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Four Years' Journeys through Great Tibet, by one of the Trans-Himalayan Explorers of the Survey of India.

By General J. T. WALKER, C.B., F.R.S., late Surveyor-General of India.

(Read at the Evening Meeting, December 8th, 1884.)

Map, p. 136.

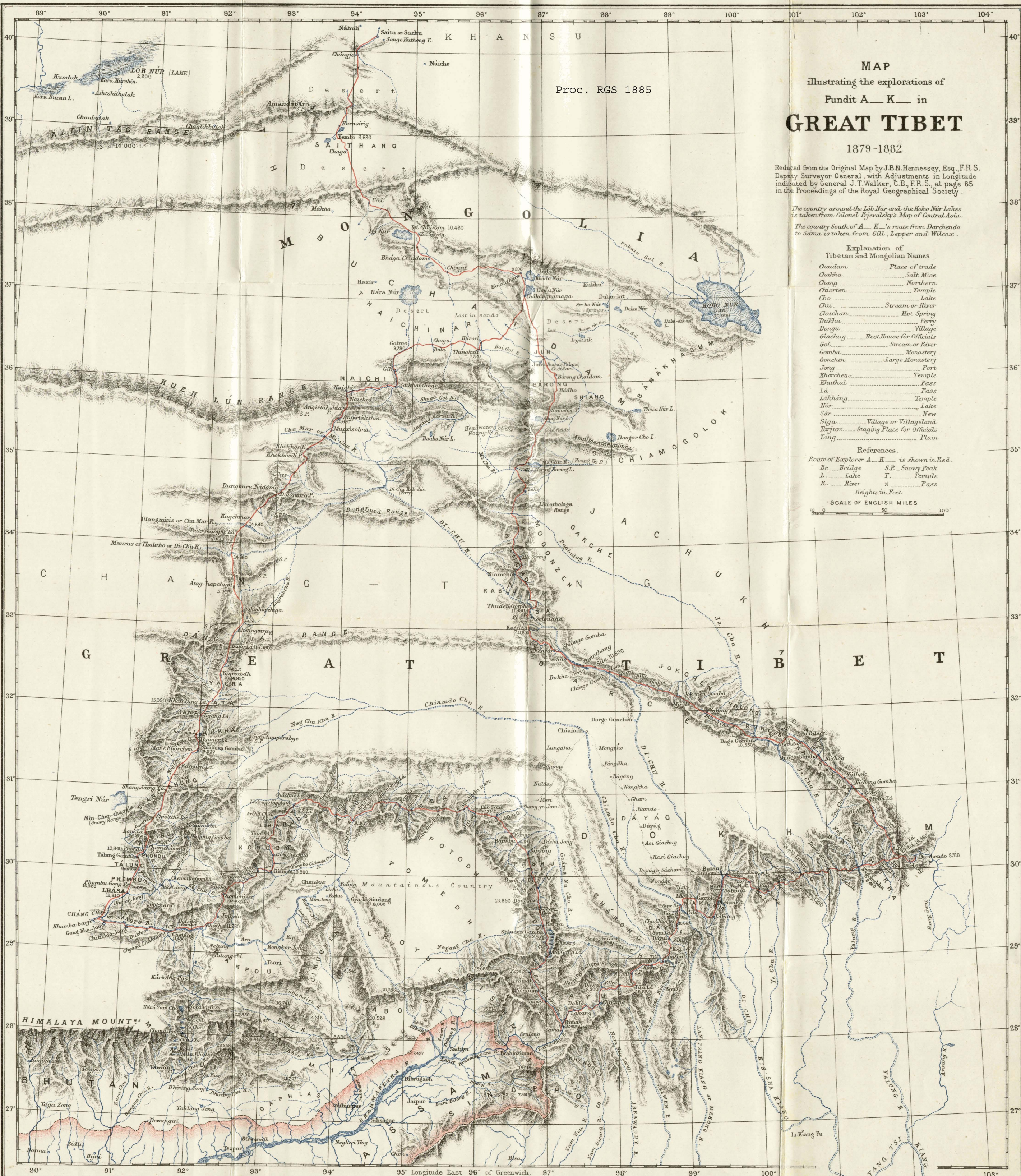
I PURPOSE this evening to give you an account of work done in Great Tibet by one of the Asiatics who are attached to the Indian Survey, to be employed in making explorations of regions beyond the British frontier, into which Europeans cannot penetrate with safety.

In the reports of the Survey this man is simply called A—k, in conformity with a long-standing custom of suppressing the names of the explorers while they are still strong and vigorous, and liable to be again employed in work of this nature. Thus the name of the celebrated explorer Pandit Nain Singh was not published until he was superannuated and living in retirement on the lands which the Government had granted to him as a reward for his valuable services.

Before describing the work of Pandit A—k, I must state the reasons which led to the selection of his lines of exploration. During the years 1865–72 Asiatic explorers, deputed by the late Colonel Montgomerie, had crossed the great Himalayan ranges at various points, and explored Southern Tibet from the highlands which give birth to the upper sources of the Indus, the Sutlej, and the Sanpo rivers, down the valley of the latter river eastwards to the meridian of Lhása. In 1874–5 Pandit Nain Singh, on returning to Léh with the mission which had accompanied Sir Douglas Forsyth to Yarkand and Kashgar, explored the direct route from Léh through Western Tibet to the great Tengri or Namcho Lake, and then to Lhása, whence he struck down to the Sanpo river which he crossed at Chetang, the lowest point then reached by any explorer; finally he entered Assam, via the Tawang valley of Bhutan, thus completing what Mr. Clements Markham has rightly called a really magnificent exploring achievement.

But there still remained vast regions for exploration, more particularly to the north and east. Of the country between Eastern Turkistan

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MAP
 illustrating the explorations of
 Fundit A—K—in
GREAT TIBET

1879-1882

Reduced from the Original Map by J.B.N. Hennessey, Esq., F.R.S.
 Deputy Surveyor General, with Adjustments in Longitude
 indicated by General J.T. Walker, C.B., F.R.S., at page 85
 in the Proceedings of the Royal Geographical Society.

The country around the Loh Nir and the Koko Nir Lakes
 is taken from Colonel Pjevvalsky's Map of Central Asia.
 The country South of A—K's route from Darchendo
 to Sana is taken from GILL, Lepper and Wilcox.

Explanation of
 Tibetan and Mongolian Names

- Chaidam Place of trade
- Chakha Salt Mine
- Chang Northern
- Chorten Temple
- Chu Lake
- Chu Stream or River
- Chuchan Hot Spring
- Dukha Ferry
- Dongru Village
- Giachug Rest House for Officials
- Gol Stream or River
- Gomba Monastery
- Gonchen Large Monastery
- Jong Fort
- Kharchen Temple
- Bhauthul Pass
- La Pass
- Lakhang Temple
- Nir Lake
- Sar New
- Siga Village or Villageland
- Tarjum Staging Place for Officials
- Targ Plain

References.

- Route of Explorer A—K— is shown in Red.
- Br Bridge
- S.P. Snowy Peak
- L Lake
- T Temple
- R River
- x Pass

Heights in Feet
 SCALE OF ENGLISH MILES

and the frontiers of China which had been traversed by the enterprising Venetian traveller Marco Polo in the 13th century, scarcely anything more was known than the very little which he says of it in his journals. Of the extensive region between the routes travelled by Marco Polo and Nain Singh absolutely nothing was known. Eastern Tibet had been crossed in two directions by the adventurous French missionaries, Messrs. Huc and Gabet, on their journeys from China by way of the Koko-nur district to Lhása, and back by way of Chiamdo to the province of Sze-chuen, but without adding to our knowledge of its geography. And Colonel Prejevalsky, the celebrated Russian explorer, had at that time only succeeded in penetrating a short distance into the north-east corner of Tibet.

Thus, in the spring of 1878, I despatched Pandit A—k towards this region, directing him to strike across the great plateau of Tibet into Mongolia by any route from south to north which he might find practicable, and to return by a parallel route over new ground. As he might very possibly strike one of the great routes to China, and be tempted to find his way to the coast, and return to India by the sea route to Calcutta, I particularly directed him to avoid China, of which the geography was well known, and make his way as far as practicable through Tibet, which was comparatively a *terra incognita*.

He was provided with a nine-inch sextant for taking latitude observations, a Tibetan tea-bowl for a mercury trough, a prismatic compass for taking bearings to distant hill peaks, a pocket compass for common use in taking his route bearings, a rosary for counting his paces, a Buddhist prayer barrel for secreting his field books, an aneroid barometer, and some boiling-point thermometers. He was also supplied with ample funds to purchase merchandise at Lhása, where he was to commence his explorations in the guise of a travelling merchant.

Warned by the difficulties which Nain Singh and other explorers had met with in getting past the guards established by the Nepalese Government on all the principal passes leading over the Himalayas into Tibet, he determined to avoid Nepal altogether, and proceeded via Darjiling, through the westernmost valley of Bhutan. Accompanied by two men, one a companion, the other a servant, he left Darjiling in April 1878, and travelling via Chumbi and Phari Jong, struck into the route which had been traversed by Bogle in 1774, Turner in 1783, and Manning in 1811, but not subsequently by any European. He crossed the Himalayas by a low and easy pass into Tibet, and proceeded via Giangche and the lake encircling a great island which figures so prominently on all maps of these regions, to Khambabarji, on the right bank of the Sanpo river, which he crossed by a bridge formed of chains of iron supporting narrow planks, just broad enough for one man to go over at a time. He then proceeded to Lhása, where he arrived in September.

