

Table referred to by Mr. Taylor.

Experiments made in smelting the iron ores of Sheargur, with Charcoal and Coke, in the cold season of 1837 or 38.

Ore.	Charcoal.	Coke.	Iron.	Per Cent.
29 Maunds....	36 Maunds.	.....	8 mds. 20srs.	42 pr. ct.
29 ... ,,	32 ... ,, .....	.....	10 ,, 20 ,,	36 $\frac{1}{5}$,,
26 ... ,,	25 ... ,, .....	.....	8 ,, 20 ,,	32 $\frac{2}{3}$,,
19 mds. 20s ^{rs}..	.....	18 mds. 20s ^{rs} ..	3 ,, 25 ,,	18 $\frac{1}{2}$,,
28 maunds. ...	.....	17 ,, 20 ,,	7 ,, 8 ,,	25 $\frac{1}{2}$,,
27 maunds. ...	.....	14 ,, 0 ,,	9 ,, 23 ,,	35 $\frac{1}{2}$,,

In some of these experiments, a mixture of red gravel ore, highly obedient to the magnet was used, and likewise Kunkur or Nodular lime-stone, but I have not preserved any memorandum of the proportion of either, or in which experiment they were used.

~~~~~

*Notes on Eastern Thibet.—By Dr. A. CAMPBELL, Superintendent of Darjeeling, (with Sketch Map of Route to Lassa).*

This opportunity is taken of publishing a sketch map protracted some time ago by Major Crommelin, it will enable the reader to understand readily the position of the principal places mentioned in Dr. Campbell's Notes.—ED.

Having lived many years in the Eastern portion of the Himalaya, viz. in Nepal and Sikim, and visited the Bootan Dooars or Lowlands annually for eight years, I have had many opportunities of becoming acquainted with the natives of Thibet, who visit these countries and the plains of India to trade, and on religious pilgrimages—I have also travelled over the whole of Sikim, and penetrated a short way into Thibet in that direction.\* It is from these people, and on those excursions that the substance of the following Notes has been collected by a good deal of laborious questioning, and in the course of official business. I am familiar with the writings of Turner, Huc, and others on Thibet, I have not used them, however, to correct these Notes, nor do I wish to substitute my own information for any portion of these published accounts. My only aim is to add a little to the scanty knowledge we now have of Eastern Thibet; and I shall be glad if I have not quite failed in my purpose.

\* With Dr. Hooker in 1849.

Thibet is reckoned by Gutzlaff in his 'Life of the Emperor Taou Kwang,' page 227, to comprise an area of 30,200 square miles; and to have a population of about six millions. Thibet, as thus indicated in the enumeration of the dependencies of China, embraces, I believe, Little Thibet or Balti, the capital of which is Iskardo; Western Thibet the principal town in which is Leh, and Thibet Proper or Eastern Thibet, having Lassa as its capital and chief city.

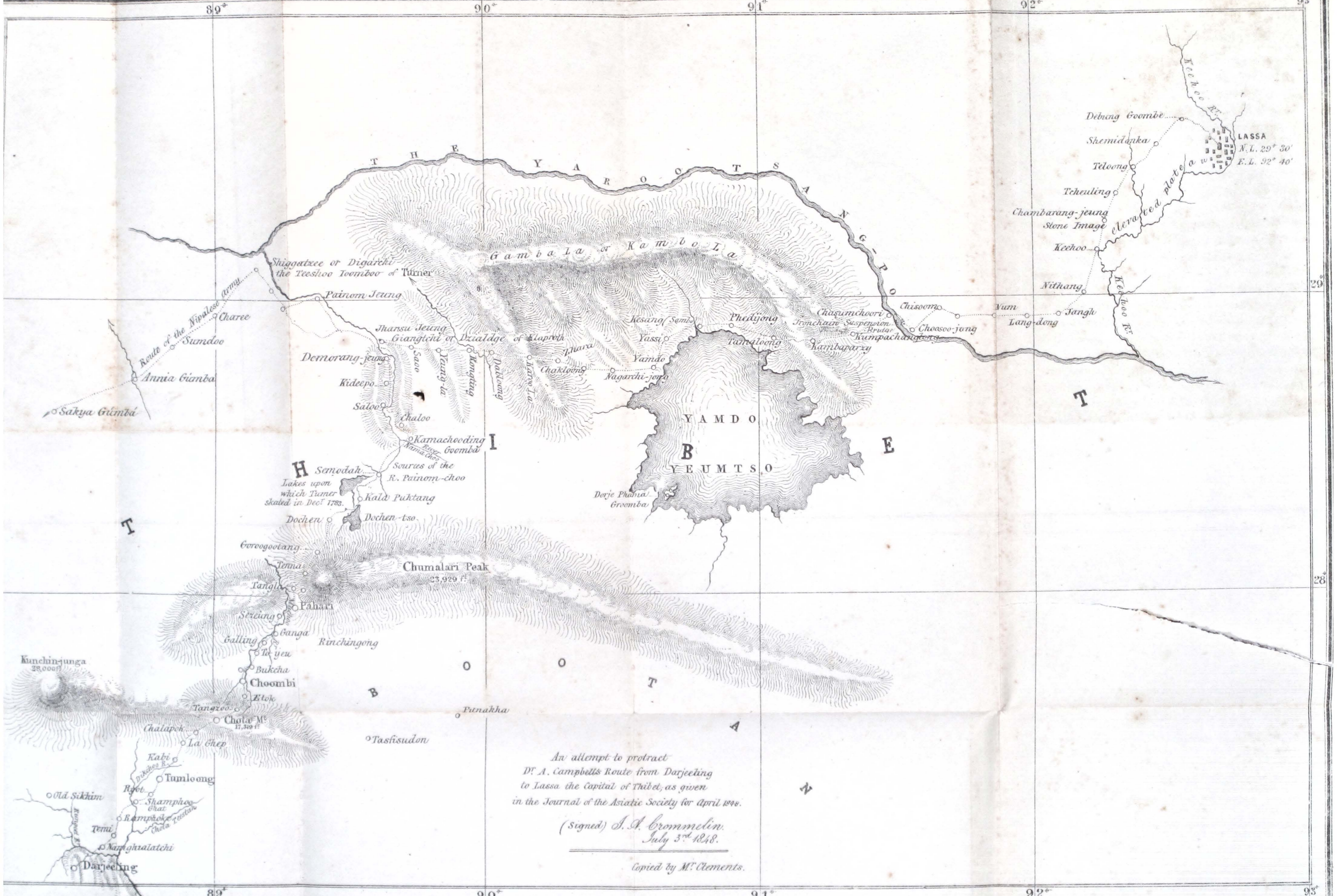
The latest and best account of the Trans-Himalayan regions, is 'Dr. Thomas Thomson's Travels,' published last year in London.

