, ..	X½	12	?	Fell.	
1853	Diamond Isle, ..	X	9	6	Ward,	The tide must rise at Diamond Isle later than at Alguada Reef.
1853	Mouth of Irrawaddy, ..	XI	9	6	Ward.	
1850	Baragué Flat, ..	XI	7	?	Fell.	
1856	Rangoon River off Town,	V½	21 to 22	14	Aylesbury.	
,,	Rangoon River Mouth,	III¼	Not known		Ditto.	

greatest difficulty in the dry season, having frequently to be dragged over sand-banks. It drains the basin between the Yoma and Poung-loung Ranges, and if its source be at all correctly placed in "Pemberton's" Map (Lat. 21° 20′ N. Long. 96° 55′ E.), the area is about 22,000 square miles, of which 7,000 are in the Province, and it has a total course of about 350 miles, of which the last 175 are through Pegu, the development of which is little short of 300 miles, so tortuous is the stream. On the West, the banks are uniformly low. On the East, the hills abut on them, in places. Eight or nine miles above Shuay-gheen, the Kyoukgee Creek goes off to the East, and after a course of 35 miles re-unites with the main stream. Seven miles further on, the Bonmadee Creek forms in a similar manner another large island, some 20 miles in length. Both are as much as 8 miles across in their widest parts. This river is called the "Sittoung," "Shuay-gheen," or "Tounghoo," respectively, in the vicinity of those places; above the latter, the "Poung-loung."

Its principal feeders are—*on the West*, the Kawleeya and Binedah (which unite near their common mouth), the Yaynway or the Myoo, the Koon, the Hpyoo (the beds of which are so impeded in their higher parts with snags and rocks and with sand about their mouths, that timber is floated down with great difficulty), the Kaboung, the Tswah, the Myohla, and Doung-than-gya, all of which have a small stream, in the dry season—*on the East*, the Ahtanau, the Shuay-gheen, the Baukatah, the Shuay-lantoung, the Mong, the Youkthwa, the Thouk-yay, the Kannee, the Kareen, the Thitnatha, the Koonoung, the Gway-thai, the Bembya, the Waiyonlay, and the Maihau.

The "Pegu" and "Puzendoung" Rivers rise close to each other, where the Yoma Range throws out to the South its radiating spurs. The former has a S. S. E. course of about 50 miles to Pegu, where it is 105 yards broad, with high steep banks, almost dry in the hot season, at low tide, which rises 4 or 5 feet. *Below*, it runs for 60 miles to Rangoon, the first 15 of which are Southerly, the remainder in a direction S. W. by S.; receiving on the West, the Lagoon-byeng and Akhaiyeng by a common mouth, and other small streams. On the East, the Pyne-kewn, the Kawek, the Pagoondoung, the Bau, &c., which communicate with the Sittoung during the rains, though showing a greater determination to this river. In the dry season, boats pass

The Pegu and Puzendoung Rivers.

Pegu River.

through the Pyne-kewn at the springs, and in the rains, small steamers can ascend, as far as Pegu, and even above. At its mouth, this river is very wide, but rapidly contracts. A bore of 3 feet is consequently raised, as the flood passes over the shoal parts, and its effects are felt at Pegu, in the sudden filling of the early flood.

The Puzendoung River.

The "Puzendoung" River has, for the most part, a S. by E. course, and 35 miles from its mouth, is 50 yards wide, with high and steep banks, 3 feet of water and 1½ feet of tidal rise. Twenty miles further on the "Mahooyah" is confluent with it from the East. It has one principal affluent, the "Ballah," which falls in from the West about 10 miles from the mouth. It is discharged into the Pegu River at the mouth of the latter, where it is called by the inhabitants the "Gna-moiyek" and higher up the "Phoungyee." It is connected with the Pegu River in the latter part of their courses by several small nullahs.

The Hleing River.

The "Hleing" River originates in the low ground to the East of the Prome Hills, but is connected, during the rains, with the Gna-weyng Khyoung, an affluent of the Irrawaddy, just above Prome. It passes by "Tahpoon," through the Tharrawaddy and Hleing Districts, into the Rangoon River at Kemendine, with a course S. S. E. in its general direction, but tortuous in the extreme. It is connected with the Irrawaddy, at Hteindau, by a stream as large as itself, which leaves it at Shuay-loung Zaymau, and during the rains by several smaller ones, so that it may be said to form one with the Irrawaddy, intercepting, as it does, the drainage of the Western slopes of the Yoma Range. It is navigable for steamers of small draught to Tsan-yuay in the dry season, where its width is 180 yards, the tidal rise 2½ feet, and the depth of water 4 feet, with a sandy bed. Boats can go in all seasons to Tahpoon, the depth of water being never less than 3 feet, but the channel is, in many places, choked with jungle. This river is called the "Kyoukthan" in the North and the "Meemakha" below.

The Irrawaddy River.

The Irrawaddy, according to Pemberton, rises amongst perpetually snow-capped mountains, in Lat. 28° N. and Long. 97° 30′ E. It thus has a course of about 900 miles to the sea, the last 240 of which are in the Province, and in a S. S. W. direction. The river has few windings, and its development,

in the latter distance, may be 50 miles more. The greater portion of Pegu, about 23,000 miles, is drained by it and its tributaries, the Hleing, Pegu, and Puzendoung Rivers, all of which fall into the Rangoon branch. The total area of its basin may be about 1,65,000 square miles. For so large a stream, it is subject to very sudden rises and falls. Its waters commence to rise in March, and after several oscillations in their level, at length attain a height of from 37 to 40 feet above the lowest level. This occurs about the end of September. Early in October, the river begins to subside, and at first very rapidly, as much as a foot and-a-half per diem, for the first few days. The stream holds much silt in solution. In March 1855, the proportion was $\frac{1}{37\frac{1}{25}}$, and in the August following $\frac{1}{2000}$ part by weight at the bifurcation of the Bassein River (Login). In the lower part, the stream is always turbid, but in the Northern part, it is tolerably clear in the cold season. No rocks exist in the bed of the main stream below Myaoung. A little above this, the country, hitherto flat, alters its nature. Abrupt and rocky hills jut down to the very banks at "Akouktoung" in a precipice some 300 feet high, at "Prome," "Kama," "Potohdoung," "and "Toungdoung," on both sides and above Thayet-myo. The bed becomes broken, irregular, and full of rocks, as evidenced by the eddies, and rapids (with the greatest difficulty stemmed by the steamers) occur in several places. Sand-banks and islands are numerous throughout its course, but the former, and most of the latter, are submerged when the river is at its highest. Changes are discernible in the course of the river between Saitha and Sarawah, but as a rule, it is faithful to its bed. The deep channel, however, is constantly shifting. The velocity of the stream at its lowest is about 1½ miles, at its highest about 5 miles an hour (Login), when it is level with the top of the banks, which are universally steep. Its width at the Frontier is ⅔, at Yandoon 1¼ miles. Steamers of 6 feet draught ascend to the Frontier at its lowest, to Ava in the rains; at which time steamers, drawing 10 feet, have reached Prome.* The tide is just felt at Henzada, and rises 3½ feet at Yandoon, where the branch to Rangoon, the most Eastern mouth, bifurcates, and the Delta may be said to commence, its Western limit being the Bassein River, which is the first branch thrown off by the Irrawaddy. The drainage

* The "Enterprize" of 10 feet draught, ascended to the Frontier in the rains of 1855.

of the portion of the basin, lying within the Province and above the Delta, is effected—*on the West*, by the Mingday, Matoong, Mudday, Shooetena, The-lay-deing, Khawa, Poutine (partaking more or less of the nature of mountain torrents), the Bashen, Noukmee, and Simpon, all of which fall into the Irrawaddy direct, and have but a small stream in the dry season ; and below which the drainage, on this side, is conveyed into the Bassein branch by streams hereafter enumerated—*on the East*, by the Keenee, Bolay, and Gnaweyng, which fall into the Irrawaddy and the Shuaylay, Toungnyo, Sinchoung, Memboo Myo-hla, Men-hla, Beeling, Thongzay, Okan, Ma-gyee Myoung-dega, and Maubee, which are intercepted by the Hleing River.

Bassein Branch.

At the embouchure of the Bassein River, which is about 300 yards wide, there is a sand-bank of 10 to 15 feet high, so that no water enters this channel, except by percolation, until the river has topped this sand-bank, in its annual rise. For 13 miles its course is Westerly, and thereafter S. S. Westerly to the sea ; to which, independent of its exceeding tortuosity as far as Bassein, it is the longest route. It receives the drainage of the Eastern slopes of the Arracan Range within its limits by numerous streams, of which the principal are the Kwengouk, Khatoo, Mayzlee, Kyet-boung Hpodau, Kanyeen, Kyouk-Khyoung-gyee, Thandoway, Hleing-bon, Myeet-taya and Paiya-hla. The tide is just perceptible at Lemina. It is navigable for large ships as far as Bassein, and for steamers of 5 feet draught, in the dry season, as far as Gnathein-gyoung. Steamers drawing 10 feet can pass through into the Irrawaddy in the rains.

The Irrawaddy is discharged into the Bay of Bengal by nine principal and numerous intermediate and smaller mouths.

The Delta of the Irrawaddy.

The various branches are connected by countless creeks intersecting in all directions, and converting the maritime Delta (in the formation of which the sea has been, and is being, encroached upon by the deposit of the suspended silt) into a congregation of islands. Either the Rangoon or China Bukeer River is the shortest outlet for the stream. The former is the most frequented of all the mouths. By the latter, the river steamers have to make a detour, in going from Rangoon, towards the Frontier, in the dry season. The Bassein mouth is the deepest and most distant. The intermediate mouths are never attempted by ships, and one or two only are deep enough to admit those of large burden. The banks of the various branches are

fringed to the water's edge, with mangrove and other jungle. Their beds are muddy (with the one exception of the Bassein branch, in which there are rocks below "Gnapootau"), and abound with alligators. Every creek of any pretension has a name, but owing to the habit the Burmese have of giving the name of each village to the portion of the stream running by it, it is often difficult to ascertain the correct one. Rangoon, the chief city of Pegu, is situated on the branch of that name 20 miles from the sea. The only drawback to its navigation is the existence of a large shoal, the "Hastings," a little below Rangoon, caused by a backwater resulting from the meeting of its stream with that of the Pegu River.

As would be expected, the soil of the Delta is rich, and yields a most bounteous return where cultivated. The greater part is however covered with grass and forest, with small clearances, near streams and tanks, for decomposing the fish, with which the waters teem, and making salt ; providing lucrative employment for the greater part of the inhabitants of the whole Delta.

The only accumulations of water, worthy to be called lakes, are enumerated below, and for them "Lagoons" would probably be a more correct term. All others partake more of the nature of jheels, ponds and marshes, most of which dry up before the close of the hot season.

Lakes, &c.

1. The "Thoo" Lake, in Henzada District, of an irregular shape, about 8 or 9 miles round and 2½ across, fed by the Mamya Khyoung from the Arracan Mountains and drained by the Simpon and Noukmee.
2. The "Lahagyin," formed in a large low tract of ground, near the junction of the Menhla Khyoung, with the Hleing River, in the Tharrawaddy District.
3. The "Kandau-gyee," near Rangoon, from 2 to 3 miles round.
4. The "Shuay-doong," near the Frontier at Maihau, in the Tounghoo District, about 5 miles round, and through which the "Doungthangya" Khyoung flows.

The water in the above is fresh and of good quality. In the lower part of the Delta, the ponds and marshes are generally brackish.

The only mineral springs that have been encountered are saline, at the foot of the spur, by which the route leading from "Kangaen" to the Alegyo Pass of the

Springs.

Arracan Mountains ascends, and also about the spurs behind Akouktoung.

Meteorology.

The climate is good, and though relaxing, induces no particular predisposition to disease. Convalescence however is of long duration, and a change is generally essential to ensure perfect recovery. A sultry evening, or night, is a rare occurrence. There is generally a breeze, which might be expected, in the lower parts, from the proximity of the sea; in the upper, from the natural formation of the country in valleys. The setting in and close of the rains are unhealthy in the jungles and hills, attributable most probably to the water. Instinctively, as it were, a Burman never drinks at these times from a running stream, when he can obtain water by scooping a hole in the sand. His assigned reason for so doing is, that it is cooler. Miasmatic exhalations arise from the plains, as the ground dries up and cracks, but with severe effects, fortunately in few places. The rains last from about the 20th May till the middle or end of October with little intermission. A few showers occur early in May. As is usual, the fall is greatest near the Coast, but the great decrease, in the North-west part of the Province, is doubtless owing to the proximity of the Arracan Mountains, which, lying in the path of the S. W. Monsoon, there attain a sufficient height to intercept the lower strata of nimbi, whilst the higher ones are carried a long distance into the North-east of the Province, before they descend low enough for condensation.

This is clearly exemplified by comparing the falls of rain at Thayetmyo and Tounghoo. A chain of Rain Gauges, at intervals of (say) 30 miles from the Arracan Coast on the West to Tounghoo on the East, would produce an interesting scale. Slight shocks of earthquakes have been felt, but no observations of their courses have been made. The Province is generally visited by one severe storm during the year, soon after the vernal equinox.

The variation of the Magnetic, East of the true North, is about 2° 35′.

The following Table has been compiled from the Meteorological Registers kept by Medical Officers at various Stations. It was impossible to make it more complete, owing to the disconnected manner in which many of the Registers have been kept :—

Table compiled from the Meteorological Registers kept by Medical Officers at various Stations in Pegu.

Period. From	Period. To	Stations.	Fahrenheit's Thermometer. Maximum. Dry Bulb.	Maximum. Wet Bulb.	Maximum. Percentage of Humidity.	Minimum. Dry Bulb.	Minimum. Wet Bulb.	Minimum. Percentage of Humidity.	Hottest month and its mean maximum Temperature.	Coldest month and its mean minimum Temperature.	Rain. Inches.	Rain. Averages. No. of days.	Rain. Averages. Most rainy month and its fall in inches.	Remarks.
June 1854	May 1855	Thayetmyo,	88	73	47·4	70	67	86·5	May .. 98	January .. 54	32·875	100	September 11	Winds variable in November and December, Northerly in January and February; during the other months Southerly. From 15th October to 15th February very cool. The great range of the Thermometer during December, January, and February, between sun-rise and noon, is very trying: on some days, it has been noted as 45°. Raw fogs in the mornings in October, November, and December. From 15th February till rains set in, the days are sultry, with almost hot winds. Dust storms in April. March is the *driest* month, *i. e.* that in which evaporation is greatest. The rains fall more in showers; seldom heavily or continuously.
Jan. 1854	Dec. 1854	Tounglioo, ..	85·8	..	..	73·2	..	..	May .. 93·3	January .. 61	76·8	120	August .. 24·5	The yearly means of an Aneroid Barometer (error unknown), that was registered from June 1854 to May 1855, are maximum 30·476, minimum 30" 19. From 15th November till 30th April, wind Northerly, at other times Southerly. November, December, January and February cool, with foggy mornings; from March until the rains set in and October hot and close days.
Jan. 1854	Dec. 1854	Henzada, ..	..	..	..	..	..	..	April .. 101	February .. 54	..	..	.....	From 1st November till 15th April, cold nights with heavy morning fogs. Hot days from March till rains. May very sultry and relaxing.
Jan. 1855	Dec. 1855	Bassein, ..	..	..	..	..	..	..	May .. 98	....	..	..	.....	November, December, January, and February cool, with early fogs; thereafter, till the rains, the days are hot.
June 1854	May 1855	Rangoon ..	84	..	..	76·5	..	..	May .. 98	December 63	94·95	120	August .. 20	Average yearly fall of rains is 90 inches. At the end of September, the wind veers round to the North. From 15th October to 15th November warm. Thereafter, till end of February, cold, with early fogs. These last till end of March, the days of which, as also of April and May, till the rains set in, are very hot.

In briefly describing the Zoology of the Province, the animals, &c., known to exist, are given under their respective families, but no attempt has been made to affix either the particular genus or species, for unless correctly done, such attempt would be worse than useless :—

Zoological Geography of the Province.

Mammalia.

Quadrumana. Monkeys of various kinds.

Edentata. Pangolins, or Scaly-ant eaters.

Pachy-dermata. Elephants ; Rhinoceros (in the S. W. portion of the Province) ; Hogs (domesticated by the Carens).

Solidungula. Pegu Ponies (none wild).

Carnivora.

I. Chiroptera. Bats, Flying Foxes.

II. Plantigrada. Bears (in the Northern parts).

III. Digitigrada. Otters ; Dogs (domesticated) ; Jackals (in the Northern parts) ; Cats, domestic (with a short twisted tail)—wild (Tiger, Leopard and Civet) ; Tigers, Leopards, Black Panthers, and Cheetas.

Rodentia. Squirrel ; Flying Squirrel ; Mongoose ; Porcupine ; Hares (towards the North) ; Mice ; Rats, (Bandicoot, Musk, Bamboo).

Ruminantia. Deer (Barking, hog, antlered, &c.) ; Oxen and Buffaloes (wild and domesticated—the latter more in the Delta) ; Bison (a species in the North) ; Sheep (introduced and thrive well in the North) ; Goats.

Aves.

Rapaces. Vultures ; Hawks ; Kites ; Owls.

Scansores. Parokeets ; Woodpeckers ; Kingfishers.

Oscines. Sparrow ; Crow ; Mynah ; Mango Birds ; King-Crows, &c.

Gallinaceæ. Doves ; Pigeons (common, green, imperial) ; Quail ; Partridge, (black and painted) ; Jungle Fowl ; Domestic Poultry ; Pheasants (grey) ; Pea-fowl.

Grallatores. Paddy Birds ; Cranes ; Egrets ; Herons ; Adjutants ; Cyrus ; Waterfowls ; Plovers (spur-winged and others) ; Snipe ; Snippets. This family presents greater varieties than any other. An Ornithologist would doubtless find many new species.

Natatores. Geese ; Ducks (wild and domesticated) ; Teal (common, whistling, and cotton) ; Pelicans.

Reptilia.

Testudines. Marsh and River Tortoises, Turtles or Sea Tortoises (all along the Southern Coast, but more particularly at the Western extremity).

Sauria. Alligators (all over the Delta, up the Pegu River, and said to be found in the Irrawaddy at Ava) ; Chameleons ; Geckos ; Lizards.

Ophidia. Cobras ; Yellow-belted Snakes ; Vipers ; Water, Tree, and Rat Snakes ; Pythons.

Amphibia. Frogs.

The waters teem with fish of all kinds. The Western Coast presents a rich field to the Conchologist, and every dinner-table, during the rains, is a study for the Entomologist.

Botanical Geography. The jungles abound with trees, valuable for their timber, dyes, oils, and gums, fibres or medicines.

Timber. Teak (on the slopes of the Yoma Range and Poungloung Mountains), Peengma Lagerstrœmia or Jarool (all over the Province, but very fine up the Youkthwa Khyoung). Iron-wood (Inga xylocarpa) ; Padouk (Pterocarpus indicus) ; Pentaptera ; Ebony ; Dalbergia robusta et frondosa ; Shorea robusta ; Melicoca trijuga ; Hopea ; Dillenia.

Dyes and Pigments. Jack ; a species of Garcinia, from which good gamboge is obtained ; wild indigo ; wild Mango (yellow) ; Douk-yat (yellow.)

Oils and Gums. The wood-oil tree (Dipterocarpus lœvis et grandiflora—the former in the South, the latter towards the North.) The Acacia Catechu (which yields the Cutch of commerce in the North-west parts) ; Gum Kino, from the Padouk ; Pulas Kino, from the Poukbeng, or Butea frondosa ; Cocoanut ; Teethsee (Melanorrhœa), which affords a splendid black varnish.

The Shau (Sterculia,) Urena lobata (a weed covering every clear spot in the lower part of the Province ;) Thengban ;

Fibres.

Khying-boung (Hibiscus) ; Noaynee ; Noaybyoo.

Medicines.

Strichnon, Sowa, Senna, Castor, and Croton Oils, Lemon Grass.

Spices.

Wild Cinnamon tree ; Ginger ; Turmeric.

The plants cultivated are—

Grains.

Rice (universally) ; Maize (in the North-Western parts.)

Vegetables.

Cucumbers ; Gourds ; Pumpkins ; Brinjals ; Radishes; Yam; Sweet Potatoes; Capsicums; Tomatoes; Onions ; Garlic ; (many wild vegetables, amongst them an Asparagus, are also eaten.)

Fruits.

Plantains; Mangoes; Meiyan-thee (a species of mangoe); Tamarinds ; Jacks; Pines; Guavas; Oranges (indifferent); Limes; Cocoanuts ; Heritiera ; Roselle ; Water and Musk Melons ; Bread-fruit ; Wood-apples; Cashew-nuts; a species of Gooseberry, and Crab-apple ; Figs ; Custard Apples, and Bèl-fruit towards the North.

Dyes.

Indigo ; Safflower; Neepasee (red); Arnotto (red.)

General use.

Cotton (coarse, curly, harsh, but very strong fibre, in small quantities, about most villages) ; the Mulberry (to a very small extent amongst the Yoma Range for the silk-worm); Tobacco (on the low lands and islands in the river) ; Paun, Betel ; Teel, and Mustard (for the oil from their seeds) as also Sesamum.