Here he laid in a stock of merchandise, and made inquiries for the next caravan starting for Mongolia, as it would only be possible for him to perform the journey under its escort. The leader of the caravan would give him no more definite answer than that it might leave in February. When pressed to fix the date he declined, saying that long experience had taught him that when the date is fixed, the robbers by whom the road is infested find it out from their spies at Lhása, and then the caravan never arrives safely at its destination. Afterwards, he declined to go at all, and the Pandit had to remain at Lhása until the following autumn, when a caravan arrived from Mongolia, half of which was to return immediately; he arranged to accompany it with his party and several Tibetans who had long been waiting for a favourable opportunity to make the journey.

He was thus detained a whole year at Lhása, but he was far from idle while there; he made a survey of the celebrated city, the Rome of Tibet, which is crowded with temples and religious edifices, and has its Vatican in the monastery at Potola, where the Dalai Lama resides, who is regarded not merely as the high priest of Buddhism, but as a visible deity, the incarnation of Buddha. This building stands on a commanding eminence, and is surmounted by five gilded cupolas, which, when sparkling in the sunlight, present a dazzling and gorgeous spectacle, visible for miles round; it contains numerous images, one of which, in honour of the god Jamba, is of prodigious dimensions; it is seated on a platform on the ground floor, and its body, passing through two floors, terminates in a monstrous head jewelled and capped; the figure is about 70 feet high, and is made of clay, but is well gilded; the pilgrims to this image have to make three series of circumambulations around it, one round the legs, the next round the chest, the third round the head, for circumambulation is an essential feature in the religion of the Tibetans; the object of devotion, whether an image or a temple, or a holy hill, or a great mountain rising high into the heavens and sacred to the gods who are supposed to hallow it by their presence, has to be gone round a specific number of times, in order to secure a minimum of blessing to the worshipper; and the oftener this number is exceeded the greater the expected reward.

The Pandit's detention in Lhása enabled him to witness the festivals held at the commencement of the new year, which occurs about the middle of February. At this time all the gods and goddesses are supposed to be present, and a large gathering of Tibetans takes place to pay homage to them, and unite in prayers for the welfare of the country. During a whole month the government of the city is removed out of the hands of the ordinary rulers and entrusted to a Lama of the Daibung monastery, who while in power is styled the Jalno, and whose business it is to make close inquisition into the manner of life of the citizens, and punish them for their misdoings; this he does by fines

levied often very arbitrarily, and with much severity, as he is allowed to appropriate for himself all the money thus accumulating. The Pandit says, that such of the richer classes as may in any way have incurred his displeasure now leave the city and reside in the suburbs; while the poorer classes who are always dirty and never change their clothes, now sweep and whitewash their houses through fear of being punished for their uncleanness. At the end of a month a ceremony of vicarious sacrifice is performed in propitiation of the deities; the victim is a man specially summoned by the Jalno; they play dice together; if the man wins great evil is foreboded; if the Jalno wins there is much rejoicing, for it is then believed that the victim has been accepted by the gods to bear the sins of all the inhabitants of Lhása; thereupon his face is painted half black and half white, a leather coat is put on him, and he is marched out of the city, followed by the whole populace hooting and shouting; he is not however driven into the wilderness, as was the scape-goat of the Israelites, but is conducted to a distant monastery, where, if he does the right thing, he dies within the next twelve months, for that is considered an auspicious sign; if he survives, the gentle and compassionate Tibetans seem to bear no malice against him for having disappointed their expectations, but they allow him to return at the end of the year and again act the part of scape-goat for his countrymen's sins.

On the completion of the festivals and ceremonials which usher in the new year and last for about a month, the citizens are considered to have become purified both as regards their souls, their bodies, and their houses; the work for which the Jalno was entrusted with special temporary powers is finished; he returns to the obscurity of his monastery, and the government of the city reverts into the hands of the Rajah and four ministers, who direct the administration of the country under the Dalai Lama, their spiritual head.

While residing in Lhása, the Pandit availed himself of the opportunity afforded him of studying the Mongolian language, and the sacred books of the Tibetans; what he now learnt stood him in good stead afterwards, for he was not only able to communicate freely with Mongolians and Tibetans without the intervention of an interpreter, but when his funds failed him, and he had not the wherewithal to defray the expenses of his return journey, he even succeeded in raising money by going about from village to village, reciting passages from the sacred books.

At length, on the 17th of September, 1879, his unavoidably prolonged residence at Lhása came to an end, and he started northwards, in the company of a caravan comprising about 100 individuals. The majority of these were Mongolians, a few of whom were accompanied by their wives; the remainder were Tibetans. The Mongolians were all mounted without exception, for no Mongolian will walk if he can by possibility

ride, and even the shepherds ride round their flocks. The Tibetans mostly walked. All were armed with spear, matchlock, or sword, to protect themselves from the bands of robbers by whom they were so liable to be attacked, that the ever present thought was how to escape being plundered: on the line of march the caravan was invariably preceded by horsemen to give warning of approaching danger; close order was kept, and stragglers were waited for; the marches were always made by day, and usually commenced at sunrise; and at night a guard of two Tibetans and two Mongolians was set to protect the sleepers.

The route taken was that from Lhása to Chaidam. For some miles it passed through a country of low hills and wide valleys, with several temples and monasteries, occasional villages, and here and there a little cultivation; the general level of the country rose from about 12,000 feet at Lhása to 13,500, at the point where villages and cultivation ceased. Sixty miles from Lhása the Lani La pass, 15,750 feet, was crossed, when the travellers found themselves on the highly elevated plateau which occupies the greater portion of Tibet, and is called the Jang-, or Chang-tang, which literally means the northern plain. I purpose giving some description of this very remarkable feature of the earth's surface presently; here I need only say that on entering it the Pandit found that he had passed from a cultivated into a pastoral region, and from fixed habitations to wandering encampments. He came across the grazing grounds of the Government brood mares, 300 in number, from whose milk a fermented liquor is prepared for the Dalai Lama, which constitutes the only spirituous beverage this august individual may lawfully drink.

A week's march carried the Pandit over ninety miles of the Chang-tang to the notable monastery of Shiabden, which, though situated at an altitude of 15,000 feet above the sea-level, is surrounded by houses, and has a permanent population of about 500 persons, of whom four-fifths are laymen, and the remainder lamas. Here caravans may rest in safety, and if need be, purchase provisions, but at very high prices. Up to this place and for about as far again onwards, the route lay through numerous encampments of Tibetan nomads, who dwell in tents covered with the black hair of the yak, which are similar in shape and construction to the felt-covered tents of the Kirghiz nomads at the Health Exhibition in South Kensington. The Pandit estimates the number of tents which he passed in this region as about 7000. But for the remaining 240 miles the Chang-tang was entirely uninhabited; no more encampments were seen, nor monasteries, but only occasional Buddhist manis, or way-side shrines; a party of five mounted men, supposed to be robbers, was met with, and a single caravan proceeding from Mongolia to Lhása; but nothing else. The Pandit describes this region as abandoned to wild animals, and not resorted to by either Tibetan or Mongolian nomads. The heights of his camping grounds on

the Chang-tang ranged from 13,500 to 15,000 feet; the highest pass crossed was 16,400 feet, on the Dángla range, which constitutes the water-parting between the upper basins of the Yang-tsze-kiang, one of the great rivers of China, and the Mekong river of Cambodia. The route crossed the upper sources of the latter river—here called the Chiamdo Chu—as small streams taking their rise in adjacent hills to the west; it also crossed three of the principal affluents of the former river, the Maurus, the Ulángmiris, and the Ma-chu, each in itself a considerable river, and only fordable where split up into several channels; their sources lie in the lacustrine region to the west, probably far away; but at a short distance to the east they join together and form the river which Tibetans call the Dichu, and Chinese call the Kin-sha-kiang, and which eventually becomes Gill's River of Golden Sand, the Yang-tsze-kiang.

After a march of five weeks at this great elevation, the travellers reached a range called the Angirtákshia by the people of the country; it is the northern boundary of the Chang-tang, and is believed to be a continuation of the well-known Kuen-lun range of Western Tibet. Crossing it by a pass of precisely the same height as the Lani La, by which they entered the Chang-tang, they descended into the plains of Chaidam, and in a few days found themselves down at a level of 9000 feet in a comparatively warm region, with plentiful forests and cultivation. Arrived at Thingkáli, they thought they had nothing more to fear from the robbers of whom they had been in constant dread hitherto; all the members of the caravan assembled together to exchange hearty congratulations on the good fortune which had so far attended them, and which they attributed to their own cunning and sagacity in evading the robbers; then they bade each other farewell, with mutual kindly offers of future friendliness and hospitality; the Mongolians, who formed the greater portion of the party, dispersed themselves in different directions, but the Tibetans remained with the Pandit to accompany him further north. He seems to have found the Mongolians very kind and friendly, ready to help him whenever his supply of provisions ran short, remarkably honest and truthful, exceedingly partial to intoxicating liquors, but generally as harmless when drunk as when sober; even if so much the worse for liquor that his legs are no longer reliable, the Mongolian can still sit his horse with safety, being accustomed to ride from the time he was a baby.