Following Humboldt, Dr. Thomson divides Thibet into two grand divisions; the western one, of which he treats so ably himself, and the eastern one, to which alone my Notes refer. Western Thibet—according to Dr. Thomson "is a highly mountainous country, lying on both sides of the Indus, with its longer axis directed like that river, from south-east to north-west. It is bounded on the North-east by the great chain of mountains, to which Humboldt, following Chinese geographers, has given the name of Kounlun, by which it is separated from the basin of Yarkund. On the south-east, its boundary is formed by the ridge which separates the waters of the Indus from those of the Sanpu." "To the north-west and south-east," continues Dr. Thomson, "its boundaries are somewhat arbitrary, unless the political division of the country be had recourse to, which, depending on accidental circumstances, entirely unconnected with physical geography or natural productions, is so liable to change that its adoption would be extremely inconvenient. The best mode of drawing a line of separation between India and Thibet, in those parts where mountain chains are not available for the purpose, appears to consist in regarding the latter to commence only at the point, where the aridity of the climate is too great to support forest trees, or any coniferous tree, except juniper."

"As limited by these boundaries, Western Thibet includes the whole valley of the Indus, and its tributaries down to about 6,000 feet above the level of the sea, a considerable portion of the upper course of the Sutlej down to between 9,000 and 10,000 feet, and small portions of the upper course of the Chenab, of the Ganges (Jahnavi) and of the Gogra."

The above is a very elaborate definition of boundaries, founded

21641



An attempt to protract  
 Dr A. Campbell's Route from Darjeeling  
 to Lassa the Capital of Thibet, as given  
 in the Journal of the Asiatic Society for April 1848.  
 (Signed) J. A. Crommelin.  
 July 3<sup>rd</sup> 1848.

Copied by Mr. Clements.

21681

21681

mainly, as regards the limits of India and Thibet, on the geographical distribution of plants. By it the Himalaya, so well known to Dr. Thomson, is annihilated as a mountain chain. The Kounlun however, which no body knows anything of, and which may be quite as frequently cut through by meridional rivers as the Himalaya, is admitted to that distinction.

I shall now endeavour to describe the second grand division or "Eastern Thibet." It is by all accounts an exceedingly mountainous country, i. e. it contains immense masses and ranges of the most rugged mountains in the world interspersed with extensive plateaus and deep level-bottomed valleys along the streams and rivers.

The Thibetans I have met with, do not recognize a continuous chain of mountains running parallel to the Himalaya; nor are they acquainted with "Kounlun" as the name of any mountain range. They are familiar with the Himalaya on one hand and call it "Kangri" which simply means *Snowy region*, and they know that the country of the Mongols, or Mongolia lies parallel to it on the other hand. The third great distinguishing feature in the physical geography of Eastern Thibet is the Yaroo river or Sanpoo of our maps. Thus characterised, I shall say that in popular estimation—which is not founded on the physical features of the country, on its natural productions, or on political divisions of territory, separately or jointly—Eastern Thibet is bounded on the north-west by the Kangtisee range of mountains,\* and a greatly elevated tract of country extending from the base of this range; on the north by Mongolia; on the east by the Sifan and Sechuen provinces of China, and on the south by the Himalaya, from the point at which it is pierced by the Burampootur on the east, to the meridian of the Mansarowur and Rawan Rud Lakes on the west. The general direction of the Kangtisee range is north and south, and it is said to connect the Himalaya and Mongolia, as by a cross-bar. It runs to the east of the Mansarowur and Rawan Rud Lakes, its highest point is said to exceed in elevation any portion of the Himalaya, and four large rivers have their sources in different parts of the range, viz. the Singh Khawab or Indus, the Langchoo Khawab which

\* The highest portion of the "Kangtisee" range is I believe the "Kylas" of Strachey.

runs through Ladak, the Marchaë Khawab which is known as the Gogra, and the Tamchoo Khawab or Yaroo, the great river of Eastern Thibet.

---

*Government of Thibet.*

In the city of Lassa,\* and over the whole of Thibet "Geawa Remboochi" or the "Grand Lama" is nominally the Supreme authority, in temporal and spiritual affairs. His residence is in Patala Goompa which is on the north side of Lassa.

There are two Resident Envoys from China called "Ampas" stationed at Lassa; subordinate to them are two great officers—Chinese—designated Daloo-he: their rank and occupation are those of general officers. Next to these are two Phopuns who act as Paymasters of the Troops, and perform the duties of our Adjutant and Quarter Master Generals. They are also Chinese. One of the Daloo-hes, and one of the Phopuns are generally stationed at Digarchi. These officers constitute the general staff of the army in Thibet. Next in rank are three Chong-hars. They are Chinese, and Military Commanders; one is generally stationed at Digarchi and another at Tingri near the Nepal Frontier of Thibet. Below these are three Tingpuns, non-commissioned officers—also Chinese. There are no other Chinese military officers in Thibet. The usual number of Chinese Troops, all Mantchoo Tartars, in Thibet does not exceed 4,000 men. Stationed at Lassa 2,000, Digarchi 1,000, Giangtchi 500, Tingri 500.

The above shews that the Chinese functionaries in Thibet are Political and Military officers only.

All the Civil appointments are held by Thibetans. The local temporal Government of Thibet is composed as follows. It is headed by the Grand Lama entirely guided in all Political and Military affairs and mainly so in Civil affairs by the Chinese Ampas and the Emperor of China.

\* M. Huc says, that "Lassa" in the Thibetan language means, "Land of Spirits." The Mongolians on the same authority call this city "Monche-dhot," i. e. Eternal Sanctuary. My friend Cheboo Lama gives the following interpretation, "L'ha" means God, "Sa" abode or resting-place. Hence it is the city of God, or the Eternal city.

The first officer is the Chemeling, the second Kandooling, the third Tengeling; they are all Thibetans and the Chief Lamas—Awataris—of Goompas\* bearing those names. From these three Lama Counsellors, the emperor of China nominates the Noume-hen,† “Nome Khan” of M. Huc, who may be called President of the Council, or Prime minister. He is Regent when the Grand Lama is a minor, and at all other times is the alter et idem of his holiness. The Noume-hen is always one of the three Great Lamas above named. At his death, or removal from office, he is succeeded in the Noume-hen’s office by one of the two remaining counsellors, always however under orders of the emperor. His successor as head of his Goompa must, as in the case of a “Grand Lama” be an awatar, i. e. he must re-appear in the flesh as a child, and be raised to that position.

Of equal rank with the Noume-hen, but having no temporal authority, is the Genden Tapa Lama, he is next to the Grand Lama himself the highest clerical authority. He is finally appointed by the emperor, being in the first instance chosen on account of his superior attainments and sanctity by the local authorities. He is chief of the great monastery of Genden. The persons privileged to take a part in the selection and recommendation of the Genden Tapa, for his holy office are the Noume-hen, the two Ampas and the four Shapees. They propose him for election to the Grand Lama, after his approval, the Ampas procure his appointment from the

\* Principal Goompas at Lassa and its vicinity.