Ethnography.

The different races forming the population of the Province, and the localities they peculiarly affect, are shown below. Taken together, they may be said to constitute a sub-variety of the Malay variety of the Mongolian race. As a rule, they are short in stature, broad in build, *i. e.*, squat-figured, with apparently great muscular development, which proves, however, flabby and soft, except in the legs.

They are tattoed from the waist to the knee, and are in the habit of tattoing charms about their bodies. They average 5′4½″ in height ; 8 stone 2lbs. in weight ; 32″.5 inches round the chest.

Characteristics.

Entirely free from caste, social and domestic, animated and quick, but having no depth of reasoning power, full of repartee, great mimics, partial to the drama,

excelling in Marionette performances. Filthy in their habits and mode of life, thinking a snake a bonbouche. In disposition, merry and philosophical, never thinking of the morrow, ungrateful, cowardly, and cruel, devoid of all sense of honor or truth, and wanting in all the essentials of a soldier. Lazy and indolent, serving from fear alone, cringing and abject as subordinates, though ever ready to presume on the ignorance or laxity of their superiors. Arrogant, tyrannical, and rapacious as rulers.

Religion.

Boodhists in religion ; its observances are principally confined to those whom years have convinced of the natural proximity of a future state ; and to women, who hail the days of public worship as opportunities for displaying the extent and gorgeousness of their attire.

Education.

The priests instruct the boys, and whereas few females can either read or write, the contrary is the case among the males.

Employment.

As artificers, they are very unskilful, save in wood-carving, in which they display boldness of tracery and beauty of design. The chief employment of the males is in cultivating, fishing, trading by boats, and salt-making ; all are adepts at the paddle, driving a cart, and cutting jungle.

The women, who have every liberty, employ themselves in weaving, keeping bazaars, and household concerns.

Amount of Population and most thickly inhabited parts.

The population, which re-produces itself, (but not more) may be set down at 5,00,000 souls, or about 16 per square mile.

The more densely inhabited parts are ; *generally*, the banks of the principal streams ; *more particularly*, a circle of 20 miles around Rangoon, the Henzada District, the upper portion of the Bassein District, and the country about Poungday.

Races and their Localities.

Burmese	The bulk of Inhabitants.	Generally distributed.
Talaings or Moans or Peguans		In the Delta, principally in the South and East.
		Ditto ditto in Towns.
Pwo, Sho, or Talaing Karens ...		Ditto and sparsely towards the North, living apart and often in the wildest spots.
Sgau or Burmese Karens		

Karen-nee, or Red Karens	In the Hills, East of Tounghoo.
Khyins	In the wildest parts of the Arracan Mountains. The faces of the women are tattoed.
Yeh-baings	In the secluded parts of the Yoma Range. They cultivate the mulberry for silk.
Shans	In distinct communities, here and there.

(Signed) E. C. S. WILLIAMS, *Lieut.*.
Supt. of the Pegu Survey.

RANGOON,
The 20th June 1856.

PEGU SURVEY DEPARTMENT.

SKETCH OF ITS WORKING,

BY

LIEUT. E. C. S. WILLIAMS,

Bengal Engineers,

SUPERINTENDENT TOPOGRAPHICAL SURVEY.

PEGU SURVEY DEPARTMENT.

SKETCH OF ITS WORKING

FROM THE

COMMENCEMENT OF THE SURVEY TO THE 30TH APRIL 1856.

THE Topographical Survey of Pegu was commenced at the close of December 1853, with the Establishment shown in Appendix A.

System determined on.

Considering that there were difficulties in the way of a triangulation of the country, which, though not insurmountable, would cause great delay, the Superintendent proposed that the Survey should be based on Theodolite traverses, triangulation being resorted to where absolutely necessary, or obviously advantageous and expeditious.

Field season of 1854.

A system of main lines was accordingly devised, and the Survey was commenced with the measurement of that between Rangoon and Pegu, by Lieutenants Williams and Trevor. Lieutenant Oakes joined the Department on the 22nd January 1854, but did not meet with the Superintendent until the second week in February, at Pegu.

While Lieutenant Trevor connected Sittoung with Pegu, the Superintendent and Lieutenant Oakes attempted to run a cross line Westerly from Pegu towards Henzada; owing, however, to the impracticability of the country intervening, its direction became South-westerly. On its completion, all three Officers (Lieutenant Trevor having rejoined) marched to Henzada, from which place they separated, each to his own District, in the middle of March.

Districts apportioned to the Officers.

To Lieutenant Oakes was assigned the Survey of the N. W. District, comprising the portion of the Irrawaddy Valley, from the Frontier to the latitude of Akouktoung. Thence to the latitude of Henzada was apportioned to Lieutenant Trevor. The South-eastern portion the Superintendent took in hand.

Work of season 1854.

In addition to the foregoing, the main line, connecting the Frontier North of Meaday and Rangoon, and about 25 miles of that between Henzada and Bassein, were completed during this season.

During the ensuing rains some 400 miles of creek were sketched in.

Duration of the field season.

The field season in Pegu is limited. In the North, the country is too unhealthy, except on the banks of the Irrawaddy, to be penetrated much before the 1st January. In the South, too wet until the 15th or 20th December. The rains set in about the 20th May. Under the most favorable circumstances, therefore, its duration is but five months.

Actual available strength in season 1854.

In order that one uniform system should be followed, it was advisable that the Officers should work together for some time. The separate labors of only two Officers, for the *entire* season, were thus obtained in 1854.

No Native Surveyors were employed during this first field season. In fact, had they been obtainable, their employment would have been premature.

Re-organization of the Department.

It soon became apparent, that the Department was inadequate to the task before it, *viz.* the Survey of 30,000 square miles. In the recess of 1854, the Superintendent represented this, and submitted for approval a new scale of establishment. The scheme was sanctioned and the Department then stood as in Appendix B.

Native Surveyors.

Native Surveyors had now to be made. All hope of obtaining any from India was vain ; the demand for this class of men being so great there. With the assistance of twelve or thirteen Caren lads, from the Missionary School at Kemmendine, twenty were obtained by February 1855, but only eight or nine proved of real value during that season.

Season 1855.

Lieutenants Trevor and Oakes resumed the Surveys of their respective duties, with orders to confine their operations to the West of the Irrawaddy, with the view of completing those portions, which the former almost effected, saving the wild uninhabited parts of the Arracan Mountains ; but the latter, not more than two-thirds, in consequence of sickness, a more difficult country, and not being so well provided with Surveyors.

Captain Stewart, H. M.'s 84th Foot, and Lieutenant Fitz-Roy, Bengal Artillery, were at the close of 1854, appointed the new or Second Class Assistants. They accompanied the Superintendent into Camp, and remained till about the 10th January 1855, when they proceeded to initiate work in the Districts assigned to them.

Captain Stewart, from Pegu, Northwards in the Valley of the Sittoung,

Districts assigned to the Second Class Assistants.

the Toungoo District. Lieutenant Fitz-Roy, from Rangoon to Bassein and thence to Opoh, the South-west District.

Lieutenant Fitz-Roy was incapacitated for some time from sickness. Both he and Captain Stewart were inexperienced, especially the former.

The Superintendent proceeded to Bassein and employed himself in surveying in the vicinity, during such time as he could spare for field duties.

At the end of April 1855, a *compiled* Map, embracing the work of the Department, during season 1854, was submitted.

Actual available strength in season 1855.

Bearing in mind the Superintendent's own peculiar duties, the temporary sickness of two Assistants, the inexperience of the new Assistants, and the time absorbed in initiating them, the services of three officers during the *entire* season, may be considered as having been devoted to the Survey.

Work of the recess of 1855.

During the recess of 1855, Captain Stewart and Lieutenant Fitz-Roy sketched in some creeks. An initial longitude being requisite, it was determined to obtain that of Rangoon, by transferring chronometers between that place and Calcutta. The Superintendent made the necessary arrangements in Rangoon. Lieutenant Trevor was deputed to Calcutta, to obtain and bring down the instruments, and it was hoped that the requisite number of comparisons would have been made, without absorbing the services of an Officer during any portion of the working season. Owing to the delay in obtaining a sufficient number of chronometers in Calcutta, the operation was not completed till the 20th January, and Captain Stewart, who had continued the work, on Lieutenant Trevor's removal to Bassein, did not resume the Survey of his District before the 1st of February 1856.

Changes of Assistants.

A short time afterwards, Captain Stewart was exchanged into the Rifle Brigade in the Crimea. On receiving the intelligence, he closed work at Tounghoo on the 16th April, and proceeded to Rangoon, *en route* to join his new corps.

At the close of the recess of 1855, Lieutenant Trevor was transferred to another appointment. Lieutenant Oakes resigned in consequence of ill health.

This rendered necessary a further infusion of new blood, never desirable for a Survey, from the impossibility of transferring experience and a knowledge of localities.

New Assistants. Season 1856.

Lieutenant Edgcome, Madras Engineers, joined, *vice* Trevor, on the 27th December, and Lieutenant McMahon, *vice* Oakes, on the 21st idem. Both took the field with the Superintendent, and early in January the former left to continue the Survey of the Central District on the East of the Irrawaddy. The latter, after initiation, was gazetted an Assistant Commissioner and Lieutenant G. Blair, Madras Artillery, was appointed in lieu. Joining on the 25th January, he proceeded into the District with the Superintendent immediately, and was in due time detailed to continue the Survey of the N. W. District, in which he arrived towards the end of March. Many weeks had not elapsed, however, ere the order appointing him to the Survey was cancelled, and he was in consequence recalled.

S. W. District.

Lieutenant Fitz-Roy proceeded to Henzada at the end of December 1855, and resumed the Survey of the S. W. District. He has lost some time by sickness.

River Surveyor.

During the season of 1855, the Superintendent represented to the Commissioner the necessity for an Officer being appointed to the specific duty of surveying the rivers and creeks of the Delta, and nominated Mr. E. Johnson, of the Bengal Marine. The appointment was made, and the Officer joined the Department on the 8th November 1855. Mr. Johnson was removed from the Department on the 20th April following. The results were the loss of a season in that quarter, and a fruitless expenditure of Company's Rupees 1,600.

Actual available strength during season 1856.

Thus again during the past season 1856, not more than three Officers can be said to have been continuously at work throughout the season, and of these, two were new hands.

Native Surveyors.

During this season, however, the subordinate Surveyors have, with two or three exceptions, done good work.

Conclusion.

The foregoing statement of the working of the Department, up to the close of the year 1855-56, is apologetic. It cannot, however, be denied that the Department has labored under unavoidable disadvantages.

Most of the Assistants have been very zealous; experience is not to be implanted by mere instruction, but must be bought, which the new Assistants have, in one or two cases, found.

There are several very promising men amongst the subordinate Surveyors.

Results.

On the 1st May 1856, a *compiled* Map, embracing the work of the seasons 1854 and '55, was submitted.

Up to the 30th April 1856, about 14,000 square miles of the most populous parts of the Province have been surveyed, at an expense of about 96,000 Rupees (*vide* Appendix C), or very nearly Rupees 7 per mile. Judging from the results of Surveys executed in India, the Superintendent was, at the outset, under the impression that the Province might be mapped at the rate of Rupees 5 per mile. The Survey ought to be completed in two more seasons, *i. e.* by the close of 1858.

(Signed) E. C. S. WILLIAMS, *Lieut.*,
Supdt. of the Pegu Survey.

RANGOON,
The 20th June 1856.

PEGU SURVEY DEPARTMENT.

APPENDIX A.

Establishment sanctioned on the outset.

Sanctioned in the Offg. Under-Secy. Govt. of India, No. 4671, dated 4th Nov. 1853.	1	Superintendent (staff salary)...	400	0	0
	2	Assistants, ,, at 300 each	600	0	0
	3	Interpreters, at 25 each ...	75	0	0
	21	Chainmen, at 10 each ...	210	0	0
	1	Writer and Draftsman, at 80...	80	0	0
		Total, Co.'s Rs.	1,365	0	0
		Travelling Allowance			
Ditto No. 2273 of the 24th May 1855	1	Superintendent, at 150 150-0-0			
	2	Assistants, at 90 180-0-0	330	0	0
		Total, Co.'s Rs.	1695	0	0

Sanctioned in Secretary to Government of India, No. 3097, dated the 12th September 1854.

APPENDIX B.

Present Scale of Establishment.

	1	Superintendent, at 550 (staff salary) ...	550	0	0
	2	First Class Assistants, at 400 each (ditto) ...	800	0	0
	2	Second ,, ,, at 300 each (ditto) ...	600	0	0
	5	Interpreters, at 25 ...	125	0	0
	45	Chainmen, at 10 ...	450	0	0
	1	Writer and Draftsman, at 80 ...	80	0	0
	20	Native Surveyors, at 35 average each ...	700	0	0
	60	Chainmen, (temporary) at 10 ...	600	0	0
	5	Native Doctors, at 25 each ...	125	0	0
		Travelling Allowance, Supt., at 150; Four Assts. at 90	510	0	0
No. 2725 of 31st July 1855.	1	River Surveyor for the Delta, at 200 ...	200	0	0
No. 106 of the 4th January 1856.	1	Interpreter, at 25 ...	25	0	0
	2	Tindals as Secunnies, at 15 ...	30	0	0
	8	Kalassies, at 10 each ...	80	0	0
		Total, Co.'s Rs. ...	4875	0	0

RANGOON,
The 20th June 1856.

(Sd.) E. C. S. WILLIAMS, *Lieut.*,
Superintendent of the Pegu Survey.

PEGU SURVEY DEPARTMENT.

STATEMENT of the Cost of the Topographical Survey of Pegu from its commencement, up to the 30th April 1856.

APPENDIX C.

Rangoon, the 20th June 1856.

YEAR.	CURRENT EXPENSES.								CONTINGENT EXPENSES.						GRAND TOTALS.
	Officers' Salaries.	Officers' Travelling Allowances.	Superintendent's Office.	Interpreters.	Native Doctors.	Surveyors.	Chainmen.	TOTALS.	Clearing Jungle, &c.	Carriage, Elephants, &c.	Native Doctors.	Hired Guard.	Office.	TOTALS.	
1853-54	4270 15 4	0 0 0	400 0 0	176 1 6	0 0 0	0 0 0	747 6 9	5594 7 7	533 15 0	1325 8 7	216 12 9	843 13 9	42 0 0	2962 2 1	8556 9 8
1854-55	17055 0 10	4228 9 9	682 0 0	698 8 2	125 0 0	2110 3 1	4410 4 10	29309 9 9	2500 6 5	1573 10 6	50 3 8	130 0 0	68 4 0	4322 8 7	33632 2 4
1855-56	24280 3 4½	6073 8 9½	506 7 3	750 0 2	135 13 3	6628 6 5	6918 14 7	45293 5 10	5519 8 2	1892 15 4	0 0 0	0 0 0	322 12 5	7735 3 11	53028 9 9
Totals	45606 3 6½	10302 2 6½	1588 7 3	1624 9 10	260 13 3	8738 9 6	12076 10 2	80197 7 2	8553 13 7	4792 2 5	267 0 5	973 13 9	433 0 5	15019 14 7	95217 5 9

NOTE.—The Survey was commenced in December 1853.

(Sd.) E. C. S. WILLIAMS, LIEUT.,
Superintendent of the Pegu Survey.

To

MAJOR A. P. PHAYRE,
Commr. and Governor General's Agent in Pegu.

REPORT

ON THE

SURVEY OF THE TOUNGHOO DISTRICT,

BY

CAPTAIN STEWART,

FIRST CLASS ASSISTANT SUPERINTENDENT TOPOGRAPHICAL SURVEY OF PEGU.

REPORT

BY

CAPTAIN STEWART, RIFLE BRIGADE,

1st Class Assistant, Pegu Survey,

ON THE

DISTRICT OF PEGU SURVEYED BY HIM.

Limits of the District.

THE North-eastern or Tounghoo District of the Pegu Survey is situated between the parallels of Latitude of the Frontier and Pegu.

The Yomah Range of hills, forming the Western boundary, and the limit of the Provinces of Pegu and Martaban, the Eastern.

The average length and breadth are about 145 and 50* miles, and the approximate area about 7,250 square miles.

Principal rivers.

Through this District nearly North and South, and to the East of a line drawn through the centre, runs a fine river which takes its three general names from three different towns, situated on its banks, *viz.* Sittoung, Shuaygheen, and Tounghoo. It is also sometimes called the Paulong River, from a range of hills, North-east of Tounghoo.

Near Tounghoo not much water in it at the end of the dry season.

Towards the end of the dry season there is very little water in it, for some distance between Tounghoo and Shuaygheen.

It fills soon after the commencement of the rains.

The large Burmese boats pass with difficulty, having continually to be dragged over the sand-banks, but before the rains have regularly set in at Tounghoo, there is a good supply of water, which increases daily and soon fills the river, flowing rapidly.

General configuration of the country.

For an average of 15 or 20 miles the country to the West of the Sittoung River is almost a dead flat; small hills then appear, which continue increasing in height till they join with the Yomah Range.

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* The breadth *practically* is not 50 miles, that is, jurisdiction over the wild tribes does not extend so far.—A. P. P.

From the commencement of these hills to the Yomah Range, East and West, and for an immense way North and South, is a vast extent of impracticable and impassable hilly country covered with every description of dense jungle.

An impassable tract of country.

Here, on the tops of the highest hills, are seen the fine bamboo; and on every description of soil the grand teak trees, but generally the most magnificent trees on the hardest soil. Owing to the ascent and descents of these hills being so steep and so thickly covered with jungle, it is feared that these fine trees must remain for ever useless, at the present time they cannot be dragged into the three or four Khyoungs that are capable of conveying them into the Sittoung River.

Teak and bamboo.

Throughout this whole country there are but a very few foot-paths, and these most difficult to traverse.

Few path-ways.

The villages are very few, and each consists of only about seven or eight houses, excepting the village of Lepguen, which is of some size and is situated on the left bank of the Koon Khyoung, about 12 miles West of Menlanna.

Very few villages.

Lepguen.

Here there is a flat circular piece of country of small extent, in the centre of the hills, the sides rising gradually again into the general irregular configuration.

This village, Lepguen, is a new settlement formed within the three last years by a few people from the other side of the Frontier, but chiefly by villagers from Menlanna.

They cultivate rice, tobacoo, vegetables, &c., weave their own cloths and rear the silk-worm in a small way merely for their own consumption; indeed, whatever is produced here cannot be carried away in any large quantities.

The track to this village from the Menlan is close to Kœmagoo, a village near and South of Menlanna. At short distances on either side of this track are a few Karen houses.

Track to Lepguen.

A few Karen houses.

How these people employ themselves beyond grubbing in the jungle, it is difficult to find out.

To the East of the Sittoung River the country is not nearly so flat, but soon assumes a bold and rugged appearance; small hills abutting sometimes on the river, and ranges of high hills rising in the distance.

The country East of the Sittoung River.

These are sometimes of considerable height, as much as 6,000 and 7,000 feet. Nothing being known of all this part scarcely, it remains a large field open for the researches of the mineralogist and geologist, and it is supposed that it would amply repay a minute inspection. No Survey party has as yet been detached to this part.

Nothing known of it.

The whole of the Tounghoo District is covered with one mass of jungle. Between Pegu and Shuaygheen, this consists of thick elephant-grass and cane; to the North of Shuaygheen it becomes tree jungle with the interstices thickly filled in with briar thorn and the small prickly bamboo.

Tounghoo District—all jungle.

The cultivated portion of the District bears no proportion whatever to the uncultivated part. The larger cultivated parts are around Pegu, Aleyna, Itsampay, Oktween, and Tounghoo.

Little cultivation.

In the South of the District the soil is clayey; proceeding Northwards a good deal of sand is found mixed with it, and laterite gradually appears as Tounghoo is approached.

Soil.

The chief formation of the small hills is laterite; to the West of the Sittoung River no stones or rocks are met with excepting on that ocean of small hills already described. There, there is some slate, some sand-stone, and large blocks of rocks. In the Khyoung that runs from the Yomah, large blocks of stone are found, and sometimes this is in great masses forming the bases of the hills that in a few instances rise perpendicularly from 40 to 50 feet out of water.

Stone.

To the East of the Sittoung River, and not far from Kyoukyee and Mong, large masses of lime-stone are found, but it does not appear to be brought down in any considerable quantities.

Lime.

To the West of the District are seven principal Khyoungs rising at the Yomah Range and running into the Sittoung River. These are "Bienda," the "Kanlea," the

Principal Khyoungs.

"Yenyuay" or "Mu Khyoung," the "Koon," the "Pin," the "Kaboung" near Tounghoo, and the "Htswa," North of Tounghoo, with a large tributary called the Tsyne.

Yenyuay Khyoung.

The Yenyuay Khyoung is the first of any importance, by this is a route to the Yomah Range, from whence paths diverge to Sarrawah, Prome and other places on the Irrawaddy. Travellers proceed up this Khyoung on foot, for about 32 miles, to a short way beyond the village of Koshuaynee which is on the right bank of the Khyoung; they then strike off into the jungle to avoid the rapids and large stones that now block up the Khyoung and follow a narrow and difficult track over the hills. Few people ever venture here, and then merely for the purpose of purchasing the little silk that is produced in the villages. There is always water in the Khyoungs in the hot season, 1 and 2 feet deep, and it has a fine sandy bed.