After a few days' rest at Thingkáli, the Pandit and his Tibetan friends were about to start for Hoiduthára, when they were attacked by a band of some 200 mounted robbers from Chiámogolok, who had come to plunder the Thingkális, and fell on them also. The robbers were eventually driven off, but they managed to carry away most of the goods which the Pandit had brought to trade with, and all his baggage animals, but happily none of his instruments. Though much crippled

by his losses, he determined to press on and make his way to Lob Núr and the plains of Gobi. He crossed the Chaidam plateau, and reached Hoiduthára towards the end of December 1879, with his companion and servant. As the proceeds of the sale of the merchandise which the robbers had left behind were insufficient to carry them on, they took service with a Tibetan from Giangze, who had migrated some years previously to this country, where he had become a man of property and influence; he befriended them, and recommended them to remain at Hoiduthára until the winter was past, offering them food and lodging meanwhile, in return for which they were to look after his camels. Towards the end of March they resumed their travels northwards, and in a fortnight reached Yembi in Saithang, the head-quarters of a considerable population of Mongolian nomads, who dwell in tents covered with white felt like the Kirghiz tents at the Healtheries Exhibition. Here, at an elevation of 9000 feet, the Pandit halted for three months, and disposed of his remaining merchandise by sale and barter, realising 200 rupees in silver, and some mares and colts. He was waiting for an opportunity to proceed to Lob Núr with a party of traders when, during a temporary absence from Yembi, his servant basely deserted him, taking away most of his money and newly acquired horses; the man disliked the idea of travelling into a country of which he had heard that the inhabitants were Mahommedans, who were at war with the Emperor of China, and he had frequently endeavoured to dissuade both the Pandit and his companion from going further, but finding them bent on proceeding, he availed himself of the earliest opportunity to rob and desert them. They were now left practically destitute, but they still determined to persevere. They again went into service and tended ponies and goats for five months, at the end of which they decided to move on with the limited funds at their disposal, and should these fail, to beg their way. Their master, the Pandit says, was a thorough gentleman, and on their departure he gave them a horse worth 40 rupees, some warm clothing, and provisions for their journey. They started from Yembi on the 3rd January, 1881, with a party of traders, crossed the Altyn Tag range by a pass 14,000 feet high, and then descended into the plains of the Chinese province of Khánsu to a level somewhat below 4000 feet, materially lower than anything they had met with since leaving Darjiling. On the sixth day they reached the important town which the Chinese call Tung-Hwan-Hsien, but which Tibetans call Saitu, and Mongolians Sachu; but the latter names appear more properly to apply to the adjacent ruins of a former city, which was visited by Marco Polo, who calls it the city of Sachiu, and describes the inhabitants as mostly idolaters, but some Nestorian Christians and some Saracens.

After a few days' residence at Sachu, the Pandit made arrangements for proceeding to Lob Núr with a party of traders, and had actually

started with them and proceeded for a short distance from the town, when he was overtaken by a horseman who was sent by the Governor to compel him and his companion to return. The Governor took them for spies and kept them under surveillance for seven months. At the end of that time an influential Lama whom they had known in Saithang arrived and recognised them, and obtained their release. He had come to visit a neighbouring temple of great renown called the Sange Kuthong or thousand images, and was about to return to his home at Thuden Gomba, 600 miles to the south, on the road to Darchendo. He offered to take the Pandit and his companion with him as servants, and they gladly accepted the offer, as they were most anxious to get away from Sachu, where for the first time in their long journeyings they were looked upon as suspicious characters; they therefore did not venture to take any observations for the latitude and boiling-point here, but kept their instruments concealed.

They left Sachu with their new master in August 1881, returning over their former line of route through Saithang to Hoiduthára; there they struck into a new line which took them southwards over the plain of Upper Chaidam to Jún, which had been visited by Prejevalsky in 1872; thence they proceeded to the Angirtákshia or Kuen-lun range, which they crossed at the Namohan Pass, about 180 miles to the east of their previous point of crossing. They now found themselves again on the Chang-tang plateau, but in a quarter where it is very much narrower than on their first route line, only 140 miles broad instead of over 400; they crossed another Ma Chu or Red River, one of the principal sources of the great Hoang-ho or Yellow River of China, and a range of hills called the Lámathologa from its rounded peaks like the heads of Lamas. Fear of the neighbouring tribe of Chiámogoloks, which is noted for its robbers, caused them to travel as quickly as they could; thus eight days' march carried them across the plateau and down to Niamcho, where they found some houses and a little cultivation. Five days onwards brought them to the home of their Lama master in Thuden Gomba.

While halting for a few days in the Jún district, they received tidings of the servant who had robbed and deserted them, that he had purchased goats, sheep, and mares, and was residing with some Tibetan nomads in the neighbourhood; they sent a man to persuade him to rejoin them, but he declined, and advised them to give up their work and join him instead as the wiser thing to do. The Pandit's narrative is very remarkable for the absence of any expression of animosity or resentment towards this man. But I think it may be said with truth of Asiatics generally that they are not surprised when a man makes the most of his opportunities to better himself, even at their own expense; men with whom we Englishmen are ever ready to sympathise as victims of oppression, whether in Egypt, or Turkey, or India, take a much more

charitable view of their oppressors—more particularly when they happen to be their own countrymen—than we do, feeling probably that they have only been done by as they themselves would have done had they had the chance; though very angry at the moment, their anger is not unfrequently succeeded by admiration of the skill which their oppressor has shown in doing well unto himself.

Thuden Gomba, where we left the Pandit, is a monastery of no great size or importance, situated in the valley of the Di-chu, the principal source of the Yang-tsze-kiang. Here he and his companion had to wait two months until it pleased the Lama, their late master, to pay them their wages, and give them a promised letter to an influential friend in the neighbouring town of Kegudo to help them to get back to Lhása. This friend recommended them to a merchant who was about to proceed to Darchendo, and with him they took service for the journey so far.

Kegudo is a town of some importance at the junction of the most frequented trade routes from Lhása to Sining and Darchendo: the elevation is nearly 12,000 feet. Leaving this place on the 12th of January, 1882, the Pandit and his companion proceeded for some distance through the valley of the Di-chu, then traversed the highlands between that valley and the valley of the Ja-chu, crossed the latter river at an elevation of 10,500 feet, and halted at the famous monastery of Kanzego, which is inhabited by 2000 Lamas and surrounded by a town of 2500 houses, and is so old and sacred that the people of the surrounding districts swear by its name in confirmation of their declarations; then leaving the Ja-chu to the west they bore straight for Darchendo, which place they reached on the 5th of February, having travelled a distance of about 420 miles in 25 days. This portion of their journey lay through a fairly open and easy country, and along a well-established trade route, passing through numerous villages and in the neighbourhood of many monasteries; just at the end, however, a difficult pass, the Gi La, 14,700 feet high, over a snowy range, had to be crossed before reaching Darchendo. The Pandit met numerous Tibetan traders returning to their homes with tea purchased in China, the aggregate amount of which he estimates at 300,000 lbs.; all of it appears to have been of the common coarse kind which the Chinese think quite good enough for Tibetans; thus it was not the Pandit's good fortune to come across either of the two kinds of tea so happily discovered by our gold medallist Mr. Colborne Baber, one of which is naturally provided with sugar, and the other with a flavour of milk.

Darchendo is the Tibetan name of the town which the Chinese call *Ta-chien-lu*; it has been well described by Captain Gill in his interesting work 'The River of Golden Sand.' It is situated on the border line between China Proper and Tibet, the country to the east being governed directly by the Chinese, and that to the west by native chiefs, subject to China, but also greatly under the influence of the Grand Lamas of

Tibet, whose control though here nominally spiritual, embraces much of the temporal also. At Darchendo the Vicar Apostolic of the Franco-Catholic Mission in Tibet resides, and as I had given the Pandit a general letter of introduction to the French missionaries, he presented it to Bishop Biet, the successor to Monseigneur Chauveau, by whom Captain Gill had been so warmly welcomed. The Bishop kindly assisted the Pandit with a present of money, and advised him to take the direct route back to India *viâ* Bátang; he also wrote to the Abbé Desgodins, a well-known member of the mission who was then in India, requesting him to inform me that the Pandit had reached Darchendo in safety and good health, and was about to return to India. This information was most welcome, as four years had elapsed since any communication had been received from him, and most distressing rumours had recently reached his family, that he had been seized by the authorities at Lhása and had had his legs chopped off in order to put it out of his power to make further explorations; I was making inquiries of the truth of these rumours through the agents of the Nepal and the Kashmir Governments at Lhása, when I had the satisfaction of receiving the Bishop's letter, which showed that the rumours were a pure fabrication; in fact from first to last, though occasionally arrested and detained as a suspicious character, he never met with any personal ill-treatment.

Turning westwards from Darchendo he took the route to Bátang which Gill had traversed in the summer of 1877. A week's march brought him to the Yalung river, also here called the Nagohu, which he believes to be a continuation of the Jachu which he had previously crossed in the district of Yalung, and the very fact of its being called the Yalung river makes this very probable. To cross the river the sanction of the headman of the village of Nag-chu-kha, on its eastern bank, was necessary; but the Pandit arrived there in the month of February, when the New Year's festivals were being celebrated; thus, on asking for permission to cross, he was suspected to be a thief, and told that no one but thieves cared to travel at this time of the year. He was detained some days while inquiries were made as to whether any theft had recently been committed at Darchendo, and the answer being satisfactory he was set at liberty. Crossing the river, at the elevation of 8400 feet, he proceeded to Litang, which Gill describes as a cheerless place, one of the highest cities in the world; its altitude is 13,300 feet or about the same as that of Potosi, but 1700 feet below the Shiabden monastery at which the Pandit had halted when crossing the Chang-tang. Small-pox was prevalent in the Litang district, for protection against which the Pandit found that a kind of snuff, prepared from the dried pustules of small-pox patients, was being administered by the Chinese physicians as a prophylactic; it has the same effect as inoculation, inducing a mild form of the disease, and thus protecting the snuff-taker from the

severer form which exists during an epidemic. Tibetans have a great horror of this disease, which is almost invariably fatal to them, though their neighbours, the Chinese, think no more of it, Captain Gill says, than an Englishman does of a cold.