|                          |       |                               |
|--------------------------|-------|-------------------------------|
| Genden Goompa, . . . .   | 3,500 | Lamas resident and itinerary. |
| Leea, . . . . .          | 5,500 | „                             |
| Depoong, . . . . .       | 7,500 | „                             |
| Gentoo, . . . . .        | 500   | „                             |
| Grume, . . . . .         | 500   | „                             |
| Chenamge, . . . . .      | 1,000 | „                             |
| Chalang, . . . . .       |       |                               |
| Chemchung, . . . . .     | 200   | „                             |
| Kandooling, . . . . .    | 200   | „                             |
| Tengelling, . . . . .    | 200   | „                             |
| Chechooling, . . . . .   | 300   | „                             |
| Moujida Taching, . . . . | 1,000 | „                             |

† Gealchup Noume-hen is the proper title which being translated is “the image of Grawa” or the Grand Lama.

emperor. The Genden Tewa, is chief Lama of a Goompa, but not an awatari Lama.

Next in rank and power to the Noume-hen are the four Shapees. They are not Lamas, always Thibetans, and the principal executive officers of the Government in the Financial, Revenue and Judicial Departments. These departments are not separated and under distinct officers. The Shapees are the highest Judicial officers in the Civil and Criminal Courts. Next to the Genden Tewa is the "Lama Yeungjing" the private guru, or high priest of the "Grand Lama." He is also appointed by orders of the emperor, and is sometimes an awatari Lama, but not always. His office is to teach and train the Grand Lama in childhood and youth, and lead him, if he can, afterwards. This is indeed an important personage in the Bhuddhist world, being no less than the keeper of the Grand Lama's conscience. The nomination to this post being in the hands of the emperor, furnishes an interesting clue to the extent of the imperial power over the church of Thibet.

The Che kap kempu Lama is a churchman of great influence in the Government. He appears to represent the Grand Lama in the council of state and in the deliberations of the Shapees. He may be called Secretary or Minister for the church, and the Shapees may, correctly enough, be called the Financial, Judicial, Revenue and Home secretaries or ministers.

The Treasury is managed by two officers named Jhassas; both are Lamas, and act conjointly, although one of them is Treasurer on behalf of the "Grand Lama," and the other on behalf of the Noume-hen or temporal estate. They are assisted by two Sub-Treasurers styled Shangjotes. Four officers designated Da-puns are the commanders of the Thibetan Troops, and act as Civil and Political Commissioners on occasions of Frontier or other disturbances, they are Thibetans, and not Lamas. The ordinary course of official promotion is from a Da-pun to a Shapee; of equal rank, to the Da-puns is the Che-pun who is however a Civil officer and acts in all Departments as Deputy to the Shapee.\* This officer is often employed as Commissioner on Deputations in Civil affairs either Judicial or Fiscal,

\* Shete Shapee is the energetic Commander-in-Chief of the Thibetan army now opposed to the Nipalese under Jung Bahadoor.

and all the cases sent up by the Police for trial before the Shapees are forwarded through this officer. All appointments to the offices above noted, require the confirmation of the emperor.

1. *Tinkpun*—Superintendent of Police and Jails.
2. *Sherpankpa*—Assessors to the Superintendent and to act as checks on his proceedings.
3. *Boopun*—Military officers subordinate to the Da-puns but also employed in Civil affairs when required.
4. *Jongpuns*—Collectors of Revenue and Magistrates in the interior. They hold office generally for three years only. They are all laymen, one of these officers who is employed in the district of Gar known to us as Gartope, is named the Garpun. He has charge of the salt and gold-diggings in that direction both of which are valuable. In the Kampa country to the East of Lassa, these officers are styled Markam teje.
5. *Giapuns*—Subordinate Military officers, Non-commissioned.
6. *Dingpuns*—Ditto, ditto.
7. *Choopun*—Ditto ditto. Privates are called Ma Mi, which means “fighting men.”

The patronage of these 7 classes of officers nominally lies with the Gealchup Noume-hen, but the Chinese Ampas have a veto if they desire to exercise it, and the working of the system is to procure the approval of these high officers to the appointments before they are made.

One of the Ampas annually visits the Nepal and Ladakh frontiers.\* The Noume-hen and the four Shapees have the entire control of the land assessment, commerce, customs and other sources of revenue, and, I believe, that no account of the revenues, or the disbursements of Thibet are required by the Emperor. The Chinese Troops and

\* In 1846, Keshen was the only Ampa or representative of the Emperor in Thibet but he was one of the eight Tongtongs of the Empire and specially deputed to arrange Thibet affairs at that time and the usual system of two Ampas was then suspended. The following anecdote of Keshen is very characteristic of the self-deceiving system of the Emperor's Government. When Keshen was ordered to be executed for having sold the interests of his country to the English during the War, his life was spared at the entreaty of “Sac Lama” the friend of the Emperor “Taokwong” and sentence of banishment in chains was substituted. Subsequently



all the Chinese officers in Thibet are paid by China and in money; the Thibetan Troops by assignments of the Government share of the land tax. There is no money Revenue sent to Peking, an annual Embassy with presents only in cloths, images, books, incense, &c.

There is a fund in Patala Goompa to which 100,000 rupees is added annually. Never opened except in time of great war expenses, it was opened to repel Zorawur Singh the Sikh General, who invaded Thibet from Cashmere in 1842. The Ampas pay is 140 Rs. per day, and he gets large presents while travelling in Thibet.

A Shapee's pay is 140 Rs. per mensem from China, and he has lands and other emoluments from the Grand Lama.

#### *Army.*

They have no Artillery in Thibet; the Cavalry so called is mounted on ponies; the principal troops are Infantry and great pains are taken to make them good marksmen. Prizes and promotions are the invariable rewards of good marksmen. The Chinese or Tartar troops are kept quite distinct from the Thibetan ones, which are only a Militia called out when required, and not regularly paid. The Imperial Troops quartered in Thibet do not exceed 4,000 men, and the Thibetan force is not so strong. There are 2,000 Imperials at Lassa, 1,000 at Digarchi, 500 at Giangtchi, and detachments at Phari, and Tingri. The last named post, is on the high road from Cathmandu to Lassa, and is situated on a Plateau called the "Tingri Maydan" by the Nepalese. The Imperial troops are armed with long matchlocks, to which a rest is attached. The Thibetans have very few firearms, being provided with bows and arrows, and short swords. The powder is of a very inferior description, and it does not appear that the troops are ever practised in military manœuvres.

at the urgency of the same Lama, Keshen was appointed viceroy to Thibet. Affairs at Lassa, and throughout Thibet were in great confusion at the time; three Grand Lamas had died by poison in a few years and the Noume-hen was suspected of the crime. Keshen had the opportunity given him of redeeming his fame, and he did so by re-establishing order in the country, and convicting the Noume-hen. It is a curious fact, however, that he proceeded from his banishment in Manchouria to his Government at Lassa *in chains*, that is to say, he wore a gold chain, the badge of punishment round his neck, concealed by his garments, nor was it removed, and his forgiveness complete until after he quitted Lassa as Governor of Sechmen.