There are but four or five villages on its banks, and on the tract from Koshuaynee to Yomah there are but a few Karen houses about half way. For miles the banks of this Khyoung, which is about 60 feet and 100 feet broad, are covered thickly with the wild plaintain.

Koon Khyoung.

The Koon Khyoung is North of the Yenyuay and is a fine stream about 70 or 80 feet broad, with water in it all the year round.

This Khyoung would be of the greatest importance in carrying down the large timber from the forests in the West, were it not for an extraordinary accumulation of immense blocks of stone about a mile in extent, which stops the passage at a short way West of Khioben.

This obstacle prevents all communication with Lepguen, even for foot-passengers.

The Pin Khyoung is still further on North and is much of the same character as the others. It has, however, a greater number of villages on its banks and is easy of passage till the rapids are arrived at. Lepguen can be reached by this Khyoung.

Kaboung Khyoung.

A little South of Tounghoo is the Kaboung Khyoung, a fine broad stream for a considerable way West of Tounghoo.

This Khyoung is the principal route to Prome, and the only one it may be said, excepting that along the Frontier from the East of this District to the West.

The Htswa Khyoung, with its tributary the Tsyne, is North of Tounghoo; a Survey party is now at work there.

Bienda and Kanlea Khyoungs.

The Bienda and Kanlea Khyoungs are between Pegu and Wineghyee: they unite before discharging themselves into the Sittoung River. Small Khyoungs, of little importance excepting in rendering communication difficult, branch off from these, or are formed during the rains and wander through the country, but this does not appear to be so much the case in the North as it is in the South of the District.

Tidal Khyoungs.

Between Pegu and Shuaygheen, *viz.* about "Wah," "Din," "Htsampay," "Pagiun," &c. are a considerable number of tidal Khyoungs. They have all many names according to the places they flow past. These Khyoungs swarm with fish, and many fisheries are erected on their banks.

Khyoungs East of the Sittoung River.

To the East of the Sittoung River are a few large Khyoungs, *viz.* the Bankatah, Shwalantoung, the Youkthwah &c., but they have not been examined yet in the survey.

Roads.

In Tounghoo District there is nothing deserving the name of a road, but as the native carts in the dry weather can work their way through almost every difficulty, this is of no great consequence. During the rains the country is impassable for carts, excepting for short distances in the North, where the soil is much harder.

The Menlan.

The Menlan or high road between Tounghoo and Pegu is now nearly entirely deserted. During the hot season the want of water in many places, especially on the road from the Yenyuay Khyoung to Muggay Ben, and from there to Thenapenzeik on the Koon Khyoung, is severely felt. During the rains this road is impracticable, there being no way of getting animals or carts across the large Khyoungs that now become large torrents.

This present Menlan is not that of former years, which was the scene of the grand periodical processions of the Rulers of Tounghoo, to make offerings at the pagoda at Pegu; this latter road was of brick but is now completely obliterated, jungle and big trees growing over it, and it is with difficulty that any trace of it can now be found.

There being extremely few inhabitants in this District and the produce trifling, the means of communication are sufficient.

Troops can well march from Pegu to Tounghoo *viâ* Shuaygheen, from which latter place there is a tolerable road to Tounghoo on the left bank of the Sittoung River, but the absence of any thing in the way of bridges over the great number of small muddy Khyoungs, and the narrow track through the high cane between Pegu and Shuaygheen, renders this an oppressive duty and wearisome march. However it is pretty well certain that the men themselves would prefer this route, if they had any experience of the tediousness and discomfort of a long journey up a river in native boats. Proceeding from Pegu to Shuaygheen *viâ* "Kiatzoo," or *viâ* "Wah" and "Meekio," the drinking water is scarce and very bad.

In the dry season the road to "Meekio" *viâ* "Wah" is very good and tolerably clear of cane and grass.

Population.

Considering the great extent of this District, the population is wonderfully small (*vide* Appendix). Few children arrive at maturity, and this can only be accounted for from the extremely filthy and lazy disposition of the grown up men who are poor, simply through their own laziness, and thus unable to provide for their offspring the few comforts and necessaries that childhood requires. This marks the savage and is invariably the reason of the decay (slow or quick) of all savage races.

Character of the people.

The people of this District bear the same character as the Burmese generally do, *viz.* ungrateful, cowardly, and treacherous, with an universal well-finished leading vice of lying, cringing, and snake-like when servants, cruel and tyrannical when masters.

Race.

West of the Sittoung River the inhabitants are nearly all Burmese, there being but few villages of Karens (*vide* Appendix), and each of these consisting of but few houses isolated in the depths of the jungle.

Employment.

Outside the large towns of Pegu, Sittoung, Shuaygheen, and Tounghoo the people appear to have no employment but in providing for their subsistence. From only a few places, such as the country around Pegu, Aleyna, Menlanna, Ouktween, and Tounghoo, is rice cultivated in sufficient quantities to be exported. After securing enough rice for the home consumption for the time, the men employ themselves in fishing and in decomposing the fish for the markets of the large towns. The women generally employ

themselves in weaving, and in some places, especially near and on the hills they rear the silk-worms, but this in a trifling degree.

Climate.

The climate throughout the District is very good, though extremely hot during the months of March, April and May. There appears to be no disease.

Manufacture.

In the small villages there is little in the way of manufacture excepting at Thayetamine, a village on the right bank of the Sittoung River, and some way South of Shuaygheen. There a few dâhs are manufactured and some other small articles, generally the women's cloths are the sole manufacture. The silk that is produced in the small villages, is bought up by purchasers from the large towns, where it is worked up into cloths.

Teak.

On that vast extent of hilly country, lying between the Menlan and the Yomah Range of hills, the teak flourishes and is in pretty considerable quantities, but as was mentioned before, from the great impracticability of the greater part of that jungle, it is valueless.

Oil-tree.

The oil-tree abounds also, but from similar reasons, perhaps, appears untouched.

The large towns.

Concerning the large towns of the District, it is not necessary to say much. They are the same as all other towns in Burmah, *viz.* a few small shops, bazars of various degrees of filth, women drawing water, and the men lounging idly about the verandahs of their houses.

Synopsis.

From one complete and general view of the whole, the Tounghoo District may be considered as one vast wilderness, and this conclusion is well justified by considering the wonderful mass of jungle, the trifling amount of population, and the insignificant portion of the whole country that is cultivated. But here Nature has lavished all her riches, a capable soil, a good climate, heat, and water.

These being given, it only requires a large population, with a great amount of energy, to render it in a short time one of the most fertile and valuable possessions in the East.

(Signed) R. STEWART, *Captain,*
1st Assistant, Pegu Survey.

RANGOON,
The 8th May 1856.

(Signed) E. C. S. WILLIAMS, *Lieut.,*
Supdt. of the Pegu Survey.

Names of Villages.	No. of Houses.	No. of Men.	No. of Women.	No. of Children.	Wells.	Tanks.	Employ Produce.	Remarks.
Aleyna	65	64	64	127	2, Good	....	Cultivation ..	A small Khyoung here from Htsampay, 4 small pagodas. The largest and most Eastern is that mentioned in the traverse book.
Htsampay.	23	27	32	38	3, Good	1, Buffaloes drink	Cultivation ..	100 buffaloes here, 30 carts. Burmese. A small Khyoung goes as far as Yaungleben then vanishes; rises about 1½ miles to the East. This Khyoung is formed by banking up the East end, does not reach the Sittoung River. A small bridge fit for carts; two pagodas, one Hpoonghyee house, four Hpoonghyees, 18 buffaloes. Burmese.
Woyengoon.....	20	24	25	22	1, Good	....	Cultivation ..	From here a road to Shuaygheen, another road to Pahoung and Yaungleben, 31 buffaloes, 10 carts. (Karen)
Pahoung	28	37	37	18	2, Good	....	Cultivation ..	16 buffaloes, 5 carts, 1 Hpoonghyee house, 1 Hpoonghyee. Burmese.
Tanbatee	24	30	29	34	2, Good	....	Cultivation ..	30 buffaloes, 6 carts, 4 bullocks, 2 carts. Burmese.
Yaungleben	77	100	65	60	1, Good	....	Cultivation ..	50 buffaloes, 50 carts, (10 bullocks, 5 carts), 1 Hpoonghyee house, 1 Hpoonghyee, 1 pagoda. Burmese.
Kukhioung	16	20	14	14	1, Good	....	Cultivation ..	Burmese.

Names of Villages.	No. of Houses.	No. of Men.	No. of Women.	No. of Children.	Wells.	Tanks.	Employ Produce.	Remarks.
Ngapiodo	17	25	23	31	2, Good	.....	Cultivation ..	1 Hpoonghyee house, 2 Hpoonghyees, 10 buffaloes, 5 carts. Burmese.
Zalookyee.....	10	7	12	21	1, Good	.....	Cultivation ..	1 Khyoung made by banking the ends of the ravine about 6 miles apart. 3 buffaloes. Burmese.
Thaybin	35	38	36	68	....	.....	Cultivation ..	1 Khyoung; good water falls into Sittoung River near Lepan. About 5 miles West, vanishes. Road to Payoungioung and to Keeboung. Burmese.
Keeboung	22	34	36	34	3, Good	.....	Cultivation ..	1 pagoda, 2 buffaloes, 1 cart, 1 Khyoung of 3 or 4 miles, formed by bunds. Burmese road to Wineyoungleben and Muggayben
Kayemoukto.....	20	27	25	18	1, Good	.....	Cultivation ..	1 Hpoonghyee house, 1 Hpoonghyee, 30 buffaloes, 10 carts. Burmese and Shans.
Waumee	7	8	8	....	....	.....	Little cultivation, silk and cotton,	On the right bank of the Yenyuay Khyoung, about 3 miles above the village, the Khyoung divides into 2, one branching off to Koboghyee, the other to Koshoaynee. Burmese.
Yaubengah	16	19	18	16	....	.....	Little cultivation, silk and cotton,	On the Yenyuay Khyoung, about 1 mile East of Koshoaynee. Burmese.
Koshoaynee	17	18	18	28	....	.....	Little cultivation, silk, ...	On the Yenyuay Khyoung; Burmese.

Names of Villages.	No. of Houses.	No. of Men.	No. of Women.	No. of Children.	Wells.	Tanks.	Employ Produce.	Remarks.
Muggay Ben	19	15	13	10	2, Good	.....	Cultivation ..	On the Toboo Khyoung, rises in the Yomah and flows into the Sittoung River; 11 buffaloes, 2 carts. Burmese.
Muggay Ben	10	12	9	10	1, Good	.....	Cultivation ..	6 buffaloes, 5 carts. Burmese.
Muggay Ben	18	19	21	27	....	.....	Cultivation ..	22 buffaloes, 5 carts; Khyoung comes from Yomah, flows nearly into the Sittoung River, but vanishes before it reaches there in the dry weather. Burmese.
Zeegoon	6	5	8	7	1, Good	.....	Silk, cotton, tobacco, ..	1 buffaloe, 2 bullocks, 1 cart. Burmese.
Thambay-yagoon	9	9	9	17	1, Good	.....	ilk, tobacco, Kayanbeng ..	
Singuey	15	21	21	22	2, Good	.....	Tobacco, cotton, silk, cultivation ..	Near Teegoon, Burmese.
Thubait	11	16	16	18	2, Good	1 Tank, ..	Little cultivation, torches ..	9 buffaloes, 1 cart. Burmese.
Menlangoo	4	5	5	4	....	.....	Little cultivation	On the Koon Khyoung, South of Khioben. Burmese.
Khioben	26	28	27	38	....	.....	Tobacco, silk, and cotton ..	On the Koon Khyoung. Burmese.
Kendan	21	22	26	21	2, Good	.....	Cultivation .	1 pagoda, 32 buffaloes, 6 carts. Burmese.
Koemagoo	15	16	14	12	2, Good	.....	Cultivation ..	16 buffaloes, 3 carts. Burmese.
Chinley	8	7	8	16	....	....	Cultivation ..	Near Lepguen, Burmese on the hills.
Dogoondan	9	8	9	11	....	1 Tank, ..	Cultivation ..	35 buffaloes, 1 Hpoonghyee house. 2 Hpoonghyees, lies between Chinley and Lepguen on the Koon Khyoung (on the hills). Burmese.

Names of Villages.	No. of Houses.	No. of Men.	No. of Women.	No. of Children.	Wells.	Tanks.	Employ produce.	Remarks.
Nursingoon	6	5	7	13	....	.....	Cultivation ..	11 buffaloes on the Koon Khyoung, near Lepguen. Burmese.
Lepguen	4	3	4	5	....	.....	Cultivation ..	9 buffaloes on the Koon Khyoung. Burmese.
Menlanna	19	18	20	30	1, Good	.....	Cultivation, tobacco, silk ..	30 buffaloes, 6 carts, 1 Hpoonghyee house, Hpoonghyee dead on the Pin Khyoung which rises at Yomah and flows into the Sittoung River. Burmese.
Nioungchedank	30	31	38	38	2, Good	.....	Cultivation ..	19 buffaloes, 4 carts (19 bullocks, 8 carts). Burmese.
Kinetpoay, (3 villages) ..	78	95	162	157	18, Good	.....	Cultivation ..	1 dry Khyoung comes from the Kaboung Khyoung, 1 Hpoonghyee house, 2 Hpoonghyees, 62 buffaloes, 16 carts 23 bullocks, 7 carts. Burmese.
Taboomok	55	60	58	90	5, Good	.....	Cultivation ..	Old pagoda near, houses scattered all round the clearing.
Menlangoon	28	29	27	30	2, Good	.....	Cultivation,	
Kanhlay and Endine	50	54	53	62	3, Good	.....	Cultivation ..	Hpoonghyee house.
Keikthalen	80	93	96	120	6, Good	.....	Cultivation ..	Hpoonghyee house.
Ouktwen	100	107	109	150	3, not good water	.....	Cultivation ..	Hpoonghyee house; plenty cultivation about here.
Yueyseyan	15	17	18	15	1, Good	.....	Cultivation.	
Yekthan	30	34	36	40	1, Good	.....	Cultivation.	
Kaboung	27	30	31	37	....	.....	Cultivation ..	On the Kaboung Khyoung; right bank.
Totals.....	1090	1237	1287	1529				
			4053					

JOURNAL

OF A

TOUR EAST FROM TOUNGHOO

TO THE

SALWEEN RIVER,

BY

MR. E. O'RILEY,

ASSISTANT COMMISSIONER, TOUNGHOO.

JOURNAL

OF A

TOUR EAST FROM TOUNGHOO

TO THE

SALWEEN RIVER;

FROM 16TH JANUARY TO 19TH FEBRUARY 1855.

January 16th. 9 A. M.—Left Tounghoo by boat.

11-30—Arrived at Tantabeng; loaded the elephants and proceeded on to Tabye, arrived at 1 P. M.; course nearly East; distance 2½ miles.

January 17th. Ther. 75°. Started at 8 A. M., and arrived at halting place in the jungle, at foot of the hills, at 12-30 P. M.; course East; distance 9 miles; the road good to the cross-road to Bammadee; the last 2 miles up a water-course in a steep valley; halting place at the head of the water-course called Kyan-Beng-Tsa-kan; the stream runs into the Nga-mai-Eeu at Bammadee.

January 18th. Started at 8 A. M.; road along a ridge of hills abutting on the main range. 9-30.—Descended and crossed some very steep hills to halting place, at the head of the Myat Tswa stream, a feeder of the Khyoung-Ma-Ngay, which falls into the Thauk-yai-khat. Arrived at halting place at 12-30 P. M.; course E. N. E.; distance 8 miles.

Ther. at 2 P. M., 82°. The main ranges of hills, as seen from the top of those crossed, show a general direction nearly N. and S. The whole of the original forest along the line of march to-day, has been cleared for cultivation by the Karens of Tabye.

January 19th. The Tsokai of Oug-Beng-Khyoung (Moo-Ban) came with his people to assist in carrying the baggage across the high range into the Valley of the Myet-Nan-Khyoung, the road having been cleared across to shorten the route to Yai-Boo (the hot springs). Hired 60 of the Karens and started at 8 A. M.; the road after starting, lay through the betel-nut plantations of this locality. The trees are planted on the platforms of alluvium along both sides of the mountain streams, the water being dammed up at certain levels to allow of its coursing freely over the whole surface.

Many miles of these betel-nut plantations exist in these mountain gorges, which afford to the Karens a perennial source of profit in the disposal of the nut (which is highly esteemed) to the traders, Nga-Pee salt-dried fish, and cottons being usually exchanged for it. Owing to the favorable position of these plantations and the excellent properties of the soil, which is formed for the most part by the decomposition of the granite and schistan rocks, the trees are most luxuriant, but in consequence of planting them too close together, the produce is not so great as it otherwise would be with an improved method of planting. This I have on several occasions pointed out to the Karens, but in common with most of the Asiatic races, they calculate upon production in proportion to the number of trees they can crush into the surface, and so defeat the object of their wishes.

Not only is the local consumption of betel-nut supplied from these plantations, but a large amount is exported to the North, and I feel convinced, that under proper management in planting, with no more care than is at present bestowed on the young plants, a large amount of nut would be available for the supply of the Rangoon market, but opposed to a progressive increase to the attainment of this object is the debasing superstition of these benighted tribes, who, on the death of one of the Chiefs of their race, deem it imperative upon them to cut down a certain portion of the trees as he may be supposed to be fairly entitled to, that he may not want a supply of nut nor lack the means of offering to the gods of his worship in his future state of existence; and were this duty to the dead neglected, they firmly believe that the spirit of the departed would return to the scene of its previous existence and visit the tribe with dire affliction.

After leaving the betel-nut plantations, the road led directly up the face of the mountain so steep that the elephants had great difficulty in ascending with only their pads on, the whole of the baggage being taken on a-head by sturdy little Karens who, with a load of 50 to 60 lbs slung on their backs, with a band passing across the forehead, made the ascent without evincing any great labor or fatigue.

At 10 A. M. reached the top of the range, descended the Eastern side,

Ther. 57°.

and after crossing several excessively steep hills, principally on the descent, arrived at Yai-Boo (hot springs) at 2-30 P. M. The steep declines passed down before

reaching halting place, are quite impracticable as an ascent to the elephants; in some places it was necessary to form steps in the hill side to prevent their sliding down bodily. Course E. N. E.; distance 7 miles.

Laid up with severe head-ache the whole of the day. A Karen of

Ther. 85°.

January 20th.

Bammadee came to prefer a complaint against the Thoogyee of Bammadee for exacting, on one occasion 10 and another 8 Rupees on pretence of a summons to answer some complaint against him; sent an order to the Thoogyee to repair to Tounghoo and await my return there.

Hired a party of Karens to open a path for the elephants through the jungle along the course of the Myet-Nan-Khyoung to the site of the gold-washing, distant about 5 miles to the East of this place.

Proceeded to examine hot springs, which extend from halting place

January 21st. Ther. at 6 A. M., 51°.

for a distance of a quarter of a mile along the margin of the stream. Owing to the dense bamboo jungle, which clothes the banks of the stream down to the waters' edge, it was found impossible to get at the larger springs, which, ere the sun appeared, showed their locality by copious volumes of steam rising apparently from the bed of the stream. Those accessible from the halting place, bubble up from beneath the large granite boulders through a sand of quartz crystals deposited by the disintegration of the granite, the water having a temperature of 129°, possessing no smell and leaving no deposit similar to those of a calcarious nature, nor does the taste exhibit any chalybeate property. The accompanying rocks in fragments near the granite, are blue and white quartz, usually found permeating the granite in their lines, and water-worn pebbles of green stone. No limestone could be discovered and neither in the vicinity of the springs nor in the ranges of hills crossed in yesterday's march, was any sign of past volcanic action visible; under these circumstances, I am led to the conclusion, that these springs are formed, by the percolation of water, into a fissure of the granite to the source of heat which rises to the surface level of its entrance in some of the contiguous hills, and that its thermal property is not owing to any chemical combination; that this may be ascertained, however, I have filled the only empty bottle I have, with the limpid water as it issues from the surface to carry back with me; but whether they possess medicinal properties or not, these springs would not

be available for restorative purposes, unless rendered accessible by a road along the base of the congeries of hills which hide this valley from that of the Poung-Loung. A Karen of this tribe came this morning with three infant children and stated that his wife died a few months ago, and having no relations to take care of them, his burden of life was heavy in the extreme, as he was obliged to employ much of his time in guarding the children from the Yaings; that on one occasion, when absent preparing the jungle for his "Toung-Ya," a Karen Yaing, belonging to a tribe who have their villages in the hills further to the Eastward, came to his house and took away his little daughter of the age of 4 years and a "Kye-Deze," and that he refused to restore them although no previous enmity existed between them. He said, that unless I assisted him in getting back the child and property, he had resolved upon revenging himself upon the aggressor by stealing into his village in the darkness and plunging his spear through the bamboo floor into his body, as his mind was disturbed, and until his property was restored, or his enemy killed, he should have no peace. I told him that I would assist him to the extent of my power by sending for the Karen Yaing at our next halting place, and ordering the restoration of his child and Kye-Deze, but that he must forego all intentions of revenge, and that I came amongst them to put an end to these acts of mutual aggression between them. He said that the past would be forgotten with the restitution of his property.