Bátang was reached in the middle of March, and then the Pandit struck across the remarkable region of contiguous parallel rivers which forms such a prominent feature on all maps of Tibet, but which as yet has not been explored by any European, though several have attempted to penetrate it both from the east and from the west. First descending into the valley of the Di-chu or Kin-sha-kiang, he crossed the river at an altitude of 7700 feet, and then ascended the western highlands to the important town of Gárhok, altitude 12,000 feet. Again descending, he entered the valley of the Chiamdo Chu, or Lan 'Ts'ang Kiang, the Mekong river of Cambodia, which he crossed at 9500 feet, and then ascended to the plateau of Dayul, 11,000 feet. His next descent brought him to the valley of the Giama Nu Chu, or Lutze Kiang; he crossed the river at an altitude of 7200 feet, and again ascending reached the Tila-la, a pass 16,000 feet high on a range of mountains which is one of the world's great water-partings, as we now discover from his survey. Descending westwards from that pass he entered the Zayul valley, the river of which flows by the Brahma Kund, or pool of Brahma, into Upper Assam, where it is known as the Lohit Brahmaputra. He descended this valley to the village of Sáma on the boundary between the Tibetan district of Zayul and the independent semi-savage tribe of Mishmis. Here he was within 30 miles of the British frontier; but narrow as was the belt of intervening country he dared not attempt to cross it, as he was told he would certainly be murdered by the Mishmis if he trusted himself to them. He learnt that some years previously they had allowed two French missionaries, Messrs. Krick and Boury, who were endeavouring to make their way to Tibet from Upper Assam, to pass through their country, and had then pursued and murdered them near the very village of Sáma at which he had arrived. Very reluctantly, therefore, he had to abandon his intention of returning directly to India, and to prepare for the long and circuitous route *viâ* Lhása instead.

It was now the middle of May, 1882. The principal pass over the Himalayas which he had to cross on his journey northwards would not be practicable for some weeks, so he went about from village to village reciting the sacred books of the Tibetans, and thus managed to earn some 20 rupees to meet the expenses of the long journey before him. At one of these villages, Rima, which is obviously identical with the Roema of previous maps, the Pandit and his companion were placed in quarantine for twenty-two days because they had come from places where small-pox was raging. The altitude of Rima was found to be about 4600 feet, the lowest of any of the Pandit's determinations in Tibet. The Zayul

valley is regarded by the Tibetans as the hottest and most disagreeable region in their country, and, therefore, criminals sentenced to transportation for life are sent there by the Government of Lhása to undergo punishment.

On the 9th of July the Pandit started northwards up the valley of the Rong Thod river towards the great range of the Southern Himalayas, which he crossed at the Ata Gáng Lá, about 15,000 feet high; he then came once more on to the elevated plateau of Tibet, and in a quarter which is of great interest to geographers, for it is the region of the water-parting between the eastern and western systems of rivers, and it constitutes an impassable barrier to the oft-asserted flow of the great Sanpo river of Western Tibet into the Irawadi. For some 40 miles of his route the water-parting between the Gíama Nu Chu and the eastern basins of the Sanpo lay on his right hand at a short distance; he then crossed it and entered the western basins of the affluents of the Gíama Nu Chu, and from thence onwards for 200 miles it lay on his left hand, when he again crossed it. Thus there can no longer be any doubt that the Sanpo river merges into the Brahmaputra, as has been constantly urged by Colonel Yule and many of our ablest geographers.

The Pandit's route lay generally over a high plateau, the measured altitudes ranging from 11,000 to 13,500 feet above the sea; he passed numerous villages and monasteries; at Lhojong he struck what is called the Junglam, or official road between Bátang and Lhása via Chiamdo, and following it, passed through several places mentioned by Huc in the account of his return journey from Lhása to China. Coming from Zayul, the penal settlement of the Tibetans, their travel-stained and woe-begone appearance led to the detention of the Pandit and his companion at the Shinden monastery, under the suspicion of being escaped convicts, for some days, when an influential personage, whose acquaintance they had made at Rima, arrived, and caused them to be liberated. Happily for them it was now summer, and they did not need much warm clothing; they crossed with apparent ease a pass of 18,000 feet, and another of 17,300, over hill ranges which Huc describes as vast mountains cut up with cataracts, deep gulfs, and narrow defiles, entangled pell-mell, of forms *bizarre* and monstrous, abounding in horrible and dangerous precipices even in parts which the people of the country describe as flat as the palm of the hand. Huc had to ride always, for he was no mountaineer, and was told that he would be far safer on the back of a Tibetan horse than on his own legs; he made many a descent on horseback, piously committing his soul to heaven at starting, as he scarcely expected to reach the bottom alive; it is but fair to him, however, to say that he was travelling in the months of March and April, before the winter's snows had melted, and when the roads were still slippery with ice.

Crossing the last of these ranges—the name of which according to

Huc is Loum-ma Ri, meaning the mountain of the goddesses—the Pandit descended to Chomoráwa at the head of the Kichu valley, the river of which passes by Lhása. Here he found the nomads engaged in burying animals that had died from a disease caused by an insect which appears to be a species of wingless beetle. It is half an inch long, with a black head and dull yellowish body, and is common all over Tibet. These insects appear to poison their surroundings by their mere presence; they swarm under grass, which for some distance around becomes so dangerous that animals grazing on it are at once attacked by a fever which afterwards becomes contagious, and attacks other animals, and even the herdsmen, and persons eating the flesh of an infected animal. Very few who are attacked by this fever, whether man or beast, are said to recover. The only treatment practised by the natives is precautionary; the Pandit says, “they eat beforehand scorched insects, which fortifies their system against the poisonous effects of living ones.” This is a practical application of the maxim, *Similibus similia curantur*, which would have rejoiced the heart of its illustrious author. The insects are not easily discovered, as they always remain hidden under the grass; but in the winter they are readily detected by the rapid melting of the snow over the spots where they are congregated; a fire is then lighted over them, and they are removed when thoroughly scorched, to be administered with salt to man and beast as a prophylactic; one of these baked insects is considered sufficient for a man.*

At this place the Pandit left the road to Lhása, and turned southwards to the Sanpo river, which we may now without any hesitation call the Brahmaputra; he crossed it at Ohetang, height 11,500 feet; he then proceeded up the right bank to his original starting-point Khambarji. This done, his work was accomplished, and he returned as rapidly as he could, reaching Darjiling with his companion on the 12th of November, 1882, just four and a half years after they had started on their arduous expedition. They arrived in a condition bordering on destitution, their funds exhausted, their clothes in rags, and their bodies

* I am indebted to our Librarian, Mr. E. C. Rye, for the following interesting note. In Westwood's ‘Introduction to the Modern Classification of Insects,’ vol. ii. p. 228, will be found a discussion of the application of the name *Buprestis*, which now represents large, brilliant, and hard beetles living in or upon timber trees for the most part, but was by the ancients apparently given under various inflections (such as *Vulpestris*, *Bulpestris*, *Bustrepis*, *Bubestea*, &c.) to a poisonous insect, said to cause oxen to swell, inflame, and burst (*Βούκηριστις, κατὰ τὸ κῆσαι τὰς Βοῦς, quia boves rumpit*). Belon has recorded that there was on Mount Athos a winged insect like the *Cantharis* or Blister-beetle, which feeds upon various low plants and was called “*Voupristi*” by the Caloyers or monks, who asserted that when horses or other cattle even feed upon the herbs which the insects have touched, they die from inflammation, and that it is an immediate poison to oxen. Latreille supposes that this Athos insect is a *Mylabris*, a view in which Kirby and Spence agree; and, as the *Mylabridæ* (which are closely allied to the *Cantharidæ*) are known to have strong vesicant properties, and are apparently especially numerous both in species and individuals in Central Asia, there seems every probability that the injuries to cattle by insects reported by A—k may really be owing to beetles of this family.

emaciated with the hardships and deprivations they had undergone. They were in a worse plight than the Russian Prejevalsky was on returning to China from his first expedition to Tibet, when he and his companions were called "the very image of Mongols," an epithet which he seems to have considered most opprobrious. But, though worn and weary, they were triumphant for they had succeeded in bringing back the whole of the instruments they took away with them, even the bulky 9-inch sextant, which, however, was not packed in a box, but wrapped round with felt and wadding; they had also preserved—what was of very much greater importance—all their journals and field-books. After a short stay at Darjiling to replenish their wardrobes and make themselves look respectable, they went down to Calcutta to report themselves to me and give me an account of their travels; as may be supposed, I was heartily glad to see them returned safe and sound, and to learn what a considerable extent of new ground had been surveyed.