*Personal Habits, Customs and Ceremonies of Thibetans.*

The Thibetans of the higher class wear Chinese satins in the warmer seasons, and the same lined with fur in the cold ; all others, male and female, wear woollens in the warm, furs and sheepskins in the cold weather, and never go about without boots. The men do not go about armed. The common people never wash during the cold season ; very sparingly at other times. The reason given for this being that the skin of the face cracks and ulcerates from the cold, if water is applied to it. The people of towns, who do not go much outside the house, wash occasionally, but the universal prejudice is strong against ablutions of the person, and it is equally extended to their clothing which is worn in a filthy and greasy state.

Soap is high priced and little used in Thibet ; it is not manufactured there. The supply is from India, through the Cashmere traders viâ Ladakh, and from Nepal. A small quantity also goes from Bengal through Bootan and Sikim. There is a grass in the country or a plant like grass, the root of which pounded with water, makes a lather and is used for washing clothes.

Travelling in the winter and indeed generally is performed on yaks. The women ride astride on them like the men, and they are so masculine and dressed so much alike that it is difficult to distinguish between them.

A Thibetan village or town is never surrounded with filth, as in India. To every house there is a privy, and the contents are carefully preserved for manure. In some situations, where the soil is suitable, saltpetre is made from the earth about the privies, but the regular supply of this article, which is used for making gunpowder only, goes from India.\* In towns the contents of the privies are sold annually, and those of people of wealth sell highest.

It is well known that the dead are not burned or buried in Thibet, but exposed on high places to be devoured by vultures. For this business there is a class of men who make it their sole vocation. They

\* At the time of the Sikh General, Zorawur Singh's disastrous incursion from Ladakh into Thibet as far as Gartope, 1812, there was a good deal of saltpetre taken into Thibet through Sikim, also sulphur and lead bullets.

are called "Raga Tongden ;" they are a low race held in dislike and shunned, but they are generally rich. They go about to the living, begging and extorting money. When refused or ill-treated, they retaliate with abuse which is often successful. "Very good," say they, "you won't give us alms now, you will come into our hands some day, and we will put a rope round your neck, drag your body through the streets, and throw it to the dogs," and the latter part is the frequent fate of the poor man's body, as these men keep numerous dogs to devour the bodies.

The bodies of the wealthy are carefully disposed of; they are carried in a litter to the top of a hill, set apart for the purpose, the flesh cut in pieces, the skull and bones pounded in a mortar, and when all is ready a smoke is raised to attract the vultures, who collect in thousands to eat it up.

The Chinese have spacious burial grounds at Lassa, and Digarchi, and there, as in their own country and wherever they reside, they are well cared for and ornamented. The Lassa one is said to contain 100,000 tombs. In the time of Wangh, a celebrated Raja of Lassa, there was an insurrection against the Chinese which ended for the time in the annihilation of the whole army, and the massacre, by the Thibetans, of the whole Chinese population. The funerals of the Chinese at that time were estimated at 4,000. This massacre was punished by the Emperor with signal vengeance, and since that time the Chinese supremacy has been finally established all over Thibet. There was a petty insurrection in 1843, in which many Chinese were killed.

#### *Religious Festivals.*

There are twelve great annual Festivals, viz. Bumteung, Kansu-pecha, Chúchupecha, Gesúpecha, Nesúpecha, Gosúngpecha, Gyajeepecha, Lallúpecha, Chindúpecha, Dúdúpecha, Kagyurpecha, Lukphopecha. Pecha is equivalent to Pujá.

On the anniversary of the death of a Chief Lama of a Goompa, there is a great festival and illumination. At Tashi Lumbu, three such are held annually.

The "Lassa Morun" festival of M. Huc is properly called the "Lha-sa Meuhlum." It is the anniversary of the first proclamation the Religion of Boodha by Sakya, at Lassa.

*Seasons.*

The year is divided into four Seasons. First Chid, or early Spring, February, March and April. Second Teuh, or Spring proper, May, June and July. Third Yirrh, or Rains, August, September and October. Fourth Gunh, or Winter, November, December and January. Some showers and southerly winds occur in Chid. In Teuh, it is temperate and dry, but showers, thunder and lightning\* occasionally prevail. In Yirrh, there is constant but not heavy rain and hail in September and October. Frost begins early in November and increases all through the winter. Heavy falls of snow are rare except on the mountains.

*Soils.*

Only three kinds of soil are recognized; a blackish one, a reddish one which is described as rather clayey, and a greyish coloured one, which is also clayey and contains a good deal of sand. The last is found along the beds of streams and yields good crops. The reddish soil is also fertile; it frequently contains gravel and stones; it is the prevailing soil in the tract called Dingcham, which extends along the northern face of the great Himalayan chain from Tawang to Keroong, but this region is quite barren. Mean elevation 16,000 feet at least. The blackish soil most abounds in the districts or provinces of U and Chang; it is the most fertile of all, but also contains stones and gravel.

The fertility of the culturable soil is highly spoken of, and 40 to 50 fold in wheat is considered the average. Crops are generally very certain, and blights or other accidents rare. Early frost sometimes overtakes the harvest and spoils the grain, when the grass is at the same time burnt up, and this causes scarcity and famine. It is then the granaries are opened, and the corn-merchants make their fortunes. There is no interference with the price of grain. It is always dear compared with India, but varies considerably; and the principal cause of scarcity appears to be the early setting in of

\* In 1845, a great earthquake was experienced in the Province of Kham north-east of Lassa. It was most severe in the district of the Dirgi Raja. About 3,000 men were killed, and a Goomba destroyed by the opening of the earth.

About 20 years ago, the district of Kompo in the Province of Kham was visited by a severe shock; one village was destroyed by the opening of the ground.

frost. This is said to be induced by continued clear nights which are greatly dreaded in harvest time.

*Agriculture.*

Wheat, barley and other crops sowed in April and May are reaped in September and October; all are irrigated. The peach ripens at Lassa in October and November. It is sun-dried and preserved. No grapes are grown at Lassa. The whole supply of raisins is received from Ladakh. The plough is used in all old cultivations: yaks, bullocks and ponies occasionally are trained to it. The plough is the same as the Indian one, made entirely of wood, except the sock which is pointed with iron. Timber for ploughs is imported from Sikim and Nepal. Rhododendron Hodgsoni, and birchwood make the best ploughs. Cultivation in fresh lands is done with the hoe. The Thibetans do not use a harrow, the grain being covered in with hand.

Barley in Thibet takes the place of potatoes in Ireland; four-fifths of the population live on it.