Loaded the elephants and started at 8-30 A. M., course up the stream and along its banks passing the highest of the hot springs, tried it with the Thermometer and found it gave 138°, another one, at a short distance, gave 135°, the rocks adjacent the same in character to those at the halting place with the addition of a thick layer of conglomerate formed by the clay as a matrix with water-worn pebbles of quartz and granite imbedded. Many fine teak trees left standing in the Karen clearings, but cannot be taken away down the stream-courses in the rainy season, in consequence of the barriers of rock and out-crops of the granite which occur at short distances in its bed, which does not exceed 30 feet in breadth any where in its course, this fine timber is therefore useless; several of the larger trees, with branches at a height of 20 to 30 feet from the ground, have been made use of by the Karens of this stream for building their houses upon.

January 22nd, 7 A. M. Ther. 47°.

On being questioned as to the reason for selecting such high positions, they stated that the object was to be out of the reach of tigers, but more especially to avoid being surprized by the "Yaings" whom they feared more than the tigers.

Arrived at halting place (Shwai-Eenig Tsakan) at 2 P. M., the march being most difficult and harassing to the elephants in the frequent ascents from, and descents into, the stream, the base of the hills coming close down to the water on both sides. Course S. E.; distance 3½ miles.

A young Karen, an Assistant to the Missionary Teacher, San Qualah, came with some Karens from Moung-Deing to see me; he states that the people are most desirous of being taught to read, and that he has about 30 scholars, children and adults.

6 P. M. Ther. 59°.

Examined the vicinity for indications of gold deposits, and sunk a small shaft near the base of the hills, the valley being so narrow, with the water-course occupying the largest portion of the surface, that it was found impossible to attain a depth of more than 4 feet, the water percolating through the shingle bed filled the hole as fast as it was emptied. On washing the soil obtained from the lowest depth, obtained a quantity of oxidulated iron sand, the usual accompaniment of gold deposits; and on working to the depth of a foot lower in the water, a few spangles of gold were obtained, clearly indicating that at a lower depth the auriferous sediment would be reached; but to effect a thorough examination of this site, a shaft should be sunk in the month of April when the stream is at the lowest, when, from the confined nature of the valley or rather "mountain gorge" a rich deposit may possibly be discovered.

January 23rd, 6 A. M. Ther. 57°.

The Karens state that the place was worked by some Burmese, on one occasion on the spot, of my experiment, and a considerable quantity of gold extracted.

The upraised formations consist of a close-grained granite with blue quartz lying in confused masses (boulders), in every part of the stream: they are water-worn and evidently brought from a distance. Neither these blocks nor the granite masses, imbedded in the hill sides, show an auriferous character, it may therefore be concluded that the gold deposit not being found in the surface, alluvium is of ancient date, and must be sought for at a considerable depth below the surface.

Hired a party of Karens from this to open a road to the next Karen location sufficient for the elephants to pass.

Two of the party attacked with fever, sent back in charge of the Karen Tsokay of Ban-ga-lee; gave the rest of the party a quinine powder each as a preventive, and to dispel the anticipation of the same occurring to themselves.

Ther. 6 P. M., 60°

Started at 8 A. M., course along the stream for half an hour, crossing it several times; latter part of march across several steep hills to halting place in the betel gardens of the Karens of Moung Deing. From the tops of the hills, crossed on the line of march, the mountain ranges to the S. E. were seen: their altitude being greater and their direction almost N. and S., with greater uniformity than the range passed.

Jan. 24th, Ther. 7 A. M. 51°

The latter part of the road being too steep for the elephants to ascend with the baggage, hired a party of Karens to bring it in, the elephants arriving without their loads much fatigued at 12 A. M. Course S. S. E.; distance 4½ miles.

This is the last village in these ranges that paid any thing to the Burmese Government, such payments consisting of an occasional present of betel-nut and certain orchids when in flower. The Karens of the locations farther to the S. E. are denominated by the other tribes "Pagoh," a general term applied to all the Yaings.

The Yaing against whom the complaint was preferred at Yai-Boo has left this and taken the child and Kye-Dze with him.

The road near halting place not being opened, did not start till 10 A. M.; course up the stream till 11, the road being still closed to the passage of the elephants. Halted at the betel-nut gardens at Dzeen-Dein-Gyee (Yaings.) Course S. S. E.; distance 2 miles.

Jan. 25th, Ther. 6 A. M. 62°

The people of this place state that they never paid either tribute or taxes of any description to the Burmese Government which they regard with dread from the frequent atrocities committed by its officers on the Karens nearer the Poung-Loung; many of the villagers lower down the stream having sought refuge here. About 10 years ago the Governor of Tounghoo sent a party of armed Burmese into this locality for the purpose of coercing their Chief since dead; their progress was marked by burning villages until they reached this point when

the Chief assembled all his people and met the Burmese, who, finding the Karens too numerous to attack, returned the way they came, but were pursued by the Karens, and, in one of the thickly-wooded gorges of the stream, were attacked with spears and some 100 killed, since when the Burmese have never attempted to penetrate thus far into the hills.

The road across the hills being clear, started at 9-30 A. M., proceeding along the betel gardens and thence up the steep face of the mountain range, from the top of which a magnificent view presented itself in the successive ranges of mountains reaching an altitude in the S. W. of 7 to 8,000 feet, the general direction being nearly N. and S., with steep spurs falling into the valley of the Myet-nan-khyoung. As far as the eye could reach, in all directions, not an acre of level surface could be seen, and all, with the exception of the small patches in the confined and rocky gorges of the water-courses, denuded of its original forest vegetation, and covered with the Toung-ya cultivations in crop and fallow of the Karens.

January 26th, Ther. 6 A. M., 61°

Crossed several steep hills abutting on the Eastern ranges and arrived at halting place in the cultivations of the Karens of "Dza-kay-do" at 2 P. M. Course 2 miles East and 5 miles E. N. E.; distance 7 miles.

A most fatiguing march for the elephants which did not arrive till 5 P. M.

The people of this place are considered by the Karens lower down the stream as demi-savage "Mo-yen-mo-yaing," and from their vicinity to the Ultra-Yaings and the Karen-nee are notorious for their kidnapping propensities and other nefarious practices. Having three cases of child-stealing by Karens of this tribe to investigate, I sent for the Chief * who presently made his appearance, wrapped in a red blanket, and accompanied by a number of his people, all more or less intoxicated. They were headed by a man beating a small gong who, perhaps, from the nature of his office, was in a higher state of excitement than the others. They assembled round my tent, and, after a short time, seeing that words would be thrown away upon them in their present state of oblivion, I requested the Chief to restore the stolen children and return to his house until himself and people were in a better mood to listen to what I had to say to them; they rose to depart, but the gong-beater not having

* Ma-Pleo.

satisfied his curiosity, and with the spirit he had imbibed, in full operation, resented the order to depart, and forthwith expended upon us the whole of his knowledge of Burmese which consisted of choice selections of terms of abuse. As he appeared to grow more impetuous with the impunity allowed him, I desired the Chief to take him away, but his interference consisted in saying a few words which were drowned in the vociferations of the drunken man. Upon this one of my peons approached him to lead him away, when he sprang to his feet, and snatching a spear from one of his tribe brandished it about in so reckless a manner that I began to apprehend mischief, to avoid which, and seeing that words had no effect, I called for my gun and told the Chief (who understood Burmese passably well) that if but the skin of either myself or any of my party were broken by the excited savage, his life should pay the forfeit, and this accompanied by a significant click of the lock had the desired effect; the drunken man here alarmed at my earnestness plunged the spear to its head into the ground and slunk behind the Chief with whom he departed, but far in the distance his voice was still heard loaded with the burthen of his Burmese acquirements.

I note this circumstance as affording a characteristic of these, and, perhaps, most uncivilized races, naturally of a timid disposition; it is only by means of some powerful excitement that their evil passions are developed, which however succumb to a firmness and forbearance controlled by reason.

January 27th, Ther. 6 A. M., 58°. Remained here for the day in order to obtain the restoration of stolen children.

After breakfast the Chief came to my tent and I took the opportunity of informing him of the object of my passage through this part of the country, which, from its difficult nature, had deterred any Government Official from doing so hitherto. He was made acquainted with the nature of our Government and its duties, so different from that of the Burmese, and that under our rule every man had equal rights; that neither oppression nor injustice of any description was tolerated, and that so long as any one subject to its rule conducted himself properly, he would be protected, even to the lowest Yaing amongst them; but to entitle them to the benefit of this change of circumstances, it remained with them to show that they could appreciate such privileges by refraining for the future from the cruel and unnatural practice of stealing and

selling into slavery the persons of other tribes whom they had taken, and that the three children claimed by the Karens, who had accompanied me from Ban-ga-lee, must be restored at once.

The Chief appeared to be convinced of the motive of my coming amongst them, and said that the children had been taken as a payment due to some of the tribe by their fathers who had died, and was the custom of all the tribes; but as the Karens, lower down the stream, had followed my instructions in this respect, he and his people would do so likewise. Two of the children were accordingly delivered over to their mothers, and the third, which has already been sold to the Karen Yaings further to the East, is promised to be recovered. Before leaving, the old Chief expressed a wish to have a Karen Teacher placed amongst them, that the children might be taught to read, and that they might attain the same degree of civilization as the more favored tribes of Ban-ga-lee and Moung-Deing.

I presented him with a few articles of cotton prints, and at his own request furnished him with an official authority as the head of the tribe of "Dza-kay-do;" I also invited him to visit me in Tounghoo when I would give him a couple of muskets and a supply of medicines.

Ther. 6 P. M., 70°. The hero of the spear of yesterday did not make his appearance, but as he expressed through the Chief a deep contrition for his conduct, I sent him a new gong-boung.

January 28th, Ther. 6 A. M., 67°. Started at 8 A. M., crossing the Eastern subordinate ranges of hills forming the cultivation of this tribe. Crossed a small mountain stream, the Moo-Loo, which falls into the Myet-nan-khyoung and thence, through a central system of hills, spurs from the main range to this place Pyan-ma-do on another mountain stream the Yai-la-lo, which separates this tribe from the Yaings further to the Eastward. The Karens numerous in this locality—three large houses seen on the line of march, each house containing 25 to 30 families. A sensible change apparent in the features of this tribe, the females especially having the cheek-bone higher and broader than those more Westerly; the tribe thorough Yaings. Course S. E.; distance 5 miles.

Ther. noon 75°. Range of elevation during this march about 1,200 feet.

The chief of these Karens (Thoo-Thao) requested to be furnished with an official acknowledgment of his position, which I have given him,

instructing him at the same time on the nature of our Government. In reply to my questions with regard to Karen-nee, he, with others of the tribe, stated that they had never paid taxes to the Authorities of that country, although a demand to that effect had been made upon them ; the reason of their refusal being that this part of the country did not belong to Karen-nee, which was five days' journey distant in a N. E. direction and that they had never been subject to that authority.

A portion of the road of to-morrow's march being impassable to the elephants, I have hired a party to open it.

Left at 8-30 across the hills forming the location of the Pyan-ma do Karens, and on descending, crossed the To-kan-lo mountain stream which separates the tribe from the Moo-dza-kyee Karens. Several large houses of the former tribe passed on the road, showing that they must be numerous, youths and children being in by far the greater proportion, who in groups of 40 to 50 waited on the tops of the hills until we passed to get a sight of the elephants.

January 29th, Ther. 6 A. M, 54°.

Only a portion of the road cleared, and we were obliged to break a passage through the high reed grass with the elephants.

At 1 P. M. halted on the Myet-nan-khyoung in the location of the Moo-dza-kyee tribe. Course S. S. E. ; distance 5½ miles.

At a short distance up the stream the La-bo-lo Khyoung joins the Myet-nan from the South, the latter taking a direction nearly due East draining the range of the Toung-Goung-Doong. The Karens state that the source of the Yoon-za-len Khyoung is found at a distance of a day's journey to the S. E., and as that stream flows to the South into the Salween, it is evident that this place is near the axis of the granite ranges. Our descent from the upraised valley of yesterday's halting place being 45′ of the aneroid and the ranges to the S. E. being apparently 3 to 4,000 feet in height.

A suspension-bridge of jungle creepers, supporting a platform of bamboo, is thrown across the stream at this place to afford a passage over during the S. W. Monsoon, when the stream becomes a torrent too strong to ford.

Examined the bed of the stream, the rocks in which consist principally of striped jasper with a blue quartz, containing copper and iron (white) pyrites, the large boulders being a granite similar in its character to that of the Cape of Good Hope.

The Karens of To-que-tso arrived last evening, bringing a present of a pig, for which they would not take money, but considered themselves amply repaid by a few colored goung-boungs. They promised to clear the road across the mountain to their location.

January 30th, Ther. 6 A. M., 48°.

8-15 A. M.—The road being reported practicable, started, but on ascending the first spur of the range found the descent so abrupt and steep that the elephants refused to descend—took off their loads and hired Karens to take on the baggage—the elephants then descended. Road across the high range to the N. E., on the top of which the aneroid indicated 27° 40′. From this point the whole of the hill systems were visible, the sources of the Yan-za-len and Youk-thwa were pointed out, the former draining a valley with a direction S. E., and the latter descending from a steep gorge to the Southward.

12 *Noon.*—Arrived at halting place in the location of the "To-que-ko" Karens on the Moo-Kyee-Khyoung, a branch of the Myet-Nan-Khyoung. Course N. E. ; distance 4 miles.

This has been a most fatiguing march for the elephants in consequence of the precipitous nature of the hills crossed. Range of elevation during the march about 2,600 feet.

Ther. 6 P. M., 67°.

The Tsokay of this place, with principal men of this tribe, came to my tent this morning with the purpose of dissuading me from proceeding any further in the direction of the "Nat-Toung." They state that the road is impassable to the elephants to the next location of the Mao-Tsa-Kyee tribe, and that the Nat-Toung rises from the surface as a wall of rock—many other reasons are given, evincing a disposition to impede my progress in that direction. After they left, the Tsokay of Ban-ga-lee, who has accompanied me thus far from his village on the Poung-Loung Range, told me that the reason of the objection to my passing further in this direction was the existence of a feud between the two tribes which could only be settled by the sacrifice of the lives of some of this tribe, and that the people of Moo-Tsa-Gyee hearing of their approach, would secrete themselves in the jungle and spear them as they passed. I desired him to inform them that the object of my visit was principally to make myself acquainted with the different tribes, and if practicable, settle their disputes and terminate their blood feuds ; that they, like their brethren in the valleys of the Poung-Loung, may, for the future, live in peace with each other and receive the benefits

January 31st, Ther. 6 A. M., 54°.

that our Government was calculated to bestow on them.* They are, however, averse to affording me any assistance in proceeding to the "Nat-Toung," and I have sent the Chief of the "Pyan-ma-do" Karens, with a party of his people, to ascertain the practicability of the road, and endeavour by a few presents to induce the people of "Moo-tsa-kyee" to open the road to their locations and thence to the Nat-Toung. I am especially desirous of reaching the Nat-Toung (1) called also "Nat-Hte-Toung(2) and Toung-Goung-Doong (3), as seen from the ranges past on the line of march it seems to form the centre of the

(1) Spirit mountain.
(2) Male spirit ditto.
(3) Mountain of the bald head or top.

* As an instance of the superstitious, vindictive, and implacable nature of these tribes in their social relations with each other, I may state a circumstance which occurred yesterday. One of the chief men of the Moo-Kyee tribe (who came into Tounghoo and has accompanied me back, to his village) took for his wife a woman of a neighbouring tribe, who lately falling sick, returned to her father's house, and during her husband's absence in Tounghoo, died. On hearing of the return of his son-in-law, the father of the deceased woman came with a party of his people to meet him, and on their arrival here yesterday, sought him out and taxed him with being the cause of his wife's death, and threatened him with the vengeance of the tribe. On the circumstance coming to my knowledge, I remonstrated with the father and did all in my power to mollify him, but to no purpose. He said that his daughter's sickness and death was caused by an act of sacrilege on the part of the husband, who had taken a gong from the place of sepulture of the bones of his own tribe, and that the spirit to whom the property belonged had, in consequence, visited his house with sickness and death, his only child having preceded the mother to the grave. The father confessed to having appropriated the gong, which shortly afterwards he replaced, but neither this circumstance, nor the man's affliction on hearing of his wife's death, appeared to have any effect with the father, who left the place abruptly, telling his son-in-law that the flames of his house should be the only warning of his next visit.

In the body of the Journal I have alluded to a singular custom of the Karen tribes in cutting down a portion of the betel-nut trees to supply the wants of the dead owner. This custom includes a portion of the property he may have died possessed of and is thus arranged; on the person's death the body is burnt, with the exception of principal bones which are collected, and after a ceremony has been performed in which drinking to intoxication a crude spirit distilled from rice forms a part, they, together with a portion of the property, the half if man and wife only, or one-third if he leaves a family, are placed in a jar or encased in bamboo slips and secretly conveyed to, and deposited on the "Ayo-Toung" (Hill of Bones) and to reveal this place of sepulture would appear to be one of the greatest crimes a Karen could commit.

It may not be considered irrelevant to the subject of the customs of these tribes, if in the above ceremony of the division of property with the dead some ethnic data be deduced of their probable origin. Herodotus, in his Ancient History, gives an account of the customs of the "Scythians" of his time precisely similar to that I have related, with the addition, however, of the sacrifice of human beings,—a practice abhorrent to these mountain races, and it is a reasonable conclusion, that ceremonies affecting the most dreaded occurrence of man's being, should be handed down intact in those tribes who from their isolated position, inaccessible and far removed from all contact with civilization, have preserved their freedom and their customs with their nomadic habits, if to this be added their physical characteristic of broad Mongolian feature and square frame of body, we may reasonably conclude, in the absence of philological demonstration, that they form a part of the Indo Sythic-family who, at some remotep eriod, were driven from their original locations in the far N. W. and have been dispersed in tribes along the spurs and subordinate ranges of the Himalaya.

The only weapon of defence in common use with all these tribes is the spear made from native iron of a very superior quality found in abundance, in these Hills, this weapon being shod with an iron "spud" used in planting their grain, is rarely out of their hands, evincing the degree of insecurity in which their lives are passed. The cross bow of cutch wood, and light bamboo arrows with poisoned points, is in use with them, but more for the purpose, of killing for food, than for personal defence.

(Sd.) E. O'R.

upheavement by which this mountain region was created, forming a prominent group of hills* piled high above the contiguous ranges, from the top of which all the surrounding countries are said to be visible, the position of Karen-nee, the line of the Salween River, and that of the Yoon-za-len being clearly defined.

The cook, with two others of the party, laid up with fever to-day.

Examined the bed of the stream, the rocks similar to those at last halting place on the Myet-nan-khyoung, with a large proportion of magnetic iron-sand in the shingle.

Ther. 6 P. M., 69°.

The Tsokay of Ban-ga-lee, with a peon and four Karens of the party, attacked with fever yesterday, and having expended the stock of quinine brought with me, they returned to their homes.

February 1st, Ther. 6 A. M., 52°.

The statements of the Karens regarding the nature of the country to the Nat-Toung are so conflicting, that I have sent on a party of my own people to examine it, being compelled to remain in camp to-day in order to purchase a supply of rice for the elephants' and people's rations. Being informed before entering the hills that rice could be procured to supply all wants of the Karen locations, omitted to purchase the requisite supply, that the elephants might be saved its carriage across the mountain ranges; I find, however, that the Karens of this place have little or none to spare, and that in advance the country is comparatively a wilderness, with but few Karen habitations, widely dispersed and consisting of only three or four families each. For the small quantity of rice obtained here the Karens refuse payment in Rupees, preferring beads and handkerchiefs. I have therefore sent a quantity of both to the Karen locations on the Southern side of the Myet-Nan-Khyoung, and must await the arrival of the rice that may be obtained in exchange in proceeding onwards.

Ther. Noon 84°., 6 P. M, 70°.

The Chief of Pyau-ma-do returned this afternoon with the head men of the Mao-tsa-kyee tribe. A more wretched and filthy group I have never seen amongst these Karens. They appear to be jealous of my entering their part of the country, under the impression, as I am informed by some

* Judging from our present elevation as indicated by the aneroid, this group must be 7 to 8,000 feet above the Sea level.

of the Karens of my party, that having made myself acquainted with their locality, I intend, after my return, to send a number of "musket-bearers" to catch and carry them into slavery. I have, however, disabused them of this idea, and for a few presents of beads, handkerchiefs, and rupees, they promise to open a road to their clearings, distant two days' journey for the elephants from "Nat-Toung."