The Pandit succeeded in keeping up through the entire length of his journeyings—about 2800 miles—a continuous and unbroken route survey, with magnetic bearings and paced distances. The pacing was mostly his own, and in order to execute it, he never rode if he could avoid doing so, and was much looked down upon in consequence, more particularly by the Mongolians, the poorest of whom always ride. But in proceeding from Barong Chaidam to Thuden Gomba, a distance of 230 miles, the Lama with whom he had taken service insisted on his riding, in order the more readily to avoid robbers, by whom the road was infested; he then counted his horse's paces instead of his own; but he was careful to take latitude observations at certain points, to enable the average length of his horse's pace to be afterwards calculated from a comparison of the meridional dead reckoning with the difference of latitude, just as his own average pace is calculated for each section of his route. He took latitude observations at twenty-two places in all, and boiling-point determinations of height at seventy places. His field-books contain a fair amount of information as regards collateral details; they are tiny little volumes which he managed to secrete on his own person, and in a Buddhist prayer barrel which he always carried about in his hands. The primary object of this interesting little machine is to hold rolls of paper, superscribed all over with the four words "Om mani padmi hom." which constitute the Buddhist universal prayer; a single repetition of this mystical invocation is regarded as a pious ejaculation to Heaven, greatly beneficial to the utterer; while even the mechanical turning round of a roll of paper on which it is written is considered equivalent to the oral utterance, and likely to promote the spiritual and temporal welfare of the turner and his friends, and to bring good fortune to the neighbourhood generally. The oftener it is inscribed on the paper, the greater the blessing anticipated from the rotation of the barrel; thus, in some of the monasteries and temples there are prayer barrels

of enormous dimensions, on which it is written thousands of times, within and without; and even the hand-barrels have large receptacles, sufficient to contain several of the Pandit's field-books, as well as his pocket compass.

Of journals descriptive of the incidents of his travels, the countries he visited, and the manners and customs of their inhabitants, such as an educated European traveller would be expected to keep up, he had little or nothing. I must now explain why, not merely as bearing on his work, but in order to correct an erroneous impression which has got about, that the Asiatic explorers of the Indian Survey are educated native gentlemen; this is not the case; we have never secured the services of Asiatics who were well educated, and who also possessed the hardihood, and courage, and powers of endurance which are required of an explorer. Of course, our employés are bound to be men of intelligence, as well as of good physique; also to have had some education, but not necessarily much, just sufficient to enable them to acquire the rudimentary elements of surveying, to make the requisite observations and measurements, and to keep up their field-books. Thus our first great explorer Nain Singh was, when I enlisted him, the master of a village school in the Kumaon Hills, and his education and acquirements were much on a par with those of the village schoolmaster of whom Goldsmith sang in years long gone by, before School Boards were invented—

“The village all declared how much he knew;
’Twas certain he could write and cypher too.”

Nain Singh also was regarded as a very learned man by his acquaintances, and given the honorary designation of Pandit, which is usually applied by natives of India to any learned Hindoo; it has thus come to be applied not only to him, but to others of the Hindoo explorers of the Survey, though, of course, not to any of the Mahommedans.

He soon learnt how to make route surveys, and determine heights and astronomical latitudes. And so did our present Pandit. But neither of them could have acquired the difficult art of determining absolute longitudes which however even accomplished European travellers do not invariably succeed in mastering. The work most strongly impressed on the Asiatic explorers is to keep up an unbroken record of the bearings and distances on their routes from place to place, for when this is done, and a few latitudes are also determined, sufficient data are available for the construction of a fairly accurate map of the survey. The distances they obtain by counting their own paces; this is a very tiresome thing to do without intermission for any length of time, though it is told of the celebrated Dr. Chalmers of Edinburgh that he had acquired a knack of counting his paces and carrying on a conversation simultaneously, so that at any time he could tell his companion the precise distance they had walked. Our explorers always wear a

rosary—what we may be sure the worthy Scotch minister never wore—to help them in counting their paces, and they drop a bead at every hundred paces. Thus, the rosary and the prayer barrel are of much practical service as surveying instruments, and their constant use gives the explorers an air of propriety and respectability in the eyes of the mechanically devout Tibetans, and never excites suspicion.

The field survey work is regarded as by far the most important business of the explorer; he is purposely not taught to reduce his own observations, or to plot the maps of his routes, for the only check on his work lies in the having this done by an independent agency, on his return to the head-quarters office.

It will be now readily understood that the explorers, though intelligent and skilful observers, are not capable of writing an account of their travels, at least, in a form that would be suitable for publication, though sitting by your side, they will give you a most interesting narrative of their adventures and journeys, and the people and places they have visited. Thus, on their return they have to be taken in hand and questioned and listened to, and their narrative has to be translated into English and written down; simultaneously their latitudes and height determinations are worked out, and their field-books are plotted in sections. Finally, a summary and general discussion of the results of the exploration is made by the head of the office to which they are attached. It was in doing this for Nain Singh's explorations that first Colonel Montgomerie, and afterwards Major Trotter, were so successful in producing interesting narratives that the enterprising village school-master came to be regarded as an educated traveller; his designation of Pandit may also have been misleading to those who were not aware that it was simply an equivalent to the Scotch "Dominie."

Our present Pandit was mainly educated by Nain Singh, and is much the same stamp of man, happily, for had he gone through a regular course of study at one of the Indian universities and been more delicately nurtured, he would scarcely have cared to become a servant to a succession of foreign masters, and to tend camels and horses and goats, in order to acquire the means of carrying on his surveys.

On rejoining the head-quarters office at Dehra Dun, and making over his field-books and instruments, he was given some months' leave of absence to his home. When he returned to the office, his overflowing information was written down, and the map and account of his journeys were prepared under the superintendence of Mr. Hennessey, who has done for him what Colonel Montgomerie and Major Trotter did for Nain Singh. And now the maps have been published, and the account of the explorations, with Mr. Hennessey's Summary and Discussion, will shortly be published too, the Government of India having sanctioned this being done, but so recently that as yet only preliminary proofs sent to myself have reached England.

It so happened that soon after I despatched our Pandit on his explorations, two expeditions into Tibet were organised, one from the north under the Russian Colonel Prejevalsky, the other from the east under the Hungarian Count Bela Szechenyi. In 1879-80 Prejevalsky explored a route across Mongolia, viâ Barkul and Chami to Sachu, the northernmost point reached by our Pandit, whence he struck southwards through Chaidam and over the Kuen-lun range to a point nearly on the parallel of 32°, and about 170 miles north of Lhása, along a route which in the main is identical with the route which the Pandit took in his journey in the opposite direction; at this point Prejevalsky was stopped, and turned back again. In 1879 Count Szechenyi and his companions, coming from Western China, traversed the entire length of the province of Kansu as far as Sachu, whence they hoped to penetrate into Tibet, but were not permitted to do so; returning eastwards, they endeavoured to take the road from Koko Núr to Lhása, but were again baffled, though supported by the Chinese officials; they were told that they could only enter Tibet viâ Bâtang. They proceeded, therefore, to Darchendo, and travelled from thence to Bâtang over the identical route which had been taken two years previously by Captain Gill, and was taken three years afterwards by our Pandit. At Bâtang, like Gill, they found unconquerable opposition to any further advance towards Lhása, and, as he had done, they turned southwards and proceeded, viâ Ta-li-fu and Bhámo to India. Thus, the Pandit's nationality and knowledge of the Tibetan language enabled him to explore regions which Englishmen, Russians, and Hungarians alike had found barred against them. He had formidable competitors in the race to acquire a better knowledge of the geography of Tibet, but he has really accomplished more than any of his rivals, all of whom were much better educated and equipped than himself.

It is a singular circumstance that a country in which Englishmen were received with open arms a century ago, and which was twice traversed by the French missionaries, Messrs. Huc and Gabet, not forty years ago, now excludes Europeans of all nationalities even when supported by the Chinese Government. This is due to the influence of the Lâmas and other priestly classes by whom the country is governed, and also, it is said, much oppressed; they look upon a European as a certain precursor of conquest and subjugation. Nor is the idea a singular one. Early in the present century it was embodied in a treaty between the British and the Nepal Governments, prohibiting all Europeans, but a few privileged officials, from entering Nepal, and restricting even them to the district immediately surrounding Kathmandu. The Nepalese have ever been our faithful and friendly allies. They readily helped us in 1857, the year of the mutiny of the Bengal army, when we so greatly needed their help; still they have a strong and not altogether unreasonable objection to the admission of Europeans into their country.

Thus at the present day there are large areas in Nepal of which less is known than of the many regions in the heart of Africa which have been visited by the agents of the Royal Geographical Society; what is known has been mostly acquired by native explorers sent into the country first by Colonel Montgomerie and afterwards by Captain Harman, but it is not nearly as much as ought to be known of a region so close to the British frontier.

From this digression I return to the Pandit. The chief value of his work is geographical. His routes from Lhása to the point, some distance beyond Shiabden Gomba, where he commenced touching Prejevalsky, from Jún to Darchendo, and from Bátang to near Lhása, of which the aggregate length is about 1700 miles, are entirely new to scientific geography; for though the interesting and vivacious French missionary M. Huc travelled over a portion of the latter route, his account of it is valueless for geographical purposes, and in parts is so highly coloured and exaggerative as to have thrown doubts on its genuineness; but the Pandit's survey removes all doubts on this point, and enables Huc's narrative to be followed very readily, which has not hitherto been possible.

His having been unable to cross the country of the Mishmis and bring his labours to an end in British territory when he was at Sáma, so close to the frontier, though very distressing to him at the time, was most fortunate from a scientific point of view, in that it necessitated his surveying 600 miles of route over entirely new ground, which took him round the eastern basin of the Sanpo river and enabled him to determine that that river certainly flows into India, not Burma, and is the source of the Brahmaputra, not of the Irawadi; he was thus also able to ascertain the upper course of the Giama Nu Chu or Lutse Kiang, called the Sok river by Huc, which lay on the other side of his route.