Neither wheat, barley nor peas will come to maturity as a paying crop in any part of Thibet without irrigation, and the water flooding of the fields, by which they derive a fertilizing effect from the frost, is equally necessary to prepare the soil for these crops. Wheat requires three or four irrigations or waterings from the time the seed is sown till the ear bursts, after which it will ripen without further watering. The flooding of the lands in winter, and watering of the crops in summer are principally effected from drains or canals cut from the rivers: very little watering is performed from wells. The whole of the arable lands along the Painom river and the most of it on the Yaroo Sanpoo are terraced and have maintaining walls of stone raised a little above the surface of the fields. Great pains are taken for the equable distribution of the water by running it off from terrace to terrace, and it is applied from leather bags when it cannot be brought to run on particular spots. Watering freely is indispensable to all crops in Thibet. The atmosphere is so dry and the soil so destitute of moisture, that without it the sun burns up the crop before it comes to ear. In a land of so little rain and with an atmosphere so dry and sun so scorching as to render irrigation and free watering indispensable, the questions which naturally arise are, What extent of area can be watered from the rivers by canals and

drains ? and Is there more arable land in Thibet, than admits of being irrigated from the rivers ?

To answer the first question, it would be best to refer to the statistics of the Nile irrigation, in illustration of the extent to which land on either side of a river may be irrigated by artificial means, not by the overflowing of its banks which is not usual by the Yaroo of Thibet, and is therefore not to be taken into the comparison. I have not the means of making this comparison. But to reply to the second question I have taken much pains to collect facts, the most prominent of which are as follow :—

1st. The culturable land on either bank of the Painom river, from its source to Digarchi, has not a maximum breadth anywhere of more than four miles, i. e. eight miles in all for the extreme breadth. In many places however, the river is closely confined by mountains.

2nd. From Digarchi to Giangtchi on the Yaroo one day's sail, the culturable land on either side the Yaroo varies from two to four miles.

3rd. From Giangtchi till the Yaroo escapes from the Kambola range, its course is exceedingly tortuous, generally through great mountains, and it has but a very narrow bed of culturable land in a few places. It is closely pressed in by great mountain ranges in the Kambola district, and elsewhere in this portion.

4th. I allow the utmost extent of culturable land ever given to me by an informant for the Yaroo valley from the point at which it leaves the Kambola range entirely to the junction of the Kechoo or Lassa river ; and that is a total breadth both banks included varying from 20 to 40 miles. There is more flat land on the South than on North bank of the Yaroo.

5th. The Kechoo River is closely hemmed in by mountains on the Eastern bank ; on the Western bank it has a belt of about 4 miles of culturable land only.

These particulars will afford some assistance for reckoning the culturable area of the finest part of Eastern Thibet, and will shew it to be very small indeed, compared with the total area of this rugged country, and it is universally asserted that the land is everywhere dependent on river irrigation for its fertility. On this subject M. Hue says "Poulon, fine purple cloth, scented sticks and wooden

bowls are the only good manufactures, neither is their agricultural produce remarkable. Thibet, being almost all covered with mountains and intersected by impetuous torrents, furnishes its inhabitants with but little soil suited for cultivation, the valleys alone can be sowed with any prospect of reaping a harvest." When the Yaroo does overflow its banks, the sediment it leaves, is fertilizing. The Yaroo soil deposit is generally light and sandy.

Three feet of digging brings you to the water at Digarchi which stands in the flat and low Delta of the Painom and Yaroo rivers. 20 feet is required at Kambajong.\*

Many Thibetans believe that the Painom rises in Sikim, but its sources are no doubt, as given by Turner, in the vicinity of the Ramchoo Lakes, north of Phari. A horse Dak is four days from Digarchi to Lassa, a boat by the Yaroo takes 12 days to the disembarking place, nearest to Lassa. It is 12 days' journey to the Salt Lakes from Digarchi, due north.

#### *Crops, Rotation of, &c.*

The number of crops is very limited; wheat, barley, buckwheat, peas, turnips and a little mustard, comprise the whole. There is no regular rotation observed. As in India with all crops, so it is in Thibet. Wheat is grown for generations in the same ground varied, in some places, by barley or buckwheat; about three times as much barley being grown as wheat. All the suttoo eaten with tea is roasted barley, and this may be considered as the staple article of food for all travellers. See M. Huc *passim*.

At Digarchi, Giangtchi, and generally in the Province of Chang or Tsang, grain is more plentiful than in the neighbouring province of U; in the former 10 to 15 seers, (20 to 30 lbs.,) of wheaten flour per Company's Rupee is reckoned cheap, and in the latter about half the quantity is so.

The dung of animals is so much in request for fuel, that scarcely any is used for manure, nor is there any spare fodder or other vegetable matter available for composts. Human ordure and ashes are therefore the principal manures in use; both are carefully preserved, and very valuable. In the towns the contents of public privies are a source of revenue to the Government, and lodging-houses have

\* Kambajong a Police Station in Dingcham. See Hooker's Himalayan Journals and Map.

privies attached to them which are most jealously watched. The contents of these places are removed by a class of people who principally live by the occupation, and are the filthiest of all the population, which is everywhere and in every grade, very dirty. They work with their hands at their vile occupation and in the middle of it unwashed may be seen drinking hot tea, and eating raw and sundried flesh close to the piles of ordure. Ashes are mixed with the ordure, and this is reckoned the best of all manures. Liquid manure, (ordure with water,) is also in use, but sparingly. This mode of using manure is probably taken from the Chinese.

Scarcely any weeding is required, as the crops grow nearly free of all weeds. When necessary, it is done with the hand, the weeds being carefully preserved for the cattle.

The Thibetans reap with an untoothed sickle, the crops being all cut close to the ground to save the fodder. Wheat is tied up in small sheaves and stocked on the ground, or in yards near the houses. The corn is beaten out by the flail as in Europe, the women taking a part in the threshing with the men. This is done with great care, so that not a grain is lost. There is also a kind of hackle used for beating out the corn. A beam 8 or 10 feet long toothed with iron spikes, through which the sheaves are drawn. The winnowing is performed in the open air.

The grain is ground into meal by watermills. In some villages, mills are built by subscription, and the parties use them in turn. There are public mills also. The millers in these take one part in 20 as payment. There is a great press at the mills for two months after the harvest, when they are going day and night, as frost sets in in November so hard that they cannot be used again till the spring. There are no windmills in Thibet I believe, although in no country in the world, I believe, is there a more steady wind in the cold season, than here.

#### *Wages of Labour.*

A Chinese soldier is very highly paid in Thibet, i. e. he gets as much as 12 to 16 Company's Rupees per mensem. The Thibetan soldier has no regular money pay. He is allowed the Government share of revenue on a portion of land, his own farm or another, and this does not exceed 40 or 50 Company's Rupees per annum.



Masons, carpenters and other artificers can earn from 8 as. to 1 Rupee a day in the towns; common labourers three and two annas. Gold and silversmiths are highly paid, 8 as. in the rupee for fine work is the usual rate.