The road being reported open, started at 7-30 A. M. and crossed a small range of hills to the Boo-lo-khyoung, a feeder of the "Myet-Nan" with a course of stream from the N. N. E. At this point the hills rise steep up from the base and afford no passage to the Eastward except across their tops. Halted the elephants and hired a party of the Karens, to proceed with the pick-axes and make steps for them to ascend and others to carry the baggage across to the Eastern side. With much labor and after two hours' toil, I reached the top, which must have been 2,600 feet above the stream, the aneroid on the top, indicating a point about 1½ inches below the marked degrees *viz.* 27″ 50′ ; descended on the Eastern side along the top of a subordinate range covered with pine trees and at 2-30 P. M. halted on the Dzan-do-khyoung, a feeder of the Boo-lo-khyoung. This has been the most difficult march of the journey hitherto ; the elephants did not arrive until 7 P. M. Course N. E. ; distance 6 miles.

February 2nd, Ther. 6 A. M., 50°.

Ther. 2 P. M., 72° 6 P. M., 49°.

The boiling point of water was found to be 204° giving an approximate height of 4,200 feet.

Loaded the elephants and started at 9-30 A. M. A strong breeze from the N. E. coming down a steep gorge of the hills to the Eastward directly upon us, rendered the feeling of cold intense. The wild Karens, with no covering but a scanty tunic, placed their feet in the ashes of the fire for warmth. Rode along the ridges of two separate ranges subordinate to the main range ; the principal portion of the day's march, through forests of fir trees, some of which were exceedingly fine timber, having stems of 80 to 100 feet, with a circumference of 6½ cubits ; found the wild cinnamon abundant on these Hills, and an old Karen brought to my notice a plant known to them as an antidote for the bite of venomous snakes. Sent some Karens for young specimens of both the fir and the poison-antidote plant.

February 3rd, Ther. 6 A. M., 44°.

Specimens taken of cones, branch, and young plants.

See Specimens.

Many beautiful flowering trees passed on the line of march, which has been for the most part at a height of 4,500 to 4,600 feet, from which elevation upwards the pine appears to affect.

Ther. 6 P. M., 51°.

Arrived at the location of the Moo-kyee Karens at 12 noon. Course E. ; distance 3 miles.

The excessive cold of the nights is felt so severely by the Burmans of my own party, who have brought only a single warm wrapper, that they are afraid of advancing any higher, the Karens having told them that the bones of some years since, still remain exposed, their death being caused by the extreme cold.

February 4th, Ther. 6° A. M. 41°. Boiling point 203° 50′.

The Karens of this locality persist in stating, that there is no passage in this direction across to the Salween and that the Nat-Toung is inaccessible.

One of the Karens, who has accompanied me from Pyan-ma-do, states that by proceeding in a Northerly direction, passing round the base of the Nat-Toung, at five days' journey, the cattle road from Karen-nee to Kyouk-Gyee can be reached. He has travelled this road and undertakes to be our guide across, I have therefore decided by proceeding by this route and have engaged a party of Karens to clear the road for the elephants to the next village to the Northward.

This tribe of Karens is by far the most wretched I have yet met in these mountains, with a most fertile soil at their hand, they plant nothing but paddy ; not a single plant of betel, oil, tobacco, or cotton is to be found in their cultivations. Salt, Ngapee, and dried fish are luxuries they but rarely enjoy, and obtain only by plundering the betel-nut gardens of other more industrious neighbours, which they carry to any of the trading marts on the Salween and exchange for those articles.

They are verily a filthy, indolent, and debased race. Previous to my arrival they had never seen a Burmese and were surprised to find them rather a well-favored set, by the way so much like themselves, especially in the fashion of the enlarged hole of the ear-lobes ; for myself, the novelty of a white skin, a rather neglected state of the beard, &c., and a bulk of body somewhat in excess of any of my people, seemed to command their respect, which however suffers some detraction in wanting the distended lobes of the ear. From one of my Karens, who passed

the night with the tribe in their usual large bamboo shed raised 10 to 12 feet from the ground, I learnt that the elders of the tribe had indulged in much speculation as to who I am, and the cause of my visit, despite his telling them that my position as the "Tounghoo-woon" rendered it necessary that I should make myself acquainted with all the races in the vicinity of my Government, and otherwise explaining the object of my visit; they persisted in forming conclusions of their own, and some were of opinion that I am an alchymist, seeking ingredients for the purpose of my profession, in the collection of ferns, orchids, and rocks which I make as I proceed; others are convinced that I am making my escape from Tounghoo taking with me my house (tent) and all my property on the elephants, the latter being a deduction from the circumstance of an affair of the Tenasserim Commissioner having done so a few years back, and visiting Karen-nee in the position of a fugitive,

Ther. 6 P. M., 67°.

the fact has become known to them from their contiguity to that country.

The people of this place having refused to accept employment in

February 5th, Ther. 6° A. M., 52°.

opening the road which they engaged to do yesterday, I have been compelled to send to the villages past for men for this purpose, 19 having arrived, they have gone on a-head and promise to have the road to the Nat-Toung open by to-morrow.

These Karens give no reason for their refusal to assist in opening the road. Under the impression that superstition is the cause of this reluctance on their part, I have refrained from pressing the request. An old Karen of my party states, however, that their refusal arises from the circumstance that they live by plundering the other tribes, having lately stolen a man from a village at four days' journey to the North, whom they sold to the Yoons on the Salween; and that by opening a road to this from the North, they expose themselves to attack from the injured tribe which, if true, is a reason sufficiently weighty for the refusal they make.

Ther. 6 P. M. 65°.

Two of my servants attacked with strong fever to-day, quinine all expended.

Examined the stream-rocks, principally a coarse-grained granite, in a state of decomposition, with porphyritic granites a blue flinty quartz.

Sent a Karen for some young plants of the snake-poison medicine, who, in addition to the plants sought for, has brought also some fruit of

a bamboo which he states is used by his tribe in all cases of bites of poisonous insects and reptiles, a portion dried and rubbed into powder being applied to the wound.

On being questioned as to its efficacy in cases of "hydrophobia" he affirmed that it prevented a fatal termination to the action of the poison, but he had never witnessed an instance of it.

I have been much interested during the day, in witnessing the process of cutting down the large forest trees on the steep acclivities on the hill sides, for the purpose of their paddy cultivation. After the morning's meal, the whole of the men and youths proceed to the place of clearing and, taking a line from the base of the hill, commence operations by making only a slight incision into the wood of the largest trees, the smaller ones being left untouched, ascending higher up the trees of largest growth receive a deeper incision on the side of the ascent, and so on in proportion as they reach the highest point for the day's work, and when the line has been completed the trees at the top, which are selected for their height and fullness of head, are severed through falling upon those below; an impetus is created which increases as it moves steadily down the hill side, and with one lengthened crash prostrates the whole of the forest vegetation; the noise of the falling trees, accompanied by the shrieks and yells of the operators, forms a combination of sounds truly demoniacal.

Wild and untutored as these people are, it is evident, from this circumstance, that they possess an intuitive idea of the economy of labor, nor is their ingenuity less remarkable as exhibited in the construction of the numerous suspension-bridges of bamboo which cross the mountain streams, in some places forming an arch of 60 to 80 feet span.

Started at 7-30 A. M. The road, opened by the Karens, lay along a

February 6th, Ther. 6° A. M., 53°.

broad valley with high mountain ranges dividing the water-shed on the East into the Salween and to the West into the Poung-Loung Valley, on both sides with a direction S. E. and N. W. The hills in the centre, over which our route lay, although of moderate height (5 to 600 feet) were exceedingly steep, rendering the passage of the elephants tedious and difficult. A succession of these hills brought us to the main range.

Ther. 2 P. M., 64°.
Ther. 6 P. M., 50°.

At 2 P. M. halted to allow the elephants to come up, and pitched tent in the pine forest at an altitude of 5,800 feet, boiling point being 202°. Course East; distance 5 miles.

Being told by the Karens that the day's march would employ the whole of the day, got the elephants loaded and started at 7 A. M., route along the ridge of the main range with a gradual ascent to an altitude of 6,700 feet. At 11-30 road diverged along another range with a direction N. E. until 1 P. M., thence down the ridge of a range descending into the valley, the Moo-la-Khyoung, an affluent of the Yoon-za-len, and arrived at halting place on its left bank, at the base of the range, of the "Nat-hhe-toung" at 4 P. M. Course S. E. 5 miles and N. E. 2½ miles. Descent N. N. E. 2 miles; distance 9½ miles.

February 7th, Ther. 6 A. M., 50°.

The greater portion of this march has been through pine forests, with other kinds of forest trees in small proportion, a good many wild cinnamon trees, principally young plants, met with on the tops of the ranges; some of the pines measured were 12½ and 14 feet in girth.

Ther. 12 noon 54°, 6 P. M., 45°. Boiling point 202°; approximate height 5,800 feet.

A North-easterly breeze set in during the night which rendered it intensely cold. In the morning a thick hoar frost covered the ground and tent; the water in the wash-hand basin in the tent had a coating of ice, and a portion in a bucket outside was frozen to the thickness of nearly half an inch. The Burmans and many of the Karens of my party had never before seen ice, and were not a little astonished to find water "converted into a glass;" while the Karens of these mountains scrambled for the broken pieces as they were taken from the bucket, and ate them with the greatest avidity, placing a small portion on the top-knot of the hair at the crown of the head. They gave no reason for doing either beyond the response that "it was good." It certainly could not have been for the purpose of rendering them more hardy, as their only covering during the night consisted of the single article of clothing they possess, a short tunic of coarse cotton, reaching to the middle of the thigh.

February 8th, Ther. 6 A. M., 27°.

Contrasting my own sensations under cover of the tent and protected by a couple of blankets, I was commiserating these poor wretches in the hearing of an old Burman, my companion in many a weary jungle trip, but he solved the question at once by stating that they would be *uncomfortable with a blanket*; that on such occasions they crept into the ashes of the fire in which they rolled like so many dogs; and that the scaly coating of dirt which encased their bodies was alike impervious to cold or heat. It is certainly a fact that no water, by a voluntary intention,

ever touches the body of these creatures from the hour of birth to that of death; and I have witnessed their remarkable agility in skipping from rock to rock, across the mountain streams, where the water was barely a foot deep. I have met with tribes among the Hpo Karens, of the ranges of mountains separating Siam from Tenasserim, who had the same hydrophobiacal propensities; they gave as a reason that ablution in their mountain streams caused sickness, but these unclean animals do not profess even that much of an excuse.

The hill ranges being too steep to admit of the elephants passing further to the Eastward, I have sent a party of Karens to clear a pathway to the "Nat-Toung" which I intend ascending to-morrow, leaving the elephants and camp at this place.

The Moo-la stream drains a valley formed by a high range of hills further to the North than that which was pointed out to me as the source of the Yoon-za-len and may hence be termed the head of that stream. At this point it is 30 feet broad, with boulders of granite, jasper, quartz, and sandstone in its bed; depth 6 to 10 inches; direction of the stream S. S. E.

Started at 6-30 A. M. for the ascent of the range of the "Nat-Toung," the whole of the intermediate hills abutting from that range covered with pine forests, the fallen foliage from which renders the surface so slippery that the ascent, with shoes or stockings on, was quite impracticable, I was therefore compelled to take them off. At 8-30 crossed a small mountain stream, the "Lahe-lo," falling into the Yoon-za-len running S. S. E. along the base of the main range, and thence commenced the ascent of the "Nat-Toung" reaching the summit at 12 noon, the upper portion of the mountain so steep and bare that it was necessary to proceed up a gully on its Northern face where the trees afforded means of ascent. Having taken up water for the purpose of ascertaining the boiling point, found it to be nearly 199°, giving an approximate height of 7,800 feet; the course from halting place to this N. N. E. and the distance, in a direct line, 5 miles.

February 9th, Ther. 6 A. M., 30°. Hoar frost covering the tent and ground, and ice, ¼ inch thick, on standing water placed outside the tent.

From this point the whole of the mountain systems were traceable so far as the haze would admit of their outlines being followed, those in the far distance to the Westward, forming the Valley of the Poung-Loung of the lowest height ranging from 2,000 to 3,500 feet; more Easterly the higher ranges passed on the line of route, with their tops covered with pine forests having an altitude of 4 to 6,000 feet, with a bold outline and

exceedingly steep flanks; and high above all the range upon which I stood, some portions more to the Northward being fully 500 feet higher than the summit of the "Nat-Toung," or probably 8,500 feet.

On the Eastern side the Salween River was seen in broad open spaces coursing to the S. E., the distance being about 12 miles, and the mountain ranges similar to those on the Western view, but at a point, as far as the eye could reach to the Eastward, the dim outline of a much higher range was visible which must attain a height of 10 to 12,000 feet, and is, I presume, the range mentioned by Dr. Richardson in his Journal of a Tour to Zimmay, called by him a spur of the Himalaya, on the Eastern flank of which the Cambodia River has its course.

The direction of the whole lines of mountains appeared to be generally N. W. and S. E., but the innumerable congeries of spurs abutting from the main systems, and forming the water-courses in the gorges down their flanks, had no general direction but appeared to be thrown up in eccentric masses perfectly bewildering, and as an instance of the difficulty, these subordinate hills opposed to a passage through the country, I may state upon the information of my Karen guide, who had traversed the country in every direction that from the Nat-Toung to the Salween, a distance certainly not more than that I have noted, in a direct line was a *four days' journey.*

Descended the range at 1 P. M. and reached the tent at 5 P. M. exceedingly sore-footed and weary, the difference of height between halting place and summit of Nat-Toung, 3,200 feet. From the Karen guide and others who have their locations near the source of the Yoon-za-len, I learnt that the range of the Nat-Toung forms the boundary between Karen-nee and the tribes of the "Pagoh" or "Karen-Yaings" to the Westward. It would be more appropriate, however, to state that the Karen-nee Chiefs, who do not possess any of the country on the Western side of the Salween up to the point of my ascent, merely exercise a control over the Karens, on the right bank of the Salween, as far to the Westward as the base of the "Nat-Toung" range, this control being chiefly that of appointing Hokays to the several tribes, who act as agents in the purchase of the slaves that are brought to them by the "Karen-Yaings" on this side; the circumstance however of Karen-nee influence being predominant in that direction has induced me to decide upon returning, even had the passage been practicable to elephants, to avoid any misconstruction of my motive, or question of my right of passing

through a country, in which my presence might, under the circumstances, be construed into an act of aggression.

I was also informed that the Karen-nee Chiefs have no authority to the South beyond the "Moo-Ban" Khyoung an affluent of the Salween, at the distance of about four days' journey from the mouth of the Yoon-za-len stream, and that the above stream, the Moo-Ban, forms the boundary between that authority and the "Yoons," or certain tribes of the Zimmay Shans.

Intimated to my people my intention of returning, much to their gratification, as they complain sadly of the effects of the excessive cold of the nights, and wish to see no more ice.

10th February, Ther. 6 A. M., 35°. Returned by the same route to halting place in the jungle.

11th February, 6 A M., 47°. By the same route to halting place in the "Dzan-lo" Khyoung.

12th February, Ther. 6. A. M., 52°. Started at 7 A. M. intending to have reached the halting place on the "Myet-Nan" Khyoung, but the steep descents on the line of march prevented the elephants getting beyond this place (Tan-que-dzo) on the Moo-Kyee Khyoung, having been eight hours on the march over a distance of latitude of 6 miles. This will give some idea of the difficult nature of the country.

A Karen of Bammadee joined the party at the last halting place, knowing that I had ascended the Nat-Toung. He prefers a charge against the Chief of Moo-Kyee for having captured his brother and sold him to the Karen-nee. This proves the nefarious character of that tribe, the Hokay, who on being sent for, acknowledged the act, but excused it on the grounds that a difficulty existed between the two tribes, the nature of which he did not explain. This was denied by the brother of the stolen men, who stated that a "Kye-tse" had been received by the Tseekay in exchange for him in Karen-nee, the Chief did not deny this, and evidently wished to restore the man to his friends, which he promised to do so soon as he could ascertain how he had been disposed of. He requested an official acknowledgment of his position from me to prevent any interference with his people on the part of the Karen-nee authorities. He also states, that the Karens in his locality, and even those on the Eastern flank of the "Nat-Toung," consider themselves as belonging to Tounghoo.

Returned to the halting place on the Myet-Nan Khyoung and thence

13th February, Ther. 6 A. M., 62°.

across a steep ridge of hills into the valley of the Ka-yai-lo, which falls into the former, a short distance to the Eastward of halting place of the 29th ultimo.

The ranges forming this valley have a direction East and West, with a gradual rise to Westward.

Halted 5 P. M. on the "Ka-yai-lo." Course from Myet-Nan Khyoung West; distance 5 miles.

Ther. 6 P. M., 69°.

I have take this route as being nearest into the Valley of the Poung-Loung, and as affording me the opportunity of visiting the locations of May-ba-lan.

A man of the Moo-kyee tribe, who came as far as the halting place of yesterday as a hired cooly, before returning to his home, requested me to give him a letter to the Karen-nee Chiefs for the purpose of restoring his wife's son who was taken and sold as a slave by people from Karen-nee some time ago. His story is, that the father of the youth, previous to his death, which occurred some twelve months since, was accused by some of the officials of Karen-nee of causing the death (by sorcery) of the head of a family of Karens subject to Karen-nee; the usual demand of a Kye-Dze of a certain value was made upon him, and being unable to satisfy it, his son was taken away as a slave. The circumstance appeared to be well known to all the Karens with me, who corroborated the statement; I accordingly gave him a letter to the Chiefs of Karen-nee, requesting their assistance in the restoration of the youth to his family which was under the protection of our Government, and pointing out the cruelty of consigning to slavery a youth, who was guilty of no offence whatever, such a proceeding being held in the greatest abhorrence by us. I trust the letter will have the desired effect, as these Chiefs have lately evinced a desire to cultivate our friendship.

14th February, Ther. 6 A. M., 59°.

Left at 7 A. M., road along the base of the hills until 9-30 A. M.; the head of the valley forming the location of "Mwai-bun-do" Karens.

From this point the drainage is to the Westward into the Youk-tha-wa

Boiling point 208°, 2,250 feet.

stream, and thence into the Poung-Loung at the boundary between Tounghoo and Kyouk-Gyee.

The hill ranges on the West of the highest point as above, has a direction N. E. and S. W., and the valley is formed by spurs from the main

ranges with a gradual inclination to the centre over which the road passes. These so-called roads are merely foot-paths, which it has been necessary to clear of the high jungle before the elephants could pass.

Ther. 6 P. M., 67°.

At 12 A. M. halted to allow the elephants to come up, arriving at 3 P. M. Course West 3 miles, and S. W. 5 miles.

Boiling point 206°,-3,250 feet.

Stream called the Tha-mo-lo to its junction with the Youk-tha-wa.

Started at 7 A. M., the road across ridges of mountains with an incli-

15th February, Ther. 6 A. M., 60°.

nation to the Valley of the Youk-tha-wa. At 10 came in sight of the Valley of the Poung-Loung. The outline of several high ranges of mountains in the direction S. E. of Kyouk-Gyee visible, whose altitude must range from 8 to 9,000 feet.

At 10-30 arrived at the large Karen village of Zeen-deng, on the top of the highest ridge immediately East of the Poung-Loung. From this point descended into the valley drained by the May-ba-lan stream and following its course to its junction with the Youk-tha-wa, halted on the latter at 2 P. M. By far the greater portion of the march to-day has been on the descent, the difference of altitude of yesterday and to-day, as shown by the boiling point of Thermometer, 2,600 feet.

A large number of the trees in the uncut forests, passed on the

Ther. 6 P. M. 71°, Boiling point 211°.

line of march, were the true "gamboge" from which a valuable article of commerce could be procured. Course W. S. W.; distance 10 miles.

Left halting place at 6-30 A. M., and proceeded along the course of

February 16th, Ther. 6 A. M., 62°.

the stream, crossing it several times until 9 A. M., thence across several low hills to its entrance into the May-ba-lan plains, and following its course, arrived at Youk-tha-wa at 1-30 P. M.

A large number of teak passed within the steep valleys on the

Ther. 6 P. M. 75°.

borders of the stream, principally however of small size. Course West; distance 12 miles.

February 17th Ther. 6 A. M. 72°, 6 P. M. 76°.

Engaged in investigating numerous complaints against the Thooghyee of the circle Bammadee.

February 18th.

Proceeded to Tantabeng.

February 19th.

Returned to Tounghoo.

(Signed) E. O'RILEY,

Assistant Commissioner.

MAJOR JACOB'S COMPLAINT

AGAINST CERTAIN REMARKS

OF THE

PUNJAB BOARD OF ADMINISTRATION.

lc

(Copies.)

No. 114 of 1855.

From

H. L. ANDERSON, Esquire,

Secretary to the Government of Bombay,

To

C. BEADON, Esquire,

Secretary to the Government of India,

Fort William.

Dated 29th June 1855.

Political Department.

Sir,

I am directed by the Right Hon'ble the Governor in Council, to transmit to you, for any notice the Hon'ble the President in Council may consider the subject to deserve, copy of a letter from the Commissioner in Sind, No. 217, dated the 28th ultimo, and of its enclosure, being transcript of a communication from Major John Jacob, complaining of his proceedings on the Frontier having been misrepresented in the first printed Report of the Punjab Board of Administration.

I have, &c.,

(Signed) H. L. ANDERSON,

Secretary to Government.

Bombay Castle,
The 29th June 1855.

No. 217 of 1855.

FROM

THE COMMISSIONER IN SIND,

TO

THE RIGHT HON'BLE LORD ELPHINSTONE, G. C. H.,
Governor and President in Council.