As regards the actual sources of the Irawadi, the information he has obtained is rather of a negative than of a positive character. His survey from the point where he crossed the Giama Nu Chu to the Mishmi border is very minute and shows two high ranges trending east and west, which are certainly not crossed by any river flowing into Burma, such as the Kuts' Kiang of recent maps. There is, however, a bare possibility that his Giama Nu Chu may be the upper source of the Irawadi, as has been conjectured by Herr Löczyn, the geologist attached to Count Szechenyi's expedition; on the other hand, it is affirmed to be the upper source of the Salwin river by the Abbé Desgodins who traversed it for some distance both above and below the ferry where it was crossed by the Pandit, down to the entrance of the valley on its left bank in which the French missionary settlement at Bongo is situated, where the Abbé resided for upwards of a year; thus it is scarcely possible that he can be mistaken. The only information obtained by the Pandit regarding its lower course was that it passes by Riu Chiako, a noted place of pilgrimage in Burma, which is reconcilable with either hypothesis.

The Pandit's surveys are in very fair accordance with those of Gill and Prejevalsky, wherever the same ground has been gone over; thus, from Bátang to Darhendo, there is a close agreement with Gill even in minor details, and the accordance between the boiling-point determinations of height is quite remarkable. Comparing with Prejevalsky, the latitudes and heights agree very closely, and the longitudes very fairly—the Pandit's positions being sometimes to the east, sometimes to the west—over a distance of about 450 miles, between the parallels of 32° and 38°, up to Igi Chaidam; but beyond that point they steadily diverge, until at Sachu the Pandit is about 25 miles to the west of Prejevalsky. It so happens that this place was also visited by Count Szechenyi and his party, and their longitude is as much to the east of Prejevalsky's as the Pandit's is to the west; the three latitudes agree.

All the Pandit's longitudes have been deduced from his route survey by dead reckoning controlled by astronomical latitudes. A second and very important check on them is obtained at his easternmost point Darhendo, where his value falls between two independent values differing by 14 miles, one determined by Count Szechenyi, the other by Mr. Baber and used by Captain Gill. Various other satisfactory tests are set forth in Mr. Hennessey's Summary, all tending to show that the Pandit has done his work right well, and is to be thoroughly relied on. I am happy to be able to state that the Government of India have already recognised the value of his services, and rewarded him by a suitable grant of land in perpetuity, as was done for Nain Singh. He has also been given one of the two bronze medals which were placed at my disposal by the Commissioners of the International Geographical Congress and Exhibition at Venice in 1881, for award to Asiatic explorers. I trust that our President and Council may deem his services worthy of some such token of the approval and favour of the Royal Geographical Society as was awarded, on more than one occasion, to his predecessor Nain Singh, whose successful career greatly influenced him in pressing forwards to complete his geographical explorations, regardless of the misfortunes which so often befell him, and which might well have daunted the heart of any man less earnest and persevering.*

* Pandit A—k has accomplished a much larger amount of exploration than has hitherto been performed by any of the Asiatic explorers of the Indian Survey; he is the man whom Mr. Clements Markham calls Pandit D in his 'Narrative of Mission of George Bogle to Tibet,' &c., p. cxvi. His principal route surveys are the following:—

(1) 1869. Milam to Rakas Tal Lake in Tibet, and thence along Karnali river to Kathai ghat, 400 miles.

(2) 1872. Shigatze to the Tengri-Núr Lake, and thence to Lhása (as Pandit D), 300 miles.

(3) 1873-4. From Tankse in Ladak to Kashgar and beyond, thence south-east to Polu, and south to Noli on the Pangong Lake, and back to Tankse, 1250 miles.

Thus he had surveyed 1950 miles of route line before commencing his present explorations which cover 2800 miles, exclusive of the distance travelled to reach Kham-batorji, the origin of the field work.

In conclusion, I would draw the attention of this meeting to that remarkable region, the Chang-tang of Tibet, which the Pandit crossed twice, on his way first from Lhása to Chaidam, and secondly from Chaidam to Darchendo. Notices of the western portion of this region have appeared in former communications to the Geographical Society, notably, in the admirable paper on the Physical Geography of Western Tibet by Captain Henry Strachey; but as yet the fact of its enormous extent, as well as great elevation, does not appear to have been fully recognised. Its outlines are represented on the wall-map exhibited, which is a reproduction of a skeleton prepared by Mr. Hennessey partly to serve as an index to the Pandit's map, and partly to show the limits of the Chang-tang; hills have been added, and for reasons which I will presently mention, it has been extended westwards to embrace the Pamir plateaus. A yellow band has been drawn round the entire region, the northern portion of which, coloured green, is believed to be uninhabited by man, while the southern portion is sparsely inhabited, and chiefly by tribes of wandering nomads. It is a vast expanse of softly undulating plains, diversified with lakes and rivers and hill ranges and, occasionally, great mountains. In this region the hills spring not from the sea-level or a little above, as in England and Europe generally, but from a level which is not much less on an average than 15,000 feet, or little below the highest mountain in Europe. Though highly elevated, it is not what would be called a mountainous region, for the hill ranges are usually far apart, and not 1500 feet above the surrounding plains, and are well below the limits of perpetual snow in Tibet; occasionally, however, mountains are met with rising 5000 to 10,000 feet above the plains, or 20,000 to 25,000 above the sea-level, and these are covered with snow all the year round. In many parts the passing traveller sees nothing but plains around him up to the sky-line. The plains are coated with a short succulent grass, forming from May to August the softest of green carpets, and furnishing an abundance of pasture for the flocks and herds of the Tibetan nomads, and also for myriads of wild animals which roam over the entire region, but mostly congregate in the uninhabited northern portion. As a rule, though grass is abundant, nothing else will grow in these highlands, no cereals nor even shrubs or trees of any description to yield fire-wood; happily, the argols of the animals by which they are overrun, furnish a supply of fuel which appears to be plentiful and unfailing; thus the grass, which in its natural state is useless for fuel, is converted by animal agency into a species of fuel which in many respects is superior to fire-wood; but for this circumstance it would be impracticable for travellers unprovided with the means of carrying their own fuel to cross the Chang-tang. There are, however, occasional spots where something more than grass will grow; in travelling across this region

from Léh to Lhása, Nain Singh found willow, tamarisk, and other trees growing round the Thachup lake at an altitude above 15,000 feet, and a little further on he met with plentiful wood and a few fields of barley at 14,400 feet; for the next 300 miles there was only grass; but then he entered a basin which is surrounded on all sides by mountains, and contains the great Dangra lake and the plains of Ombo; and here, at an altitude of 15,200 feet, he found well-built villages inhabited by an agricultural community, and richly cultivated fields which produced a profusion of barley. The establishment of such a community at so great an elevation, and the existence at this elevation of a cultivated plain enclosed by mountains, which in their turn are surrounded by boundless extents of pasture land, are very remarkable and quite unique in their way; I believe nothing of the kind is known in any other part of the world.

The Pamir highlands which are situated between the Hindu Kush and the Thian Shan ranges and between the lowlands of Eastern and Western Turkistan, are similar in many respects to the Chang-tang of Tibet, having extensive highly elevated plateaus diversified with lakes and low ridges and occasional great mountains; also an abundance of grass, furnishing pasture for numerous animals, both wild and domesticated, and no fuel but argols of which there are quantities, and wandering nomads who happen however to be Kirghiz Mahommedans instead of Tibetan Buddhists. The region between the Pamirs and Western Tibet has as yet been only partially surveyed; but there can be little doubt that there is a more or less broad belt of similarly elevated table-land lying to the north of the Mustagh range which connects the Pamirs with the Chang-tang. Thus the entire region of elevation stretches over some 30° of longitude, say 1700 miles; its average breadth is about 300 miles, its average height probably exceeds 14,000 feet, and its area is about half-a-million square miles; it gives birth to the upper sources of most of the great rivers of Asia, the Oxus, the Indus, the Sutlej, the Ganges, the Brahmaputra, the Salwin, the Mekong, the Yang-tsze-kiang, and the Hoang-ho; and it constitutes the greatest protuberance that is known to exist on any part of the earth's surface.

NOTE.—In the map (dated June 1884) which was drawn in Dehra Dun to illustrate Pandit A—k's explorations, the longitude of Sachu, the northernmost point, is $94^{\circ} 2'$, as deduced from the route survey controlled by the astronomical latitudes. The adopted origin of longitudes was Lhása, $91^{\circ} 5' 30''$. The value of the magnetic variation was assumed to be $2^{\circ} 30'$ E. throughout. Subsequently the variation was ascertained to be $2^{\circ} 45'$ E. at Darjiling in lat. $26^{\circ} 56'$; and Prejevalsky found it to be $3^{\circ} 59'$ E. at Di-chu Bab-dun, in lat. $34^{\circ} 45'$; thus assuming it to increase with the latitude.—the longitude remaining constant—it would be $4^{\circ} 50'$ E. at Sachu, lat. $40^{\circ} 8'$. These three values are in fairly close accordance with those for the corresponding points in the Admiralty Chart of Curves of Equal Magnetic Variation, for 1880.

To correct the Dehru map for the difference between the adopted and the actual values of the magnetic variation, the longitudes of all places on the Pandit's route-line north of the parallel of Lhása should be increased in the following proportions—the latitudes remaining constant because controlled by the astronomical determinations:—

On parallel of 32° ..	2·4	statute miles.
" 34 ..	5·3	"
" 36 ..	8·9	"
" 38 ..	13·3	"
" 40 ..	18·5	"

Thus the longitude of Sachu should be increased by 21' of arc, bringing it from 94° 2' to 94° 23'; and this value has been adopted for the accompanying map, with corresponding alterations in the lower parallels.

Prejevalsky's value of Sachu as taken from Petermann's 'Mittheilungen,' July 1883, is 94° 26'. Count Bela Szechenyi's value is 94° 58'.