*Breads, &c.*

The bread is all unleavened, and cooked on heated stones or grid-irons. The poorer people make their bread with coarse wheaten flour and water, the better classes with fine flour and butter. The latter description I have eaten; it is a sort of heavy biscuit, made in a long twisted loaf-like shape. The sweet and pure farinaceous taste of the fine flour of Thibet equals the best Cape or American flour. Rice is only eaten in Thibet by the Chinese, and the richer Bhotias. The whole supply is received from Bootan and Sikim. The Thibetans do not cook and eat it plain as the Indians and Chinese do, but make it up into large balls with butter and sugar using it as a pudding and sweetmeat. The staple food of the country is "Champa," called Suttoo in India; it is finely ground flour of toasted barley. It is universally eaten and without additional cooking, and is excellently suited to the people of a country which is so ill-supplied with fuel. Mixed up with hot tea and formed into solid balls, it is called "Paak." Prepared with lukewarm water, it is called Seu. Travellers often carry the "Paak" ready made in skins, and eat it as they go along, but if it is possible to get fuel, they prefer making a jorum of tea, and having the paak warm and fresh. The Thibetans are great eaters when they are in plenty. Tea is drunk at all houses, and at every meal, and is regularly used four times a day, i. e. in the morning early, about 8 A. M., at noon, and in the evening. For breakfast which is always eaten at daylight and before washing of hands, face or mouth, the favourite dish is Tookpa, a sort of broth, made with mutton or yak's flesh, Champa, dry curds, butter, salt and turnips. This is eaten without bread, and followed by a cup of scalding tea. They never drink tea when it is the least cold, and if a foreigner allows his cup to cool and then drinks it, he is considered a very careless fellow. An attendant is always on the watch when tea is being served, and as you proceed, he replenishes your cup with a ladle or from the hot teapot until you cry "Hold, enough," or

empty out your cup, and put it in the breast of your cloak, the usual receptacle of many necessaries to a Bhotia. The snuff bottle, thick woollen nose cloth, tea cup, bits of dried flesh, &c. are all huddled here, without remorse, and it is a most filthy receptacle.

*Salts, Minerals, Metals, &c.*

1st. *Peu*, a carbonate of soda, is found all over Dingcham and Thibet, south of the Yaroo; it appears as a whitish powder on the surface of the soil, never in masses under ground. It is not used to make soap or otherwise in the arts, a small quantity is always put into the water with tea; it is considered to improve the flavour, and it gives a high brown colour to the decoction. It is generally used in medicine.

2nd. *Chulla*, Borax. I cannot learn that borax is produced in any part of Thibet south of the Yaroo river. The general direction of the Yaroo is easterly. It is largely imported into Digarchi, whence it is distributed to other parts of Thibet and to India viâ Nipal, Sikim and Bootan, whence it finds its way to Calcutta and Europe.

3rd. *Sicha*, Saltpetre, is produced generally in Thibet and manufactured at the large sheepfolds where composts of sheep's dung and earth are formed to produce it.

4th. *Moghee*, Sulphur, is not found in Thibet. India exports this article for consumption at Lassa where gunpowder of good quality is made. The charcoal of the poplar—(changma,) and of the willow—(langma,) are considered the best for gunpowder, and this is fortunate, as these two trees alone attain to any magnitude near Lassa.

5th. *Lencha*, common Salt. Three sorts are known in commerce.

1. *Sercha*—White and best.
2. *Cháma*—Reddish and good.
3. *Pencha*—Yellowish and bad, contains soda or magnesia and earthy matter.

All the salt consumed in eastern Thibet is the produce of lakes or mines situated to the north of the Yaroo river, or comes from "Lache," a district lying between Digarchi and Ladak, which is traversed by the Yaroo. The best information procurable is to the

effect that all the salt of Thibet is the produce of lakes; still there are people who assert that it is also dug out of the ground. Possibly this is confined to the vicinity of the lakes or to their dried margins. All travellers in Thibet are agreed that the salt-producing districts are the most rugged and inaccessible that can be imagined. It is quite true that men and sheep only can reach the salt deposits. It is also true that the elevation of the deposits prevents their being worked, except for the warmer half of the year, April to November. Thousands of sheep are employed in carrying the salt from the deposits to places accessible to yaks. These latter animals carry it all over Thibet in loads up to 160 lbs. Sheep in open places will carry 20 to 24 lbs.: in the vicinity of the deposits the ruggedness is so great that 8 to 10 lbs. is as much as can be safely put upon them.

Snow falls annually after November in the salt-producing tracts and covers the ground for two months or more. The elevation of these places cannot, I believe, be under 22,000 feet.

At Digarchi, 1st quality, 2 Rs. per maund, or 20 lbs. for 1 shilling.

At Giangtchi, 20 per cent. dearer. At Lassa, 5 Rs. per maund, or 8 lbs. for 1 shilling.

These prices indicate the relative distances of the places named from the salt districts. There are no available means of ascertaining the actual distances. Digarchi, the nearest mart may be twenty days' journey on horseback from the nearest salt lakes. See annexed Route No. 1, of 55 marches for loaded men. (p. 334.)

It is believed that salt is now in course of being deposited in a lake at Tinke in Dingcham—near one of the sources of the Arun river, but it is not worked, and great pains are taken to conceal the fact, as there is a prophecy that whenever salt shall be found in the lakes of Dingcham, the glories of Thibet shall be on the wane; which means that a rush shall be made from all sides for the salt which will render the exclusion of strangers ineffectual. Salt is given to sheep and cattle in Thibet, but not to horses.

6th. *Doh so*, which in the Thibetan language means "Stone charcoal." Coal is nowhere found in Thibet. It is known in that country as a produce of China which is seen at Siling, and other marts on the Thibetan confines of China.

7th. *Ser*, Gold ; is found in the sands of a feeder of the Yaroo which joins it on the Northern bank. The name of this river is not known to me, but it flows from a country called "Shapduk" and falls into the Yaroo to the west of Digarchi. The greater part of the gold of Thibet is the produce of mines or diggings. See Route No. 2, from Digarchi annexed. (p. 334.) The Yaroo itself does not yield any gold-washings. There are no mines of iron, silver, copper, quicksilver or lead in Thibet. All these metals, and their oxides are imported from China.

8th. The yellow Arsenic of commerce is found at Teloongchurfoo, near the borders of China to the North and West of Lassa ; it is called Pabea.

9th. *Peu-she*, Amber. The Thibetans always wear large opaque amber-like beads in their necklaces ; but the substance is not a produce of their own country, nor is it amber ; it is, I believe, expissated turpentine—gundaferoza, mixed with some hardening material. Friction makes it smell of turpentine. It is brought from Siling and other marts of China.

10th. Turquoise, *Gya yen*, or China stone.

*Pe yeu*, Thibetan stone.

*Te yeu*, Cashmere stone.

This beautiful stone is greatly prized in Thibet, and every one wears it, real or imitation, in rings, necklaces, earrings and amulet cases. The best are very rare, and although found in Thibet, I believe, no one can give an intelligible account of the localities. I do not believe that the turquoise is a natural product of Thibet, and the following story corroborates the opinion.