BOMBAY.

POLITICAL DEPARTMENT. *Dated 28th May 1855.*

MY LORD,

I HAVE the honor to forward a letter from Major Jacob as per margin, bringing to notice, that his proceedings on the Frontier have been misrepresented in the first printed Report of the Punjab Board of Administration, and requesting that the erroneous impression conveyed by the Board's remarks may be corrected.

No. 133 of 28th July 1854, complaining against injustice done him in the Punjab printed Report No. 1.

2. I greatly regret that, partly through an oversight and partly from a wish to explain the system followed by Major Jacob more in detail, than leisure from current duty has hitherto permitted, the present communication of Major Jacob has lain by me for several months without being forwarded.

3. Without pretending to do justice to the whole subject, which would require much more leisure than I have at command, it may be useful and of interest to your Lordship in Council if I briefly state some of the principal characteristics of the system which Major Jacob has followed with such complete success.

4. One of the most prominent features of that system is, that the men under him act entirely on the *offensive* ; not that they ever meddle with those who show no inclination to attack them, but that they never wait to be assailed ; and the men are never allowed to suppose that they may stand on the defensive and await attack. There can be no mistake as to the intentions of any body of armed men, suddenly quitting the hills and moving upon any part of Sind, and directly such a movement is known to be in contemplation, the Frontier Posts are instructed to meet it *offensively*. No forts or other defensive works whatever are any where allowed. Such as existed at the time Major Jacob

was placed in charge of the Frontier, were at once destroyed or abandoned. The troops have been always freely exposed, as in the field, and taught to rely upon their superior vigilance and celerity of movement to guard them against sudden attack ; every obstacle to rapid movements, or to the concentration of every man of the whole force, being, as far as possible, removed.

5. The men are taught to consider, that it is their business to protect the country people and not merely to protect themselves. Whatever the odds, marauders must be met and their plundering expeditions checked. It is not permitted to a small force to put itself in a position of self-defence and allow the country people to be plundered.

6. Another leading principle is, that no private person, whether British subject or foreigner, is on any account permitted to plunder or kill, and no distinction is made, whether those so plundered or killed, be friends or foes. Robbery and murder are treated as equally criminal, whether the victim be a British subject or not.

7. I believe this rule to have had the greatest possible effect on malefactors beyond our border. They could entertain no doubt as to the sincerity of Major Jacob's intentions to put down such crimes, when they saw that he was as active and severe in punishing our own subjects who robbed or murdered the mountaineers, as he was, when the aggressor was a foreigner and the sufferer one of our own subjects.

8. The plea of family blood-feud or retaliation, in such cases, is always considered an aggravating circumstance, as proving the most deliberate malice aforethought. This rule of natural justice became very soon thoroughly understood and respected by all parties concerned.

9. No private person is allowed to bear arms without written permission. This is a cardinal rule in the Frontier arrangements, and is the one regarding the good effects of which I was most sceptical, till I saw the results of its operation, since which, I have been convinced, that it is one of the main causes of the long-continued tranquillity of the border. It puts an effectual stop to our own people plundering their neighbours, which was in itself one great cause of the bloodshed and disorder on the Frontier in former days. It ensures their ready co-operation with the troops, especially in giving the earliest possible intimation of any intended attack, and it makes an armed plunderer a marked man wherever he goes, and greatly increases the difficulties of eluding pursuit.

10. I feel assured that this principle might be carried out with the greatest possible benefit in Guzerat and Kattywar.

11. The highest moral ground is always taken in all dealings with the predatory tribes, who are treated as beings of an inferior nature, so long as they persist in their misdeeds, as vulgar criminals, and disreputable persons with whom it is disgrace for respectable persons to have any dealings, and whom all good men must, as a matter of course, look on as objects of pity not of dread, with detestation possibly, but never with fear.

12. In nothing did Major Jacob's influence over these Frontier tribes strike one more than in the change of public feeling among them with regard to the profession of a robber. Formerly, rapine was looked on as the only occupation befitting men of rank, and the professed robber was regarded with terror, not unmixed with admiration. A few plunderers were sufficient to scare the whole country side, and their exploits were the objects of admiration to all young men of spirit.

13. The case appears to be widely different now. Plundering is looked on as disreputable and unbecoming a man who has any claim to respectability; and the honest cultivator, fortified by the feeling that the general sense is against the plunderer, as a malefactor, is not afraid to meet him on equal terms and considers himself the better man of the two. This feeling is of course much stronger in the troops, and their thorough contempt for plunderers as malefactors rather than enemies, has been productive of a corresponding feeling, which makes the plunderers afraid to meet the regular troops on any thing like equal terms.

14. As perfect information as possible is obtained regarding all movements, or intended movements, of the plundering tribes resiidng beyond our border, and such information is acted on with the greatest activity; Major Jacob's knowledge of the nature and habits of the Beloochee robbers being sufficient to enable him, in most instances, to judge correctly of their probable proceedings, and effectually to check and counteract them at a distance from British boundaries.

15. Strict justice is always meted out; and no success or want of success or any other circumstance whatever, is allowed to influence the terms offered to, or the treatment of offenders, whether whole tribes or individuals. Violence, robbery, bloodshed are held as equally criminal and disreputable in all men; the abandonment of such practices and the adoption of peaceful and industrious habits, is considered as most honorable and encouraged in every way.

16. In short, to quote Major Jacob's own words in a Memorandum on the subject with which he furnished me, "the essence of the whole "business is first to put down all violence with a strong hand; then "your force being known, felt, and respected, endeavor to excite men's "better natures, till all men seeing that your subject is good and of the "greatest general benefit to the community, join heart and hand to aid "in putting down or preventing violence.

"The great power of a machine is shown by its smooth and easy "working; a noise and struggle show the effects of opposition, and "therefore in fact a deficiency of power. The working of true princi-"ples is now apparent here in almost total absence of open physical "force. When we came to the Sind Frontier in 1847, the people had "no idea of any power, but violence. The proceedings of the British "Authorities tended to confirm this state of feeling. When the men "of Cutchee plundered in Sind, the only remedy applied by the Gover-"nor of Sind was to encourage the Sindee to plunder in Cutchee. Both "parties then were equally guiltless or equally criminal, no idea of moral "superiority was thought of. Such being the case, it was absolutely "necessary, in the first instance, to have recourse to violent measures to "show the predatory tribes that we possessed, in far greater degree than "themselves, the only power which they respected (mere brute force.)

"Our first year (1847) on the border was one of enormous bodily "labor; we had literally to lie down to rest with our boots and swords "on for many months together. We crushed the robbers by main "force and proved far superior to them, even in activity, and it may "be well to observe that at this time, but one regiment of the Sind "Irregular Horse was on the Frontier."

17. With regard to the observation in the Punjab Report about the Posts being close to the Hills, Major Jacob remarks,—"When our "Frontier was in a disturbed state, I had my Posts close to the hills, "esteeming this arrangement to be an advantage. Since quiet has "been established, I have withdrawn them, save as respects some Beloo-"chee guides. But though we had succeeded in forcibly subduing the "robber tribes, I should have considered our proceedings as a failure, "had it been necessary to continue to use violent measures. Having

"by the use of force made ourselves feared and respected, we were able "to apply better means, and to appeal to higher motives than *fear*; this "I had in view from the very first. The barbarians now feel (which they "could hardly imagine before) that strength, courage, and activity, may be "possessed in the highest degree by those also influenced by gentle and "benevolent motives. Under the influence of this growing feeling, the "character of the border plunderers has been changed, whole tribes "within and without our borders, amounting to more than 20,000 souls, "have totally abandoned their former predatory habits and taken to "peaceable pursuits. Our Jekranees and Doomkees, formerly the wildest "of the border riders, are now the most honest and industrious people in "all Sind; every man of the Sind Irregular Horse is looked on and treat-"ed as a friend by all the country folk."

18. In pointing out that the duties performed by his men have not been confined to patrolling from post to post, Major Jacob observes with great justice—"The moral power of their bold and kindly bearing and "proceedings has spread far and wide through the country, and effected "what no mere force would have done; even the Murrees, who have not "felt our physical force much, are fast coming under this influence and "are beginning to feel themselves disreputable. If the irritation and "excitement to evil practices, caused by the incursions of our Muzzarees, "* * * do not interfere with the full development of the causes now at "work on our border, it seems to be certain, that perfect peace and "quiet will be established among *all* the tribes in hill and plain, whose "sole or chief pursuits have hitherto been robbery and murder."

I have the honor to be, &c.,

(Signed) H. B. E. FRERE,
Commissioner.

COMMISSIONER'S OFFICE;
KURRACHEE,
28th May 1855.

No. 133 OF 1854.

FROM

MAJOR JACOB,

Political Supt. on the Frontier of Upper Sind.

TO

THE COMMISSIONER IN SIND.

Dated 28th July 1854.

SIR,

BY favor of the Collector of Shikarpoor, I have to-day seen and perused a printed volume of *Selections from the Records of the Government of India, No. II. Punjab Report.*

On other occasions I have been officially supplied, by your order, with copies of such Reports for my Office, but this one I have not so received.

In this volume I find at page 40, paragraph 133, the following passage:—

"133. Aided by 400 Infantry, the Cavalry Detachments, in all 800 "strong, (of which the troopers receive only 20 "Rupees per mensem) almost entirely hold and "protect the Derajat Frontier Line (300) three "hundred miles long, and distant on an average only 6 miles from the hills, "whence the robber hordes come pouring down; while the Sind Horse "1,400 strong (of which each man receives 30 Rupees per mensem) guard "a Frontier only 70 miles long, and that distant generally 30 miles from "the hills. The Eusufzye Frontier, from Toongyee on the Swat River "down to Pehoor on the Indus, is of the same length as the Sind Line from "Kusmore to Khangur, and yet the former is patrolled and defended "by the Guide Corps, 800 strong, including both Cavalry and Infantry. "In neither case are the supports taken into consideration. Our Derajat "Line is supported by the Cavalry of Dera Ismail Khan, Asnee, Dera "Gazee Khan, and Bunnoo, and the Sind Line by those of Sukkur and "Shikarpoor. The duty thus imposed upon the Punjab Cavalry is "arduous, and several Commandants have expressed their opinion, that the

"Their duties compared "with those of the Sind "Horse.

" present high state of efficiency of their Regiments cannot be maintained " under such constant toil and exposure."

On this passage, I beg leave to offer the following remarks :—

The Sind Frontier, guarded by the Sind Irregular Horse under my Command, extends from the Chandia Hills to the Indus above Kusmore near Mittee. The distance is detailed below ; the names given being those of the Frontier Out-posts and Head Quarters :—

From the Chandia Hills	to	Dost Ali,	miles	... 30
" "	to	Shadadpore,	"	... 15
" "	to	Khyree Gurree,	"	... 16
" "	to	Rojaun,	"	... 24
" "	to	Jacobabad,	"	.. 10
" "	to	Dilmorad,	"	... 9
" "	to	Kussunne Gurree,	"	... 11
" "	to	Tungwanee,	"	... 14
" "	to	Rundkote,	"	... 12
" "	to	Roomree,	"	... 15
" "	to	Kusmore,	"	... 18
" "	to	Mittee,	"	... 11
		Total	miles	... 185

Since the year 1848, there have been no troops whatever, either in support, reserve, or in any other way, connected or concerned with the Sind Frontier, except the two regiments of Sind Horse. There has been no Cavalry at Sukkur or Shikarpoor, and no other than the Sind Irregular Horse in Sind at all, since 1847. The Infantry at Shikarpoor has no connexion with the Frontier which, since 1848, has formed a separate Command.

The Sind Irregular Horse is 1,600 strong, but deducting men always on furlough 1,400 ; all reserves and supports are included in this number, there are no others whatever.

On the principle of the calculation given in the paragraph quoted from the Punjab Report, the Detachments on the Sind Frontier stand thus :—

Omitting the supports at Head Quarters at Jacobabad, there are 10 posts, 360 strong, of all ranks in the aggregate, along a line of 185 miles in length, or less than 2 men per mile.

The Punjab Report shows 400 Infantry and 800 Cavalry (also exclusive of reserves) holding a Frontier Line of 300 miles, or just 4 men per mile, or in place of the state of things affirmed in the Punjab Report, the State pays monthly 80 Rupees per mile of Frontier in the Derajat, and 60 Rupees per mile in Sind.

With regard to the proximity of the hills, the fact is, that this is very great advantage. The Mountaineers, the very best of them, are contemptible in the plain, but when to reach them, the Cavalry has to make a weary march of 50 or 60 miles through a desert ; constant toil and exposure are indeed necessary to success.

In former days when I had posts at Shahapoor, Chutter Poolijee, Koomree, &c., close to the hills, fewer men sufficed for the work. At present, our Frontier Line is only at its extremities near the hills, the distance from which generally is about 60 miles. The most formidable plundering tribes are however not the Mountaineers but those of the plains. The Doomkees, Jekranees, Ramdanees, Kosahs, Boordees, Muzzarees, &c., &c., are all inhabitants of the plains of Cutchee and Sind, and it was these, and not the Mountaineers, who formerly laid waste the whole border country.

Even now, the Muzzarees, living within our own border in the Punjab between Mittenkote and Kusmore, are the worst marauders in the whole country. These men still continually plunder in the British Territory on the left bank of the Indus (which they cross cleverly and habitually on skins) in the Bhawulpore country and occasionally in the hills. Only a few weeks ago, a gang of these Muzzarees fully armed, was committing depredations in the Gotekee District.

Within the Sind border, similar practices formerly prevailed on a very large scale, but these have been for many years totally put a stop to ; and, since 1848, no man has been allowed to bear arms. Under the arrangements carried out on the Sind border, whole tribes, amounting to many thousands of men, whose sole or chief occupation formerly was plunder, have been actually reclaimed from their evil habits, and have long since become useful and industrious members of society.

The labors then of the Sind Irregular Horse have at least been attended with complete and permanent success; the Frontier has not only been guarded by the Corps, but our foes have been converted to friends and the robber tribes to peaceful subjects.

The constant toil and exposure necessary in the first instance to produce these results, are now no longer requisite, and where proper principles are followed out, such must always be the effect.

But the Sind Irregular Horse have not only held and quieted the Frontier without aid or support from any other source, but even at a critical period, when all the border tribes were in a state of violent irritation, the Sind Irregular Horse detached 500 men to serve for nearly two years in the Punjab.

As to the robber hordes which "come pouring down from the hills," I am well acquainted with the statistics of the tribes, and the country generally, at least up to Mittenkote, and it is certain that the only formidable predatory tribe in the hills, the men of which have for many years past made incursions into the British Territory in that quarter, is the Murree tribe. But these men have far to go to reach that country, and the largest body of them which has left the hills to plunder in the country between Mittenkote and Kusmore since the annexation of the Punjab, did not amount to 300 strong. The Lasharees, Goorchanees, &c., are contemptible, the Khetranees are not a predatory tribe at all, and if not annoyed by the hostile incursions of others, remain at peace with all.

The Boogtees, formerly so formidable, have long since been reduced by me to total submission and obedience, and have for years past ceased to annoy the Punjab Territory or to injure its inhabitants, unless, perhaps, in defending themselves occasionally against the inroads of the Muzzarees of Rojaun.

The paragraph quoted above from the Punjab Report being founded on imperfect information, is then evidently incorrect as to fact, and unjust as to conclusion; and I beg respectfully to claim, as I think that I have a right to do, the protection of the head of the Province in which we have so long served, from these injurious remarks made and published, regarding our proceedings, by the Board of Administration of the

Punjab, who have evidently been misinformed as to the state of things and to whom we are not responsible.

I have, &c.,

(Signed) JOHN JACOB, *Major*,
Political Superintendent, &c. &c.

(True copy.)

(Signed) W. J. M. STEWART,
Assistant Commissioner.

(True copies)

(Signed) H. L. ANDERSON,
Secretary to Government.

No. 493 OF 1855.

FROM G. F. EDMONSTONE, ESQUIRE,
Secretary to the Government of India,

To J. LAWRENCE, ESQUIRE,
Chief Commissioner of the Punjab.
Dated Ootacamund, the 29th August 1855.

FOREIGN DEPARTMENT.

SIR,

I AM directed by the Most Noble the Governor General to transmit to you, for such remarks as you may desire to offer on the subject, the accompanying copy of a letter* from the Secretary to the Government of Bombay, submitting copies of a communication from the Commissioner of Sind and of its enclosure from Major Jacob, complaining of his proceedings on the Frontier having been misrepresented in the first printed Report on the Administration of the Punjab.

* No. 114, dated 29th June last.

I have the honor to be, &c.,

(Signed) G. F. EDMONSTONE,
Secy. to the Govt. of India.

OOTACAMUND,
The 29th August 1855.

No. 755 of 1855.

From

R. TEMPLE, Esquire,
Secy. to the Chief Commr. for the Punjab,

To

G. F. EDMONSTONE, Esquire,
Secy. to the Govt. of India, with the Govr. Genl.

Dated Lahore, 8th October 1855.

Political Department.

Sir,

I am directed by the Chief Commissioner to acknowledge the receipt of your letter No. 493, of the 29th of August last, with its enclosures, being copy of correspondence connected with a complaint by Major Jacob, impugning the correctness of certain remarks in the first Punjab Report, in which the duties performed by the Sind Horse on that Frontier, are compared with those of the Punjab Force and the Guides on the Western border of the Punjab.

Section I. Punjab Report, page 40, para. 133.

2. In reply I am to make the following observations:—The remarks quoted by Major Jacob, were written from notes prepared by Sir Henry Lawrence, the President of the late Board of Administration. The Chief Commissioner is not aware of the sources from which this information was obtained. But he is quite sure that neither that Officer, nor any of the other Members of the Board of Administration, had the slightest intention of misrepresenting the state of the case, or the smallest desire to detract from the well-merited reputation of Major Jacob. The fact is, that the Board, at the time the Report was written, were desirous of defending their Administration from certain attacks which had not long before been made against it, and, thus, were led to contrast the arrangements in Sind with those in the Punjab, for the defence of their respective Frontiers.

3. The Chief Commissioner has no personal knowledge himself of the exact circumstances of the Sind border. He has always understood, however, that there existed a wide extent of desert between the cultivated and inhabited portions of Sind, which Major Jacob's Force guarded, and the hills from which the robber tribes issued to plunder.

4. If this be the case, the Chief Commissioner believes that it will be generally admitted that this circumstance must prove a great advantage in defending the Frontier. The robbers have to pass through this desert in their advance, and again in their retreat. There would appear then to be considerable facilities during their incursions for a body of Cavalry to get between them and the hills, and intercept their retreat. As Mr. Frere remarks in the concluding sentence of paragraph 14 of his letter of the 28th of May, to the Bombay Government, the robbers may be counteracted and checked "at a distance from British boundaries."

5. In Major Jacob's remarks on the statements in the Board's Report, there appear to the Chief Commissioner some points which deserve notice.

6. The Board did not state, as that Officer seems to think, that 400 Cavalry and 800 Infantry guarded the 300 miles of the Southern Derajat, but that 800 men in all guarded the 300 miles of the Southern Derajat. This would make a great difference in the calculation, and would give less than 3 men per mile; and as half that number are Infantry, the cost would be about 36 Rupees and not 80 Rupees per mile.

7. The Chief Commissioner cannot think that the proximity of the hills is an advantage. It is not merely that the posts are thus placed, but that the villages, with their cultivation and property, are close to the hills, and therefore are liable to be plundred before the troops can afford aid. The force in the Trans-Indus Territory has to guard the border, and to hold the country, which in many parts is well peopled. In the Southern Derajat, it is true that the population is sparse, and the hill tribes generally when in the plains, are not very formidable, but such is not the case as you proceed Northward. The Kusranees, Sheeranees, Bozdars, Wuzzeerees, and Afreedees, can muster in large bodies, and in the broken ground in the skirts of the hills would prove formidable against small bodies of troops. The Guides (800 strong) who alone hold all Eusufzye and guard the Swat border, are in the middle of, perhaps the finest Puthan race in the country. A tribe, which can collect 30,000 armed men in the plains, who conquered and held Peshawur from the Barukzaies for a time, and who at the battle of Nowsheera, all but

defeated Maharajah Runjeet Singh at the head of his disciplined Battalions.

8. The Chief Commissioner would be sorry to make the slightest reflection on Major Jacob or his measures. He has always considered that Officer to have performed excellent service, but it may be doubted if the system in force on the Sind border would answer generally in the Punjab border. The Chief Commissioner cannot believe that small Detachments of Cavalry, however excellent, could hold open posts close under the hills with impunity. It is not merely the Chief Commissioner's opinion, but it is that of some of the best Officers of Her Majesty's and the Hon'ble Company's Service, that the Guide Corps and Punjab Infantry are not to be surpassed by any Native Troops in India. But even a small Detachment of these men could not safely be posted in the open plain in the vicinity of the hills. If this be the case, it follows that the tribes on the Sind Frontier are not so warlike as the majority of those on this side, or that there are circumstances which prevent their being able to make their attacks with the same facility as can be done on this Frontier.