Before the paper,

The CHAIRMAN (Sir Henry Rawlinson) said that in the unavoidable absence of Lord Aberdare he had been requested to preside that evening, and he was the more pleased to resume his old functions, because the paper to be submitted to the meeting was one full of interest and importance. They had all heard that some years ago a system was adopted in India of employing native surveyors to examine the countries beyond the frontier, where European travellers or Government agents were unable to appear, and which were quite inaccessible to other attempts at exploration. This fact had been well known in England for many years past. It was originated, he believed, by Colonel Montgomerie twenty years ago; it had been followed with more or less success by other officers in the Department, and latterly it had been brought to perfection by the late Surveyor-General, General Walker, who was to address them on the subject that evening. Considering the jealousy with which the English were regarded by the wild tribes around the frontier, it was only prudent to suppress the proper names of these native explorers, and to designate them either by their titles or by mere initials. It thus happened that most of their great authorities with regard to the geography of Central Asia, especially the interior of Afghanistan, the course of the Upper Oxus, Tibet, and the line of the Indus within the mountains, were known by what sometimes were supposed to be *sobriquets*, but which really were the initials or the titles of the individuals, such as the Pundit, the Mirza, the Havildar, and more recently H—S and A—K. They might at some future time perhaps hear of the adventures—and many of them were of great importance—of H—S, but at present they had merely to do with the wanderings of A—K. The history of A—K would be given in detail by General Walker. He had certainly during the last four years performed a most remarkable journey, inasmuch as he had crossed from the extreme frontier, Darjiling, in lat. 27° right across Tibet to Mongolia, having reached Sachu in lat. 40°. From thence he made a considerable detour to the eastward, passing Darchendo and Bathang, and coming down to Sama within 30 miles of the Assam frontier at Sudiya on the Brahmaputra, but this small distance of 30 miles he could not cross. There was an impassable barrier owing to the homicidal propensities of the Mishmis, who inhabited that belt, and he was obliged therefore to retrace his steps to the north and go round by Lhasa to Darjiling, and so on to the British provinces. It was really a most remarkable achievement,

and the notes which he preserved during his journey contained a vast amount of interesting geographical detail. There was one point indeed of especial interest, for his journey afforded overpowering evidence of the identity of the great river Sanpo of Tibet with the Brahmaputra of India. It had been argued in former times both in that Society and elsewhere that the Sanpo really represented the head-waters of the Irawadi, but that heresy had been dying out, in great measure owing to the acuteness of Colonel Yule. It had not, however, entirely expired, but he thought it might be said now that A—K's explorations had settled the matter once for all. The value of A—K's narrative was further very much enhanced by the fact that his notes had been put together by the Head of the Survey Department, General Walker, whose name was a sufficient guarantee of minute accuracy of detail combined with sound general views of the physical geography of Central Asia. Without further trespassing on the time of the meeting he would now call on General Walker to read the paper which he had drawn up from A—K's notes.

After the paper,

Colonel YULE said that what General Walker had stated about the Chantang Plains and their connection with the Pamir recalled what he had often been led to think of, and which was first suggested by that splendid paper of Captain Henry Strachey's, to which allusion had already been made. He was sorry that it was the first and last paper which Captain Strachey had contributed to the Society's publications, and that was nearly thirty years ago. Describing the part of Tibet in which he travelled, Captain Strachey suggested the idea that the Pamir must be of very similar structure; and everything that he (Colonel Yule) had since read of the Pamir, as consisting of sloping valleys, flat indeed in their surfaces, but gently sloping from the upper to the lower ends, as if an Alpine valley had been filled up either with diluvial matter or by atmospheric deposits, exactly corresponded to the description of those high plains which the Tibetans called Chantang. Another notable point in connection with these high grassy plains was the enormous amount of animal life which they supported. Colonel Prejevalsky, who had seen most of the animal life in that region, having penetrated further into the northern plains of Tibet than any other European, estimated the wild yak population at millions. He also mentioned that a full-grown yak weighed between 1600 and 1800 lbs., and when they thought of millions of animals of this size living upon scanty herbage at the height of 12,000 or 15,000 feet above the sea, it did give one a most extraordinary conception of the chemistry of nature, which could evolve such masses of flesh from such a field of sustenance. Then they came to the old question of the Brahmaputra and the Irawadi. Much more seemed to have been said about modern controversies, and the part taken in them by such persons as himself, than the circumstances justified. The fact was, that but for those "heresies," as Sir Henry justly called them, which had been raised without any substantial ground in fact, within the last fifty or sixty years, there never would have been any controversy on the subject. Really the question stood now very much as it did when the most illustrious member of the corps to which he had the honour to belong, James Rennell, first described his view of the course of the Brahmaputra as descending from the Sanpo of Tibet. His rough sketch, by which he showed the ascertained course of the Sanpo, and the discharge of the Dihong (not then known by name) into the Brahmaputra, corresponded almost exactly with the facts as they had them now. Indeed he stated that the distance intervening between the reports and maps and surveys of the Jesuits in Tibet, and those which he had from the natives who had come from Upper Assam, was an interval of about 100 miles unaccounted for. The interval still unaccounted for was just about the same—100 miles. They had made

some advance as to negative facts, disproving the possibility of any exit for the waters of the Sanpo other than the Brahmaputra, and this excellent pundit A—K had added very strongly to that negative evidence; in fact, he was sorry to say that a little imagination of his (the speaker's) own had been brushed away. For many years, in comparing the maps and the evidence, he had thought there was *one* stream coming from Tibet which hitherto had been unaccounted for, and which might possibly, and did probably, form one of the sources of the Irawadi; he was afraid, however, that after this pundit's journey no such source remained. The explorer seemed to have traversed the whole of the possible space between the known rivers close to China and the known rivers nearest to India, and no room was left for such a source. He did not think there could be any foundation for the idea thrown out as possible that the Nu-kiang of the Chinese was anything else than the Salwin. They would find it in the Tibetan maps laid down very positively as the Nu-kiang of the Chinese coming down from Tibet, and the modern missionaries in that quarter maintained the same opinion. He believed they had not tracked the river absolutely, but they had followed routes parallel to it, for long journeys, and there did not seem to be any room left for doubt.

The CHAIRMAN asked whether Colonel Yule could give any explanation of the extraordinary volume of water of the Irawadi, which seemed to be incompatible with the limited extent of country it would drain if the Sanpo was really the same as the Brahmaputra.

Colonel YULE answered that he did not think he could add anything to what he wrote thirty years ago in an appendix to Major Phayre's mission. He then took a great deal of trouble with the question, and came to the conclusion that it was quite within reason that in a country which possibly had an excessive rainfall, like that at the head of the Irawadi and the head of Assam, a small number of square degrees might produce that amount of water. He discussed the matter again some years ago, when Mr. Gordon, in a section of a large work on the Irawadi, had endeavoured to demonstrate the truth of the "heresy" (as we have ventured to call it), and what was said on that occasion would be found in the 'Proceedings' of the Society.

In answer to a question from the Chairman as to whether he would like to say something on the side of the Irawadi, Mr. GORDON said he did not believe that justice had ever been done in the Society to the question of the connection of the Irawadi with the Sanpo. He himself offered to read a paper on the subject last session, but the Council declined to receive it. He had looked through the papers for many years, but they did not contain a single statement on the Irawadi side of the question, though there was a great deal of assertion on the other side. He was bound to say that General Walker had treated him with the utmost courtesy for the several years that he had been working on the subject, but still it had never been fairly treated in the Society. He could not do justice to it now, because in order to do so he should require as much time as had been occupied by the paper, and therefore he had better say nothing further on the matter.

Mr. CLEMENTS MARKHAM thought the meeting would be the more struck with the great value of the travels of these pundits, and of the geographical services of General Walker, Colonel Montgomerie, and Mr. Hennessey, when they remembered that if it had not been for those journeys, and for the elaboration of the work of the travellers, they would be entirely ignorant of the whole country north of Lhasa, except from what they could learn from travellers who wrote in the last and previous centuries. It was more than seventy years since any Englishman was at Lhasa, and only one Englishman had ever been there. With regard to that vast plateau

comprised in the province of Chang to the north of Lhasa, it was 150 years since it had been traversed by any European, and he thought he was right in saying that only one European ever had traversed it from Lhasa to China, returning by the same route. The man he alluded to was a Dutch traveller of good family, a native of Flushing.

The CHAIRMAN remarked that there were also Huc and Gabet.

Mr. CLEMENTS MARKHAM said that Huc and Gabet did not travel across the plateau from Lhasa to Sachu, and return by the same route. The name of the Dutch traveller to whom he alluded, was Samuel Van der Putte, but unfortunately when he was dying at Java, being afraid that an improper use would be made of his journals, he burnt them. They, however, had some account of his experiences in the journey from Lhasa to the north, in about 1729, derived from the Capuchin Friars then established at the Tibetan capital, who received their information from Van der Putte. Horace de la Penna, one of these Friars, has preserved a few details. From these it would appear that the Dutch traveller came to a palace called *D-am* after several days' journey northward from Lhasa. This may be the *Shiadden* of the Pundit. He then reached a great river which he called *Biciu*, apparently the *Dichu* of General Walker, the upper course of the Yang-tsze. It took him a day and a half to cross this river, being detained on an island in the mid-stream. Hence I assume that he struck it at a lower part of its course, and consequently must have crossed the plateau rather to the east of the Pundit's route. It was a striking fact that during the last century, and especially during the latter part of it, when Warren Hastings was Governor-General of India, Englishmen and other Europeans actually penetrated to the central parts of Tibet, and there was also communication by post. He held in his hand a letter from one of the Grand Lamas of Tibet to the agent of Warren Hastings, which came by post. Englishmen were now entirely excluded from that country, and it was important that the barrier should be removed. He would express the hope that Mr. Ney Elias, if he was present, would give them some account of the views that he held as to the possibility of renewing that intercourse which existed some hundred years ago between the English authorities in India and the governing classes of Tibet.