"A great merchant of Thibet named Chongpo who traded, ages ago, with India, and once crossed the seas beyond India, brought the finest real turquoise to his native country. From that time the stone has been known there, and like coined money, it continues to circulate in the country as a medium of exchange." The imitations brought from China are made of common earthen-coloured or other compositions. They are easily detected. Those imported via Cashmere are real stones but not valuable. The only test of a real stone is to make a fowl swallow it ; if real it will pass through unchanged.

*Route to the Salt Mines in Thibet.*

Digarchi to PUNCHOOING 3 marches. Direction at Digarchi N. W. across the Yaroo.

Amringjong, 4 marches. Direction, N. W.

To Nakchang, 8 ditto, N. W.

Sang-zang Lhoda, 6 ditto, N. W.

Sakojong, 7 ditto, N. W.

To-then, 8 ditto, N. W.

Bomet, 3 ditto, N.

Lon-kurqun, 10 ditto, N.

Tarokchan, 2 ditto, N.

Borgpagege, 3 ditto, N.

To Salt mines, 1 ditto, N.

Being 55 marches for loaded men, each 10 miles, say.

*Route to the Gold diggings.*

The same from Digarchi as to the Salt mines as far as Sang-zang Lhoda, thence to Kasha 10 marches, N. by W.

To Komunk 5 ditto, N.

Two more marches to Gold diggings, N.

These marches are somewhat longer than' the former ones, and may be each 12 to 15 miles.

*Animals.*

*The Goa*—An antelope.

*Gnow*—The ovis ammon.

*Rigong*—Hare.

*Kiang*—Wild ass.

*Lawa*—Musk deer.

*Shao*—A large deer, *Cervus affinis* vel. *Wallichii*.

*Cheu* or *Chiru*—Antelope Hodgsoni.

*Dong*—The wild yak of Thibet. The fiercest of all known ruminants. It will rarely allow a man to escape alive if it can come up with him. It is generally hunted on horseback, the great aim being to detach one from the herd. It affects open grassy places and goes in large herds. The following is the plan adopted by hunters on foot for killing the "Dong."

Its favourite pasturages are ascertained, and in the midst of these the hunters throw up circular enclosures of stone a few yards apart,

the hunter taking up a position in one of them. When a "Dong" is within shot, the hunter having fired at him, instantly quits his enclosure for another; for as soon as the animal hears the shot whether he is hit or not, he, guided by the smoke of the discharge, rushes furiously on the enclosure, and commences knocking it to pieces. When the hunter gets another shot at him he retires again from his shelter to a fresh enclosure, and so on, till he has killed his beast. The ordinary size of the "Dong" is four times that of the domestic yak, it is black all over, having occasionally a white streak in the forehead. The horns of a full grown Bull are said to be three feet long, and the circumference must be immense. The common mode of describing it is to throw out the elbow, bring the fingers to the ribs and point to the circle thus formed as the size of the base. It is used by the grandees of Thibet at marriages and other feasts, when it is filled with strong drink, and handed round to the company. Nothing more commendatory of the host's joviality can be said, than that "he regaled his guest out of the Dong's horn."

The horns so used are finely polished, and mounted with silver, or gold, and precious stones. If I ever succeed in getting one, I shall certainly present it for a "snuff mull" to the Highland Society, as the days of drinking in horns are over with us now.

It is common in Thibetan goompas—(Lamaserais,) to see a stuffed "Dong" standing in front of the image of Mahá Káli at whose shrine the animal is thus figuratively sacrificed; axes and other instruments of sacrifice are ranged around the image. Strange that Buddhists should preserve *this* feature of Hinduism in their places of worship, not more so however than, as Huc describes that a Lama should nearly go into fits on seeing a louse from his tunic impaled for the microscope, while the whole of his countrymen and co-religionists are among the greatest slaughterers and consumers of butcher's meat in the world.

*Pegoo*—the yak.

*Cow*—small, like the cow of Bengal. Hair long.

*Sauh*—cross between cow and yak.

*Sauh Yak*—produce of cow by yak bull.

*Ba Sauh*—produce of female yak by bull. These are great milkers, better than yak or cow; tail half-cow, half-yak. Females give

young with bulls or yaks, best produce with yaks. Elevation of shoulder less than in the yak. Hair long but less so than the yaks.

*Look*—sheep, four principal varieties; 1st, Chang Look, or Northern sheep, very large with fine wool. Flocks of 400 to 1000 tended by one man;—2nd, Sok Look, rare, but greatly prized; it is a doomba or heavy-tailed sheep, comes from the province of Sok situated to the east of Lassa; wool not very fine;—3rd, Lho Look, a very small sheep indeed, generally white, sometimes black, is bred principally about Lassa; wool very fine and like the shawl wool;—4th, Changumpo Look; abundant about Geroo and in Dingcham, generally very large. I never saw finer sheep in my life than all these were; white wool very fine and soft. The flesh of all the Thibet sheep is fine-grained and good.

*Peu Ra*—Thibet goat, small, hairy, of all colours. Has an under coat of fine wool, similar to the shawl wool, but there is no shawl wool trade from Eastern Thibet to India at present. Flesh pretty good.

*Phák*—pig, two varieties. The Lho Phák or southern pig which is most abundant to the south of Lassa, and is described as similar to the Indian village pig, and the small China pig now abundant in Lassa and other towns: no wild hogs anywhere in Thibet. The Chinese butchers in Lassa blow their pork and take in the country folks greatly by its fine appearance.

*Cha*—common fowl, generally small in Thibet, and there is no large kind as in Sikim where the fowls are remarkably large.

*Damjha*—ducks. Not eaten by the Thibetans, but greatly prized by the Chinese, for whose use only they are bred near and in Lassa.

*Damjha Cheemoo*—goose. Not eaten by the Thibetans, but much liked by the Chinese.

*Gang Sir, Gung Kur, Chaloong, Toong Toong*—Comprise the numerous wild fowl, swimmers and waders, which migrate from India in March and April, and return in October and November; they are all eaten, but not extensively. There is a sort of prejudice against killing them; but as they all breed on the lakes and rivers of the country and are most numerous, the eggs are found in great quantities, the people who live by gathering and selling these eggs never

rob a nest of *all* its contents, but take about half the eggs. This forbearance arises from the general aversion to taking life which prevails in Thibet, and it has its reward as it is supposed that the birds if entirely deprived of their young, would not again return.

*Chungoo*—a wild dog, reddish colour.

*Koong*—the Civet, is brought from China and inhabits the Chinese borders of Thibet. It is mottled rather than striped.

*Sik*—leopard. Thibet or contiguous countries.

*Tagh*—tiger, ditto ditto.

*Somb*—bear. A red and a black species.