9. Major Jacob states that the Muzzarees, who are inhabitants of the Punjab, are the worst marauders in the whole country. To this rather sweeping statement, the Chief Commissioner can only observe, that if such be the case, it is remarkable, that their various depredations have not been brought to notice. We have received no complaints against them from Bhawulpore and but one instance of any thing like a complaint from the Sind side can be recalled to mind. If this tribe have really committed such acts, it would be well that the whole of the details should be made known.

10. The Chief Commissioner does not believe that the Murrees have lately proved troublesome on the Mittenkote border; but it is not very long since a part of the 3rd Punjab Cavalry were cut up by them close to Asnee. In 1851, and again 1852, they were reported to have made an attempt on Rozhaun, about 30 miles from Asnee.

I have the honor to be, &c.,

(Signed) J. MACPHERSON, *Major*,
Military Secretary for the Secretary.

SILK EXPERIMENT

AT

LAHORE.

No. 2421. No. 839.

FROM

R. TEMPLE, ESQUIRE,
Secy. to the Chief Commissioner for the Punjab,

TO

G. F. EDMONSTONE, ESQUIRE,
Secretary to the Government of India,
Foreign Department,
FORT WILLIAM.

Dated Lahore, the 23rd September 1854.

GENERAL.

SIR,

I HAVE the honor to forward to you, to be laid before the Most Noble the Governor General in Council, the accompanying extract from the proceedings of a Meeting of the Agri-Horticultural Society of the Punjab, regarding the cultivation of flax and the rearing of silk-worms in the Punjab.

2. With regard to flax, the Committee, it will be observed, have solicited sanction, with the view of improving the cultivation of this important staple, to rent, on behalf of Government, 30 or 40 beegahs of land in the vicinity of their garden, for the cultivation of flax during the coming season, so as to admit of a comparison being drawn between the plant reared by the zemindars and that grown by the Society; and that they be also supplied with the seed which will be required for the purpose at the cost of Government.

3. The land is procurable at Rupees 20 per beegah per annum, inclusive of all charges on account of agricultural operations, and the Committee have, in anticipation of sanction, made arrangements for obtaining it. From the calculations entered into as shown in their proceedings, the Committee feel confident that the land will yield a profit to Government of nearly 2,000 Rupees.

4. Under the above circumstances, the Chief Commissioner desires me to request the favor of your obtaining the sanction of His Lordship in Council to the renting of 40 beegahs of land for the cultivation of flax on account of Government as proposed, and to the Committee being supplied with seed ($1\frac{1}{2}$ maund per beegah) at the public expense.

5. As regards the growth of silk, the Committee strongly recommend that the plan adopted for the cultivation of Tea in the Kangra Hills, be put in force with regard to silk, *viz.* that graduated rewards be offered by Government for the production, by the people themselves, during the year 1855, of silk-cocoons on the following scale, *viz.* :—Rupees 250, as a first Prize for the largest quantity of dried merchantable cocoons, exceeding 100 Company's seers, that may be produced in the Punjab. The Government to become the purchaser on behalf of the Society of the cocoons, at the rate of one Rupee per seer. Rupees 200, as a second Prize for the next largest quantity of cocoons not less than 75 seers, and Rupees 150, as a third Prize for any quantity not less than 50 seers. It is not proposed that the whole of the quantity for competition should necessarily be given in at one time, but that the entire quantity be delivered before the end of October 1855, and that all the good cocoons that may be offered, be purchased by Government at the above-named rate, whether those who rear them obtain prizes or not. The Society further propose, that the Governor General's Agent at Moorshedabad be allowed to expend Rupees 250 for the purchase of eggs; that the eggs be forwarded by letter dâk to Lahore free of charge to the Society.

6. For the year 1856, the Society propose that prizes in the following proportion be offered with the view of promoting the cultivation of the better kinds of mulberry;—A Prize of Rupees 500 for the largest piece of land not less than 100 beegahs devoted to the rearing of *Morus multicaulis*, of which the Society hope to be able to distribute some 3,00,000 cuttings. A Prize of Rupees 350 for the next largest piece of land similarly devoted, consisting of not less than 75 beegahs; and a Prize of Rupees 200 for the third largest piece of land devoted to the same mulberry of not less than 50 beegahs. The cultivation to be in one or at most two pieces, the plants to be 2 feet apart each way, with 4 feet walks, at from 16 to 18 feet from each other, and the whole in a healthy condition.

7. And lastly, the Society solicit permission to extend the plantation of the *Morus multicaulis*, by the immediate appropriation of some 100 beegahs of land in the neighbourhood of the Society's Garden, on the same plan as that suggested for the flax fields, and also, in order to secure a still greater variety of mulberry, they request that Major McGregor be authorized to send up daily, during the months of January

and February next, by letter dâk and free of expense to the Society, small bundles of cuttings of the mulberry that commonly affords food to the silk worms in Bengal.

8. All the above propositions with regard to silk, the Chief Commissioner also recommends to the favorable consideration of His Lordship in Council.

I have the honor to be, &c.,

(Signed) R. TEMPLE,
Secretary.

LAHORE,
The 23rd September 1854.

Extract from Report of the Proceedings of a Meeting of the Agri-Horticultural Society of the Punjab held on Tuesday, the 12th September 1854.

IT is further strongly recommended, as a new feature in the proposed measures for improving the condition of this important staple, that the Society be authorized to hire, on behalf of Government, from 30 to 40 beegahs of land, in the immediate vicinity of their garden, for the cultivation of flax, during the coming season, so as to admit of a comparison being drawn between the flax grown by the zemindars and the plant reared under probably more favorable circumstances. The seed required for each beegah, the purchase of which it is hoped the Government will also sanction, will be one maund and-a-half (at a cost of about Rupees 4); and land is obtainable at 20 Rupees per beegah, for which sum the cultivators undertake to perform all agricultural operations, such as ploughing, watering, weeding, sowing, and reaping *for one year;* a plan by which the grower can ascertain the expenses of his crop to a Rupee. It is strongly recommended to the Meeting, that, in confident anticipation of the sanction of the Authorities to this measure, which anticipation they venture to rest on the past liberality of Government, and the great importance of the subject, and also on account of the advanced state of the season, the Secretary be at once empowered to make arrangements for obtaining land.

The Committee have no doubt that the Government will suffer no loss by this transaction, and feel confident that it may yield a consider-

able profit after paying all expenses, as will be seen by the following calculation :—

Debtor.

To purchase of flax seed, for sowing 40 beegahs of land, 60 maunds, estimated at 2-8 per maund ...	Rs.	150	0	0
Cultivation of 40 beegahs of land, at 20	„	800	0	0
Preparation of fibre, making of tools, &c., estimated at	„	750	0	0
Freight of 10 tons of flax to England, @ 100 Rupees per ton.....	„	1,000	0	0
Total, Co.'s Rupees		2,700	0	0

Creditor.

By 200 maunds of linseed, 5 maunds per beegah, at 2-8 per maund	Co.'s Rs.	500	0	0
Ten (10) tons of flax, the average produce, being estimated at ½ a ton per acre, at £40 per ton, (the current rate in England being nearly double)	„	4,000	0	0
Produce of khurreef crop, at an average of 5 Rupees.....	„	200	0	0
Total, Co.'s Rupees		4,700	0	0

Leaving the very considerable probable balance of Rupees 2,000 to the credit of the Account.

The Committee feel assured that a wide circulation of these rules, and the sanction of Government to their new propositions, if approved of by the Meeting, will be attended with the most beneficial results; and they would suggest that, in whatever form, or to whatever effect they may be ultimately approved of, and adopted by the Society and the Authorities, a translation of them be made in simple Oordoo, and printed for general circulation through Commissioners and District Officers.

Resolved, unanimously, that the suggestions of the Committee be most cordially approved of, and that a copy of the same be forwarded, without delay, to the Chief Commissioner, with a respectful request that he will be pleased to cause the authorized portions, to be circulated at

once, and to submit the portions not yet authorized, to the Supreme Government, should he deem it necessary.

SILK.—In conformity with the directions of the August Meeting of the Society, the following paper has been drawn up, and is submitted for present consideration.

It is now established, beyond a doubt, that the silk-worm can be reared through all the vicissitudes of a Punjab season. The common mulberry on which the worm can be fed, is abundant in this part of the Punjab. The finer mulberries such as *Morus multicaulis* and *Morus chinensis* are cultivable here, and have thriven remarkably well in the garden. The Governor General in Council has, with much liberality, placed an efficient establishment, brought up from Bengal, at a considerable expense, for the winding and reeling of silk at the disposal of the Agri-Horticultural Society of the Punjab. The establishment have commenced working and have produced silk from the cocoons reared by the Society, pronounced by competent persons, in the local markets, far superior to the silk imported from Bokhara and Khorasan, and for which, in token of their sincerity, they offer a higher price for any quantity that may be produced. The opinion elicited from the Bengal Chamber of Commerce, is also of the most favorable description and should bring encouragement to further exertions. A small portion of the raw silk has even been converted by Lahore weavers into dereaee of a quality superior to the ordinary silk manufactured here, and every thing augurs well, if the experiment be pursued with zeal and vigor, for the permanent introduction into a country where new products are so much required of a new and profitable staple. With reference to the favorable comparison now drawn between the Bokhara, the Society's, and Bengal silk, and to a statement (put forth in the account of the silk manufactures of this country, which may be said to have originated the silk experiments of the Punjab) that Bokhara silk was considered much superior to Bengal silk by the Lahore weavers and dealers, it may be as well to state in reconciliation of the apparent discrepancy, that the Western has been preferred to the Eastern silk, because it is much stouter; but that to make the Bokhara silk fit for the loom, it is necessary to re-wind it at an expense of one Rupee per seer, during which re-winding, a loss of from 3 to 5 tolahs of refuse is incurred,

the silk wound here after the Bengal fashion, is turned out of any thickness that may be required to suit it to the local market, and by reeling, is produced so clean and even, that it does not require to be re-wound, a fact which naturally and considerably increases its value in the eyes of the local purchaser.

The Society propose, therefore, and beg most respectfully and most earnestly, to recommend for the consideration of the Local, and submission to the Supreme Government, that the following measures be adopted for the further advancement of a scheme, fraught with advantages to a population who have hitherto devoted themselves too exclusively to the cultivation of cereal productions, and who are quite ready to adopt new articles of culture, if they can be shown to be profitable.

It should be borne in mind, that within the next two or three years, (during which the people may reasonably look forward to the completion of at least some portion of the magnificent Canal Works, now carrying on in the Baree Doab under the auspices of a munificent Government,) an immense tract of land will be brought within the reach of cultivation by the fertilizing waters of the canal, but that the further increase of cereal productions, which may be the consequence for want of other and more profitable objects being brought to the attention of the agriculturist, will be a positive evil to the cultivator, as no proportionate increase of consumption can be looked for for many years to come. On this anticipation alone, the Society might, with confidence, rely for urging the absolute necessity that exists for stretching every nerve to introduce new and profitable products, the rearing and exportation of which must be attended with beneficial results to the cultivator, to the consumer, and to the Government.

It is now recommended, therefore, that the Government should offer, on the excellent plan suggested by the Chief Commissioner for the cultivation of tea, in the Kangra Hills, as recorded in the Selections from the Punjab Correspondence, graduated rewards for the production, by the people themselves, of silk-cocoons on the following scale :—Rupees 250, as a first Prize, for the largest quantity of dried merchantable cocoons, exceeding 100 Company's seers, of eighty tolahs, that may be produced in the Punjab ; the Government to become the purchaser on behalf of the Society of the cocoons at the rate of one Rupee per seer. Rupees 200, as a second Prize, for the next largest quantity of cocoons not

less than 75 seers, and Rupees 180 as a third Prize for any quantity not less than 50 seers.

It is not necessary that the whole of the quantity for competition be given in at one time, but it is to be understood that the entire quantity of silk cocoons must be delivered by the growers, who are desirous to compete for prizes in Lahore, before the end of October 1855. The Government to purchase all the good cocoons that may be offered at the rate of one Rupee per seer, whether those who reared them obtain prizes or not, provided the cocoons are properly dry, of the current year's rearing, and of merchantable quality. It is recommended further, that Major McGregor, the Agent to the Most Noble the Governor General at Moorshedabad, to whom the Society are already so materially indebted in every respect in aiding them in their endeavours to introduce silk into the Punjab, be authorized to expend at the proper season, that is, about the middle or end of February 1855, the sum of Company's Rupees 250 for the purchase of eggs at Moorshedabad, and that he be requested to forward them to Lahore in the same manner, as that already so successfully adopted by him on two previous occasions, that is, by letter dâk, and free of charge to the Society, the great majority of these eggs being intended for distribution among the local applicants whose number is already considerable.

The Society would recommend the above prizes for the year 1855, during which the silk-worms can be fed on the common mulberry, which, in the opinion of Mr. DeVerinne, the Superintendent of the Silk-winding Establishment, is almost equal to the Bengal mulberry, and which abounds throughout the upper portion of the Punjab.

For the year 1856, they would strongly recommend that prizes, in the following proportion be offered, with the view of promoting the cultivation of the better kind of mulberry.

1*st*.—A Prize of Rupees 500 for the largest piece of land, not less than 100 beegahs, devoted to the rearing of *Morus multicaulis*, of which the Society will, in February 1856, should no unforseen accident occur, be in a condition, even under present circumstances, to distribute some 3,00,000 cuttings more than enough to plant 300 acres. (With the *Morus chinensis* their operations must be limited for the present, as the quantity now under cultivation will not yield more than 4,000 to 5,000 cuttings in February 1855.)

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2*nd.*—A Prize of 350 Rupees, for the next largest piece of land, similarly devoted, consisting of not less than 75 beegahs, and

3*rd.*—A Prize of 200 Rupees, for the third largest piece of land, devoted to the same mulberry, of not less than 50 beegahs. The cultivation to be in one or at most two pieces, the plants to be 2 feet apart each way, with 4 feet walks, at from 16 to 18 feet from each other, and the whole in a healthy condition, the land to be measured, and the condition of the crop to be reported on, on or about the 1st of October 1856.

In the mean time, it is most strongly recommended, that the Government be solicited to permit the extension of the plantations of the *Morus multicaulis*, by the immediate appropriation of some 90 or 100 beegahs of land in the neighbourhood of the Society's Garden, to this particular cultivation on the same plan as that suggested for the flax-fields, by which plan the Society would, at the end of 1855, be in a position to distribute any quantity of mulberry cuttings for which indents might be received. The land in the vicinity of the Society's Garden is very favorable to the growth of *Morus multicaulis*. In order to secure a still greater supply of mulberry, it is further requested that Major McGregor be authorized to send up daily during the month of January and February 1855, by letter dâk, and free of expense to the Society (by any other conveyance they would undoubtedly perish by the way), small bundles of cuttings of the mulberry that commonly affords food to the silk-worm in Bengal, with the view of ascertaining which of the three mulberry trees is the most likely to succeed, with advantage in these Provinces.

The Society would seize the present as an appropriate opportunity of expressing their sense of the readiness and zeal with which Dr. Jameson has aided them in their pursuits, as to him they are indebted for the plantations of the *Morus multicaulis* that are now flourishing so vigorously in the garden. His further assistance in supplying cuttings of *Morus multicaulis* and *Morus chinensis*, is confidently reckoned on, during the ensuing season.

In conclusion, the Society would beg to be permitted to lay particular stress on the cultivation of silk in this country, for the additional reasons that, as a valuable article of export, the rate of carriage hence to Calcutta, or freight to Bombay, would be very light, not two Annas a seer, at the present rates of Bullock Train hire, so that it might be exported without being subject to the disadvantages under which more

bulky, and less valuable articles must labor; and *secondly*, that its cultivation, especially the rearing of the silk-worms and winding of the silk, is peculiarly suited to a growing portion of a population of the Punjab, *viz.* the emigrants from Cashmere.

It might be noted, finally, that the Society's endeavours to introduce the silk-worm into the Punjab have been already noticed in terms of approbation by the public prints of England, when it continues still to be asserted, as it has been for many years, that the demand for silk exceeds the supply.

Resolved, that the above paper be unanimously adopted as a proposition of the Meeting, and that a copy be forwarded, with as little delay as possible, to the Chief Commissioner, with a respectful request that he will be pleased to support the proposition, if he should deem it necessary to forward the same for the sanction of the Supreme Government.

The Meeting then adjourned to Tuesday, the 10th October 1854.

(True extract.)

(Signed) HENRY COPE,
Secretary.

No. 4481 OF 1854.

FROM G. F. EDMONSTONE, ESQUIRE,
Secretary to the Government of India,

To J. LAWRENCE, ESQUIRE,
Chief Commissioner, Punjab.

Dated Fort William, the 13th October 1854.

FOREIGN DEPARTMENT.

SIR,

I HAVE the honor to acknowledge the receipt of your Secretary's letter dated the 23rd ultimo, No. 839, giving cover to extracts from the proceedings of a Meeting of the Agri-Horticultural Society of the Punjab, and conveying your recommendation that certain proposals therein made in respect to the cultivation of flax and the rearing of silk-worms in the Punjab, may be submitted for the favorable consideration of the Most Noble the Governor General in Council.

2.—In reply I have the honor to communicate the sanction of His Lordship in Council to all the proposals in question, with the exception of that contained in the former clause of the 7th paragraph of Mr. Temple's letter, *viz.* the proposal of the Agri-Horticultural Society of the Punjab to take up about 100 beegahs of land adjacent to their garden for the cultivation of the mulberry. The probable cost of this undertaking is not stated, but it may be assumed that the land, which would be so occupied, being in the immediate vicinity of the city, must be very valuable, and that the rent demanded will, in consequence, be exceedingly high; this, added to the charges of cultivation, would probably render the experiment by no means an inexpensive one; and certainly a much more expensive one than it would be, were it tried elsewhere than in immediate proximity to a large and populous city. As at present advised, therefore, the Governor General in Council is not prepared to give his sanction to this part of the Society's scheme, but he will not decline to re-consider it in a complete form, should you desire to press it.

I have the honor to be, &c.,
(Signed) G. F. EDMONSTONE,
Secretary to the Government of India.

FORT WILLIAM,
The 13th October 1854.

No. 213.—No. 95.

FROM

R. TEMPLE, ESQUIRE,
Secy. to the Chief Commr. for the Punjab,

TO

G. F. EDMONSTONE, ESQUIRE,
Secy. to the Government of India,
Foreign Department.

Dated Lahore, the 30th January 1855.

GENERAL DEPARTMENT.

SIR,

IN reference to your letter, No. 4481, of the 13th October last, communicating sanction to certain proposals of the Agri-Horticultural Society, with the exception of the scheme for taking up 100 beegahs of land for plantations of the *Morus multicaulis*, I am directed to reply further as follows:—

2. After weighing the objections stated in your letter, and considering the Society's arguments, the Chief Commissioner became convinced that it would not be expedient to urge the proposal from which sanction had been withheld. He believed that the proposition would involve a permanent occupation of the land, which might prove embarrassing to the Government and distasteful to the proprietors. It was evident that the Society were adopting a costly mode of founding a plantation, by renting irrigated land near the city, and that the purpose in view might be served by planting some of the Society's own available ground, or by reclaiming waste land. Furthermore, there was reason to suppose that the sanction of this proposal might result in the silk operations being enlarged beyond the dimensions probably contemplated by Government. The Chief Commissioner, therefore, explained his objections to the Society, and they have accordingly consented to forego this portion of their proposals; and will make other arrangements for the supply of food for the silk-worms.

3. The Chief Commissioner also took the opportunity of ascertaining the amount hitherto expended on the silk operations, and also the amount which would be required in future. I am now instructed to append a detailed Statement of the past and probable expenditure. The abstract result of the Statement is as follows:—

Expended in 1853 and 1854,	Rupees	5,279	0	0
For 1855	„	5,628	0	0
For 1856	„	5,960	0	0
Total,	Rupees ...	16,867	0	0

It will be seen, therefore, that the sanction of Government must be solicited to an expenditure of about Rupees 17,000. There will, however, be returns to set down against this, for already the Society have succeeded in demonstrating the possibility of producing good marketable silk at Lahore. The ultimate value of such returns it were perhaps futile to estimate; the Society are sanguine that the outlay will be covered: but the Chief Commissioner cannot venture to expect that such will be the case.

4. But the Chief Commissioner believes that, in order to give a fair scope to the experiment, it will be desirable to extend the operations over two more years, and to incur the expenditure above suggested. Already a skilled and practical European Superintendent has been secured, and some silk-winders from Bengal have been employed, and furnaces and other apparatus constructed; there is a good stock of seed in store, and further quantities have been obtained from Cashmere and Bengal. It will be expedient to employ more winders in order to give the Superintendent full occupation and to initiate Punjabees into the art. With the same view also, the apparatus will need enlargement. The details of the expenditure under each head can be seen from the appended Statement.

5. On the supposition, then, that the object is not to establish a large Silk Factory as a Government Concern, but to make an experiment on a moderate scale, to test the practicability of producing indigenous silk, and, in the event of success, to induce Natives of the Punjab to engage in the production, the Chief Commissioner would recommend that the Society be permitted to carry on their silk operations for two more years (*i. e.* to close of 1856) at a cost not exceeding Rupees 17,000. But it may be proper, perhaps, to render the above limits quite absolute; and to explain to the Society, that they are on no account to be exceeded. Before the expiry of the above period, it will be clearly seen whether Punjabees, generally, will undertake the rearing of worms and the preparation of silk. If they do, then an important product will have been introduced at a cost not excessive. If they do not, still the amount expended will at least show that no reasonable effort has been spared for this object.

I have the honor to be, &c.,
(Signed) R. TEMPLE,
Secretary.

LAHORE,
The 30th January 1855.

No. 871 OF 1855.

FROM
C. BEADON, ESQUIRE,
Offg. Secretary to the Government of India.

To
J. LAWRENCE, ESQUIRE,
Chief Commissioner of the Punjab.
Dated Fort William, the 27th February 1855.

FOREIGN DEPARTMENT.

SIR,

I HAVE the honor to acknowledge the receipt of your Secretary's letter dated 30th ultimo, No. 95. stating, with reference to the rearing of silk-worms in the Punjab, that in order to give the experiment a fair trial, it should be carried on for two years more at an expense of Rupees 11,588 in addition to the sum previously sanctioned.

2. In reply I am directed to convey the Hon'ble the President in Council's sanction to the additional outlay, as recommended by you, upon the distinct understanding that no further assistance will be given by the Government. His Honor in Council expects that a considerable portion of the outlay will be recovered by the sale of produce.

I have the honor to be, &c.
(Signed) C. BEADON,
Offg. Secy. to the Govt. of India.

FORT WILLIAM,
The 27th February 1855.

No. 1524.—No. 502.

FROM
R. TEMPLE, ESQUIRE,
Secy. to the Chief Commr., Punjab,

To
G. F. EDMONSTONE, ESQUIRE,
Secy. to the Govt. of India, Foreign Department,
FORT WILLIAM.
Dated Lahore, 16th July 1856.

GENERAL DEPARTMENT.

SIR,

IN reference to your letter, No. 871, of the 27th February 1855, sanctioning a total expenditure of Rupees 17,000 for silk experiments at Lahore, under supervision of Agri-Horticultural Society of the

Punjab, to extend up to close of 1856, I am now directed to submit a final Report on the subject, as follows :—

2. At the commencement of 1855, it was (*vide* my letter, No. 95 of 30th January) reported that Rupees 5,279 had been already expended, and a further expenditure of Rupees 11,721 was sanctioned for 1855 and 1856. At that time, the Agri-Horticultural Society were sanguine that the outlay would be at least nearly covered by proceeds. But the Chief Commissioner, while recommending the experiment and expenditure, did not venture to hope that the Society's expectations would be realized.

3. During the season of 1855, the experiment was vigorously carried on. There was as Superintendent, a gentleman of much practical skill, and a staff of eleven silk-winders from Bengal. The worms were also for the most part of the Bengal species,—at first the generation of the worms was very successful. The insects came forth in surprising abundance: they throve on the mulberry leaves that were given them, and at first began to spin excellent cocoons; every thing prospered until the weather became hot and the atmosphere dry. But as the Spring advanced towards Summer, the food became deteriorated by the shrivelling up of the leaves, the worms grew sickly, and the cocoons fell off. The early promise was fair, but the ultimate result was almost *nil*. Some 94 lbs. of silk were produced valued at Rupees 500, where some 800 lbs. had been expected valued at Rupees 6,000; and there only remained these scanty proceeds to set down against an expenditure of Rupees 12,000. After this season, the European Superintendent abandoned the undertaking, but the silk-winders remained.

4. Perceiving this state of things, the Chief Commissioner, at the commencement of 1856, directed the Council of the Society to deliberate on the further continuance of the experiment. Copies of the Minutes recorded by those Officers are appended as showing the opinions entertained. It was then decided to continue the experiment during the season of 1856 by means of *Cashmere silk-worms*, as there appeared a hope that perhaps this species would prove more hardy than the Bengal species which had failed during 1852.

5. But from the two reports of the Society herewith appended, it will be seen that the same fate befel the Cashmere worms as the Bengal worms. The Cashmere worms also flourished at first, but as soon as the season became inclement, they began to wither. Their cocoons ultimately

produced no more silk than the meagre quantity which was produced the year previous. And the Society pronounce the Lahore Silk experiment to have failed *in toto*. The Establishments have now been discharged and the concern wound up.

6. From the abstract Account annexed, it will be seen that Rupees 10,569-9-8 have been expended in all, or Rupees 6,430-6-4 less than the sum sanctioned. But the value of the silk produced is only Rupees 1,100 instead of the Rupees 19,000, as originally hoped for by the Society. The result has not been fortunate; but the Government liberally supported the experiment for three consecutive years and the Society did its utmost in the way of supervision; as regards skilled agency all reasonable advantage was enjoyed, excellent shelter for the worms was provided, and two species of worms were tried.

7. The conclusion, therefore, I am to state, appears to be that the climate in this part of the Punjab is inimical to the production of raw silk. For this purpose an equable temperature and a tolerably moist atmosphere are required. But in the Spring, which is the season for silk-spinning, the weather is at first comparatively mild. So long as that lasts the worms thrive on rich green fodder and spin fair cocoons, but in about the middle of April the weather rapidly changes for the worse and the worms are ruined. In the Northern parts of the Punjab (Hooshiarpore, Kangra, Noorpore, Deenanuggur, Nurot, Bijwat, Rawulpindee, Huzara) which are submontane, that is, within the influence of the Himalayas, different climatic conditions exist. There the atmosphere may retain its humidity and coolness longer than in the Southern Districts, and there the protection of silk in quantities may be possible. Private experiments have been conducted occasionally in some of these places with a certain measure of success. But there are neither the means nor the Agency for such experiments on the part of Government available in those quarters. In the *Central* Districts of the Punjab, a few pounds of marketable raw silk might be produced as samples, but no considerable quantities can be raised.

I have the honor to be, &c.,

(Signed) R. TEMPLE,
Secy. to the Chief Commr., Punjab.

LAHORE,
The 16th July 1856.

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Minute by D. F. McLeod, Esquire, C. S., Financial Commissioner, and Member of the Council of the Agri-Horticultural Society, dated 12th February 1856.

As we are required separately to record our opinions upon the result of the past experiments, with a view to determining whether they should be continued or not, I beg to state mine as follows, with reference to the Secretary's very clear statement laid before the Meeting of to-day and the discussion then held.

It is clearly proved, and fully admitted, that the experiment *quoad* the Bengal silk-worm, has been a failure, and I am of opinion that in submitting to the Chief Commissioner an explanation of our views, we should estimate with such proximate correctness as may be attainable, the amount of past expenditure fairly chargeable to the trial of the Bengal worm, and point out that as regards the Cashmere worm to which the discussion is now reduced, this amount may, in our opinion, be struck out of the Account.

But admitting this failure, I would by no means admit that the fact throws any discredit on the experiment, or detracts from the value of our past operations. The great objects on such experiments is to clear away all uncertainty, to elicit facts of importance, and plan matters on a distinct and reliable basis for the future, and viewed in this light, I consider our past operations to have been eminently valuable.

It has been clearly established that the Bengal worm entirely differs from that of Cashmere, and the colder regions beyond; that the former is wholly unsuited to these localities, and that the latter is identical with the most approved silk-worm of the South of Europe, a fact, which, although heretofore noticed, will now be brought more prominently and in a more popular form, to the knowledge of persons interested in the manufacture of silk. The habits and peculiarities of each variety have been closely watched and clearly ascertained; a knowledge of the more approved modes of winding has, at the same time, been introduced into the Punjab; the difference between the requirements and tastes in this matter of the Native and European consumer, has been ascertained as well as its causes. Improved varieties of mulberry have been introduced with every prospect of the present season, clearly establishing the relative value of each and of the indigenous mulberry, as respects the Cashmere insect, with which alone we have now to do; and in short, data have been

supplied to a great extent, with every prospect of their being shortly rendered complete, for establishing clearly both the wants and the capabilities of Lahore, as respects the rearing of silk.

While however much has been thus effected, and as respects the Bengal worm, the experiment may be regarded as conclusive; this is not the case as regards that of Cashmere. The importance of the latter, and indeed, the fact of its being a distinct insect, having been in the first instance unknown, the main efforts of this Society have been hitherto directed to the Bengal worm, and hence the Cashmere insect has had but a very partial and imperfect trial It is, I think, of paramount importance, that the question whether this insect can, or cannot, be profitably reared at Lahore, be set definitively at rest, and on this account alone, if no other reason could be adduced, I should think it highly expedient that the experiment should be continued for a time longer, more especially as we are now well on in February, and by May or June at furthest, it may be expected that the results of the present season's operations will have been clearly established, while the additional outlay required until then, will be but very small as compared with that already incurred.

In addition to this argument, however, it seems from our Secretary's showing, that there are several encouraging facts which afford a reasonable hope that the experiment, as regards the Cashmere insect, may prove successful, or that it may be shown to be capable of being profitably reared at Lahore.

1*st.*—It is found that all the operations of the season can be closed by the end of April, and last but for two or three months in all; that the expense to be incurred may thus, to a great measure, be concentrated into a brief period and thereby probably rendered inconsiderable, while the heat by the time indicated, has not become such as to be productive of any sensible injury to the worms, or their silk-producing qualities.

2*nd.*—The silk produced from this worm in its present state, and as at present reared and fed, is greatly preferred by the Native consumer to the Bengal or other kinds, being much stouter and stronger, though it is not so well adapted for the European market, in consequence of so few fibres being required for a single strand (or whatever the proportion may be.)

3*rd*.—That the insect thrives admirably on the indigenous mulberry, which is believed to be the very one on which it is fed in Cashmere, so that our available means for supplying food may be considered unlimited as respects the supply of silk for the Native consumer, while as regards the European market, it may be reasonably expected that the use of fine varieties of mulberry leaf will effect an improvement in the quality of the silk, more especially in connexion with the very encouraging fact, that this variety of insect is identical with that most approved in the South of Europe.

4*th*.—The insect is much more hardy and requires less care than that of Bengal, while baskets and other receptacles are necessary for the latter, into which they are transferred for spinning ; the former spin within the branches of the mulberry stalks supplied to them for food, or in the thatch of the building in which they are kept, or in short wherever they can find a quiet nook in which to deposit their cocoon.

5*th*.—Their yield is very much larger than that of the Bengal worm, a seer of silk being yielded, on an average, from 5,000 cocoons of the Cashmere worm, while 19,000 of the Bengal worm are required for the same quantity, and although this cannot absolutely be set down as a proof of the former being more economical or profitable, until it is shown more clearly than has hitherto been done, what is the relative cost of feeding and rearing a given number of cocoons of either variety, yet the fact appears encouraging.

6*th*.—It is also an encouraging fact, that the worms which are now being hatched from the eggs produced by our own moths last year, are apparently as vigorous, and in every way as promising, as those from eggs newly imported from Cashmere, thus indicating, so far as we can at present judge, that there is no progressive deterioration.

For the reasons above detailed, I am very clearly of opinion that the experiment should be persevered in, at all events until we are enabled to report the results of the present season's operations ; and I would further add, that if these should indicate that there is no reasonable prospect of silk-rearing being rendered profitable at Lahore itself, I would still advocate most strongly, the continuance of the experiment at all events for another season, so modified in its arrangements as to enable us to judge whether other localities in the Punjab, especially those skirting the hills, are calculated to yield a different result.

As I have been asked by the Council to place my opinion first on record, I have done so in full detail, and would now request, that the Secretary will kindly note in the margin of this any errors which I may have made, or any remarks which he thinks may be useful, and then circulate it to the other Members for their separate Minutes.

(Signed) D. F. McLEOD.

Mr. McLeod has entered so fully into the subject, and with such aclear conception of it, that I have no remarks to make, and I see no errors to correct.

(Signed) H. COPE.

Mr. McLeod adds in a P. S.—

In the foregoing I have refrained from any remarks regarding the expenditure, past or future, reserving those until submission of the complete Accounts, which the Secretary has promised to render by Saturday, and I would suggest, that when submitting those, he kindly furnish us with a Memorandum, to show what further outlay will be required to carry us on to the close of the present season's operations.

I would further suggest, that if a paper were drawn up, exhibiting clearly all the observed differences between the habits, peculiarities, and productive powers of the Cashmere and the Bengal worms, as a separate document, this would add to the value of the experiment, be highly interesting to the public generally, and naturalists in particular, and would be a very suitable and acceptable addition to the records of our transactions.

(Signed) D. F. McLEOD.

Minute by Major J. M. Drake, Deputy Judge Advocate General, and Member of the Council of the Agri-Horticultural Society, dated 12th February 1856.

It appears that the Bengal worm is a failure. That the Cashmere worm has not had a full trial. The Cashmere worms are now coming out. I think that the experiment should be continued till the worms have done spinning, and that from the out-turn a judgment must be formed whether it will be desirable to continue the experiment or not.

(Signed) J. M. DRAKE.

Minute by Major Burnett, Horse Artillery, Member of the Council of the Agri-Horticultural Society, dated 18th February 1856.

THOUGH I have little hope of the Silk experiment succeeding at Lahore, I am nevertheless induced to recommend that it be continued to the end of April, as at that time it will be known what the real state of the experiment is without incurring any considerable expense, as the worms will have by that time done their work for the season 1856.

(Signed) F. C. BURNETT.

Memorandum, dated Lahore, 28th February 1856.

AS it is directed that each Member of the Council should express his opinion, I would refer to the Memorandum drawn up by me at the Meeting of the 4th February, which contains all the points which occur to me for consideration. I think that the Bengal worm has proved a failure. The other Members wish to give the Cashmere worm a further trial, I have no particular objection to this; but I have little hope that the Cashmere worm will fare much better than that of Bengal.

There were two questions to be practically solved by the experiment.

1*st.*—Can silk be produced at Lahore?

2*nd.*—Can Natives of the Punjab, seeing the Lahore experiments, be induced to undertake the production?

To the first question I would answer Yes, but at much cost and with much difficulty. To the second question I would answer No—not in this vicinity, though, *perhaps*, in the submontane districts of the Punjab.

(Signed) R. TEMPLE, *Member*.

No. 51.

FROM

MAJOR BURNETT,

Secretary to the Agri-Horticultural Society,

To

R. TEMPLE, ESQUIRE,

Secretary to the Chief Commissioner, Punjab.

Dated Lahore, 16th May 1856.

SIR,

IN anticipation of my General Report on the Silk Operations carried on by the Society for the year 1856, which shall be submitted

at the conclusion of the season, *i. e.*, about the end of this month, I have the honor to bring to the notice of the Chief Commissioner, with a view to save Government any further unnecessary expenditure, that the Society has come to the conclusion, after a fair trial, that the rearing of silk-worms at Lahore, as a profitable speculation, has proved a decided failure.

The Society is nevertheless of opinion, that silk may be produced profitably in the lower hills, about Kangra and Noorpoor, and it would recommend that an experiment be carried on during the next season, on a small scale, under the Deputy Commissioner. Should the Chief Commissioner sanction a further experiment, it would be desirable to retain some of the Bengalee silk-winders, as the Punjabee boys, who are learning, are not yet sufficiently expert to be depended on.

The whole of the Feeding Establishment has been discharged, and in ten days the Winding Establishment will have completed this work.

I have, &c.,

(Signed) F. C. BURNETT,

Secretary, Agri-Horticultural Society.

No. 52.

FROM

MAJOR BURNETT,

Secretary to the Agri-Horticultural Society,

Punjab,

To

R. TEMPLE, ESQUIRE,

Secretary to the Chief Commissioner,

Punjab.

Dated Lahore, 31st May 1856.

SIR,

IN obedience to the orders of the Chief Commissioner, conveyed in your letter, No. 1146, of the 23rd instant, I have now the honor to forward a general Report of the whole of the silk experiment, showing the expenditure and returns, together with the causes of its failure, which has been approved of by the Council of the Society.

I have also to report, that the whole of the Silk Establishment has been paid up to the end of this month and discharged in compliance with the Chief Commissioner's desire, but I would request to be informed whether

the Bengalee winders are to receive any further sum of money to enable them to return to their houses in Bengal.

I have the honor to be, &c.,
(Signed) F. C. BURNETT,
Secy. to the Agri-Horticultural Society.

LAHORE,
The 31st May 1856.

THE silk operations for the year 1856, having been concluded, the Secretary submits the following statement, showing all that has been done and expended since the 31st of May 1855, the date on which last year's operations were concluded.

1. The silk experiment was sanctioned by Government in the beginning of 1855 till the end of 1856, at a cost not to exceed Rupees 18,000, and it was hoped, that although there was only a return of about 94lbs. of silk, valued at Rupees 500, with an outlay of about Rupees 12,000 the first year, this year would fully pay its own expenses. The late Secretary, in his Report of the 8th February last, estimates the out-turn for this year at 950 seers; it will be shown whether such has been the case or not.

2. Twenty (20) seers of eggs were collected by a Cashmeree servant of the Society in Cashmere, at a cost of Rupees 5 per seer, and 7 seers were forwarded by His Highness Maharajah Golab Singh, for which nothing has yet been charged. The value of Rupees 25 for Bengal eggs was also received from Colonel McGregor from Moorshedabad. The Cashmere eggs commenced hatching about the middle of February, and continued doing so until the middle of March; it was then found that of the 27 seers of Cashmere eggs 5 seers were bad, and 2 seers were sand.

For the first three weeks after hatching, nothing could be more promising than the appearance of the worms. At the commencement they were fed on the leaves of the *Morus multicaulis* and *Chinensis* from the plantations in the Society's Gardens, the common mulberry of the country not having come into leaf for a fortnight later; the number of worms daily increasing, until the beginning of April, when their daily supply reached 80 to 100 maunds of leaves, they were consequently very indifferently fed, and then only twice a day; and from the want of rain and the drying winds

which prevailed, notwithstanding every precaution was taken to keep the houses moist and cool, the leaves arrived in a dried shrivelled-up state, the worms began to fall off and to spin very poor unhealthy cocoons much before the proper time. The earlier cocoons were shown at a Meeting of the Society, held on the 8th of April, and were remarkably fine, indeed quite equal to some samples of Hatian cocoons which were exhibited with them. At that time 950 cocoons went to a seer, but latterly when they fell off it took upwards of 3,000 very indifferent cocoons to weigh a seer. Ten maunds of cocoons have been produced which has yielded 79¾ lbs. of clean silk. About 40 lbs. of cocoons have been disposed of in supplying eggs for next year, of which there are available, for distribution, about ¾ seer. The Bengal worms have, as last year, proved a total failure, the cocoons produced by them being not worth the trouble of winding. Thus it will be seen, that the experiment of rearing silk-worms at Lahore, as a profitable speculation, has been fully tried under every advantage and on a most liberal scale and has proved a decided failure. The months of March and April are too dry in the vicinity of Lahore, and the country mulberry is too late of producing leaves necessary for the food of those worms that are early hatched. There is also great difficulty and expense attending the gathering of the leaves from high trees, and, having to bring them from a distance, they arrive in a dried state so as to be quite unfit for food for even the strongest worms.

It must also be taken into consideration, that in this year's experiment we have had the advantage of the whole ranges of barracks in the Musjid Square, for the protection of the worms from the heat and dust-storms; nothing could exceed Mr. Appleby's care and attention in looking after them and seeing they were well provided with fresh food. Mr. Appleby is of opinion, that the speculation will never pay at Lahore.

Expenses connected with the Silk-experiment for the year 1856.

Salary of silk-winders from the end of May 1855 to end of May 1856	Rs.	1,536	0 0
Mr. DeVerinne's salary from 31st May 1855 to end of November 1855, drawn by the late Secretary, but not paid to Mr. DeVerinne		750	0 0
Mr. Appleby's allowance at 25 for 12 months ...		300	0 0
Twenty (20) seers of Cashmere eggs @ 5 per seer ...		100	0 0
Bengal eggs		25	0 0
Carried-forward ...		2,711	0 0

Brought-forward ...	2,711	0	0
Feeding Establishment from the end of last year up to their discharge this year	1,175	11	0
Contingent Charges, Carpenters, Grammies, Chokeedars, Bheesties, String, &c....	267	2	0
Wood for making stands for silk-worms	136	0	0
Totties must be added; the estimated value of the land in the Society's Garden, taken up with mulberry plantations, say	350	0	0
Company's Rupees ...	4,639	13	0

(Signed) F. C. BURNETT,
Secy. to the Agri-Horticultural Society, Punjab.

MEMORANDUM.

Expenditure from the commencement of Experiment (as per Mr. Harding's Account) to the 31st May 1855.

Establishments	4,157	15	9
Contingencies	1,717	1	11
Total ...	5,875	1	8
Add expenditure as per Major Burnett's Account from 1st June 1855 to 31st May 1856	4,639	13	0
Add due for 7 seers of eggs procured from Cashmere, through Maharajah Golab Singh	41	11	0
Silk-winders' travelling expenses back to Moorshedabad	13	0	0
	10,569	9	8
Amount sanctioned by Government for the experiment to the close of 1856, *vide* No. 871, dated 27th February 1855	17,000	0	0
Amount expended below the sanction Rs. ...	6,430	6	4

(True copies.)
(Signed) R. TEMPLE,
Secy. to the Chief Commissioner, Punjab.