*Nehornehu*—a large sheep, or goat, or antelope. I do not know which, is found in the very rugged mountains north of the Yaroo river, and in the neighbourhood of the salt mines or lakes. Is four feet high, has very large horns, sloping back, and four feet long, has a tail 15 inches long, is shaggy, and of various colours, sometimes black and red.

No leeches, musquitoes or peepsas in Thibet; and maggots or flies are never seen there. There are no bees or wasps in Dingcham or Thibet proper. In the valley of Choombi, a good deal of fine honey is found, which is exported to Thibet.

The lakes in Thibet are full of fish, one kind only is described, it grows to the weight of 8lbs.; it is named "choolap," it is not well flavoured or delicate. I have sent specimens of it to the Asiatic Society of Calcutta, and by Dr. Hooker to Sir J. Richardson. Enormous quantities are taken by the hand in the winter season; when the lakes are frozen over, a hole is made in the ice to which the fish immediately rush, and are then pulled out by the hand. Salt is not used to preserve fish, they are gutted, split up, the tail put in the mouth and allowed to dry in the open air, they keep in this way for a year. The principal lakes on this side the Yaroo are Yamdo Yeuntso, Ramchoo, Kala, and Chomotetoong near Dobta.

#### *Sheep grazing, &c.*

The number of sheep in Thibet is extraordinary. The flocks are immense, and a person of no consequence whatever will have 2,000 or 3,000 sheep. The large owners have as many as 7,000. The fleece is taken once a year in May or June. The ewes breed twice a year. The great lambing season is in April and May. The other



in October and November, many of the autumn lambs die from the cold, but this is not considered any great loss as the skins are so valuable. A cloak of lamb skins made of fourteen skins is worth 25 Thibet rupees or 10 East India Company's Rupees.

The rams remain with the ewes always, but after the ewes are in young, the rams have a sort of breeching put on. My informant's notion is, that this is done to prevent annoyance to the pregnant ewes, but I suspect that they are kept in this way, until the proper season for letting them to the ewes. The allowance of rams is two or three for every hundred ewes. The males are gelded when quite young or up to a year old, the prices vary from 5 to 7 Thibet Rupees per head, i. e. 2 to 3 rupees of ours.

The Government dues on sheep farms is 10 per cent. in kind every three years, this is in addition to a general tax of 1 rupee per door on all houses per annum.

During the summer season, but little fresh meat is used. The Thibetans do not like it boiled, and are not partial to it raw unless it has been dried. In November there is a great slaughtering in the towns, and a wealthy man in the country will kill two hundred sheep at this time for his year's consumption, the animal is butchered, skinned and gutted, and then placed standing on its feet in a free current of air. It becomes in a couple of days quite hard, and white, and is then ready to eat. It is kept in this way for more than a year, and undergoes great vicissitudes of climate without spoiling. I have seen it at Darjeeling in the rains quite dry and hard, and in no way decomposed. When long exposed to the wind of Thibet it becomes so dry, that it may be rubbed into powder between the hands. In this state it is mixed with water and drunk, and used in various other ways. The Thibetans eat animal food in endless forms, and a large portion of the people eat nothing else.

The livers of the sheep and other animals are similarly dried or frozen and are much prized. To a person unused to the dried meat of Thibet, the liver is represented as peculiarly distasteful; it is bitter, and nearly as hard as a stone.

The fat is simply dried, packed in the stomachs, and thus sent to market or kept for home use.

The skins furnish clothing for the working classes and servants. All classes in Thibet put on furs of some kind at the commencement of the winter. It is not reckoned reputable to kill your own meat, and therefore every hamlet has its professional butcher. In towns it is a great trade from the enormous quantity of meat consumed. Some butchers will have five hundred carcasses dried and ready at their stalls. The trade of a butcher—Shempa—is hereditary and strange to say a despised one.

The horns of animals are not turned to any useful purpose in Thibet. Small houses are built in the suburbs of Lassa with horns and clay mortar. Goats are also reared in considerable flocks, but principally on account of their milk. The flesh of the sheep is infinitely preferred. The milk of yaks, cows, sheep and goats is used alike for making dried curds, and the various preparations of milk used by these people. The milk of mares does not appear to be used at all in Eastern Thibet, although ponies are extensively bred there. The number of other cattle renders it unnecessary. Fowls are of a small breed, and are reared with some difficulty. The large fowls of Sikim and Bootan are much prized there. The Thibetans do not care about fowl as an article of diet, and it is only since the period of the Chinese supremacy that fowls, pigs, or fish have been used by them. Even now in the places remote from Chinese posts pork and fowls are not to be had.—The Chinese must have pork, eggs, and fowls, and around Lassa, Giangtchi, Digarchi and other places and their stations, these are reared for Chinese consumption.

#### *Diseases.*

In July and August severe fevers are not uncommon. Cholera is not known; dysentery is, and is often violent, sometimes proving fatal in four days. Cough and diseases of the chest are not prevalent.

Ophthalmia is very prevalent and very severe. Itinerant ocalists go about the country and are in good repute: they never perform operations, but cure by application of unguents and washes. Three days travelling in the snow without hair-blinds is sure to produce ophthalmia.

Skin diseases are by no means common, although the people are so filthy in their habits. The most dreaded and the most fatal of

all diseases is the small-pox. The people fly the infection, leaving their homes in the most inclement weather. Inoculation is regularly performed annually in the warmer seasons. Two methods are in use, one by incisions on the wrist, the other is effected by inhalation. A plug of cotton which has been impregnated with small-pox virus and dried is introduced into the nose and left there for two or three days, at the end of which the symptoms of the small-pox appear. This method was introduced from China where it is largely practised. Dropsy is rather a common disease, and is generally fatal in the cold season. There is very little Rheumatism in Thibet proper; at Bakchan in Choombi it prevails to a very great extent. There is a malady called the "Laughing disease" which is much dreaded, people die of it. It consists of violent fits of laughing with excruciating pain in the fauces and throat, men and women have it alike and is named "Joomtook" in the language of the country. It frequently proves fatal in a few days, but is not accompanied with fever.

---

*Report on two specimens of Cuttack Coal from the Talcheer Mines forwarded by E. A. SAMUELLS, Esq., Commissioner of Cuttack. By H. PIDDINGTON, Esq. Curator Museum Economic Geology.*

Upon examining the specimens of coal, I find that they are wholly shale, and what is called Top coal, that is coal from the upper and generally inferior beds of a mine.

The shale it is useless to describe, being worthless.

The coal (Top Coal) varies much, some of it being composed of layers in which there are about equal parts of layers of shale of a dull black and of good bright bituminous coal. In other bits, the bituminous coal greatly predominates, and gives good promise that at a moderate depth, a really good coal might be met with. We can say nothing as to what the quantity might be.

The bituminous coal is a bright black glance coal, easily separating into flat sharp rhomboidal fragments in the layers, which in the forceps do not melt or flame, but shoot into singular ramifications which glow for a considerable time: the smell is that of good bituminous coal. It will not coke at all.