Mr. DELMAR MORGAN said, looking to the value of the work done by these pundits, it was very much to be regretted that Europeans did not push forward into these countries, bringing back the results of their observations which could not fail to be of great interest. The natives employed in this work, though very intelligent, had no special qualifications for observing those facts of natural science which would be observed by Englishmen. He was glad to hear that the Royal Geographical Society were thinking of devoting some of their surplus funds to the exploration of Central Asia; he only wished they had done so before, for scarcely anything had been done for the last ten or fifteen years with reference to this work in Central Asia. He thought it was a great pity to leave it to Russians, to Austrians, or to any one else to carry out these explorations. He suggested that probably the work of Colonel Prejevalsky, a German translation of which was noticed in the last number of the 'Proceedings,' was well worth the attention of the Royal Geographical Society, and if they would undertake its publication he should be very happy to give any assistance in his power in the way of translation.

Sir RICHARD TEMPLE said he had not had the advantage of receiving beforehand a copy of the paper, and they would therefore understand that he was entirely unprepared to speak. Nevertheless, being called upon by Sir Henry Rawlinson, who was among the very greatest of Asiatic geographers, politicians and antiquarians, he was of course bound to obey the call. As they were aware from what had fallen

from Mr. Markham, no Englishman of that generation had penetrated into Tibet, but he had himself passed as far as the threshold of the Promised Land. When he looked back upon the glories of that country, when he thought of the picture gallery which was in the interior of his brain, and of the pictures impressed upon the tablets of his mind—of the cloud banners, of the snowy peaks, piercing blue sky, of the dark umbrageous forests, of the flocks of sheep and goats and yak, of the sparkling rivulets, the frozen lakes, and the tortuous, difficult passes through which he used to climb—when he thought of all this the imagination of such a retrospect was truly exciting. But with regard to what had just fallen from the last speaker he must explain that it was all very well to say, “Why do not Englishmen penetrate to these regions, when Englishmen used to penetrate them a hundred years ago?” Let him remind them of the vast political changes which had come over the Chinese Empire. In the last century the Chinese were willing to cultivate intercourse with the English, and with their great representative, Warren Hastings; but various things had now supervened, in consequence of which the Chinese jealously excluded them from Tibet, for Tibet was really a portion of the Chinese Empire. There was a Chinese resident and Chinese troops at Lhasa, and indeed Tibet was to the Chinese Emperor what the Native States of India were to the British Queen. By Chinese policy they were thoroughly excluded from Tibet. He could assure them that this was the case from his own experience, for he had been as far as the frontier and could tell them how absolutely the passage was barred. That being so, what was the use of saying, “Why don't we penetrate?” They could not penetrate except at the risk of bloodshed, which would bring on political complications and might lead to war. There were certain morals to be drawn from the paper which had just been read. They had seen the vastness of the natural resources of Tibet. Colonel Yule had justly pointed out the marvellous manner in which sustenance was provided by the Creator for the countless individuals that formed the animal creation there; but they must remember that every one of those many millions was a valuable entity. The wool, the hair, the horns, the hoofs, the very tails of those animals were valuable, and among them, too, there were some that could be conveyed as living flocks and herds to Darjiling, the adjacent British territory; he alluded particularly to the sheep and the goats. They must remember also that as they had a great empire in the East, so they had a corresponding duty towards all the adjacent region. It was science, as represented by General Walker that evening, that was the pioneer of civilisation, and geography was the handmaid of science. A second moral to be drawn from it was the remarkable manner in which geography was from time to time verified. They had been told that the observations of this native surveyor had been compared point to point, detail to detail, and particular to particular, with the antecedent narratives of the gallant Frenchman Huc, and the late lamented Englishman Gill. The native surveyor could not possibly have known what those observers had said, and, therefore, when his records and journals and explorations came to be compared in the office at Calcutta by so trained an officer as General Walker, and were found to correspond often in minute respects, the verification thereby afforded was eminently to the credit of science and geography. There was yet another moral to be drawn by British people from this remarkable journey, viz. that their native fellow-subjects in the East were after all possessed of qualities which rendered them worthy citizens of the British Empire. Let them consider the skill, the endurance, the resolution, the patience, the capacity shown by this native gentleman. Had he been an Englishman he would have possessed the stimulus afforded by a liberal education, but as they were told, he was a comparatively uneducated man. Had he been an Englishman he would have looked forward to returning to his native land, where

the applause of the public, the thanks of Parliament, the gracious approval even of the Sovereign would have awaited him. But what had that poor man to look forward to? Not to those honours which afforded an honourable stimulus to British enterprise, but only this, his zeal for the Department he served, his obedience to so good a superior as General Walker, his loyalty to the public service, his firm determination to do his duty according to his poor ability, and, above all things, his reliance upon that British Government which he knew would reward him generously should he survive, and would take care of his family should he perish while on service.

The CHAIRMAN, in closing the discussion, said a great deal of interesting information no doubt might be obtained from many gentlemen present had time permitted. As it was now past their usual hour, he must sum up in a very few words. In the first place, he wished to call their attention to a subject which had been alluded to both by Mr. Markham and by Colonel Yule, and indeed by all the speakers, namely, the value of Tibet in a commercial point of view. General Walker's paper had been chiefly addressed to the adventurous journey of the Pundit, but it was valuable in many other respects, especially in stimulating inquiry as to the trade and productions of Tibet, which might become a subject of national importance. He hoped it was not the case, as so often stated, that they were finally or permanently excluded from Tibet. It was only indeed within the last month or two that a very favourable opening had been created for further communication between India and Tibet. They had probably recently seen a most interesting account in the *Times* of the mission of Mr. Colman Macaulay from Darjiling to meet the Tibetan authorities on the frontier at the end of Lachen Valley. The distance was only 100 miles from Darjiling, and Mr. Colman Macaulay had there met the Tibetan authorities, and made all preliminary arrangements for the resumption of commercial intercourse between the countries. What this remarkable intercourse was likely to lead to was exemplified in a couple of paragraphs, which he would take the liberty to read, because they showed the practical value of opening up Tibet. The *Times* said, "We hear complaints everywhere of the stagnation of trade. Here is a large market waiting if we only insist on admission. The Tibetans prize broadcloth above all things; they have begun to learn the use of piece goods, and a demand to which there is hardly any limit is springing up for them. Knives and hardware of all kinds are eagerly sought; they are large consumers of tobacco and indigo; and, even with the existing restrictions on trade, the staples are gradually increasing. As regards tea the question is not clear; but it is an instructive fact that within 100 miles of Darjiling is a people which drinks tea morning, noon, and night, which uses practically no other beverage, and yet obtains its supply from districts of China 1200 miles away. With respect to the return trade, the chief articles would be gold, musk, live-stock, and, above all, wool and woollen goods. The quantity of sheep's wool and of the fine wool of the shawl goat available is prodigious; and it is now almost worthless from the absence of demand. Doubtless other articles of trade would appear as commerce developed. The richest part of Tibet is practically within a stone's throw, and the inhabitants, who are from the highest to the lowest keen traders, are debarred from intercourse with India through sheer ignorance and the tenacity of tradition." That was a most important illustration he submitted of what might happen from the opening up of Tibet, and it certainly afforded a very favourable prospect for renewed trade with that country. The experiences that had been gained would, he hoped, lead up to that result; for it was quite true, as Sir Richard Temple had remarked, that the difficulties in the way were political more than anything else. The Geographical

Society, at any rate, would be very ready to encourage exploration in Tibet and the contiguous countries; but if political difficulties supervened they could hardly be expected to commit the Government by premature attempts to force an entry into the country. They must wait for matters to be conducted in the regular diplomatic manner, and he had every hope that as all parties now had their eyes open to the importance of the subject, a favourable issue would result. With regard to the geographical questions involved, which were of large interest, he only hoped that Mr. Gordon on some future occasion, if he thought he had a case for identifying the Sampo with the Irawadi, would be prepared to bring it before the Society who would give it a patient hearing. For his own part he confessed that he regarded that identification as a heresy, but still heresies did sometimes turn out to be true, and it was possible that it might be the case in that instance. The paper to which they had listened was a most valuable one, and they were greatly indebted to General Walker for bringing it before them. Although General Walker's name was very well known to the Society and to all geographers, yet he had not received, in Sir Henry's opinion, that share of public acknowledgment to which his services entitled him. It was only by a careful comparison of the skeleton maps of Central Asia published ten years ago with the highly improved edition of the map of Turkistan which General Walker had recently issued, that they were able to realise the enormous amount of new geographical information which had been acquired during the last few years while he had been in charge of the Surveyor-General's Office in Calcutta. It was only through such a comparison that they could appreciate the value of the services which had been rendered to geography. General Walker had no doubt employed many native agents for this purpose; he had filled up many blanks in the map of Asia, but his crowning success had been this marvellous journey of the Pundit A—K. He must remind the meeting that A—K was really General Walker's own creation; for they were indebted to the General, not only for the scientific preparation of the individual and for the organisation of the expedition, but also for the utilisation of the results. Without an experienced and commanding head to have reduced those rough notes and books to order, all this exploration and this expenditure of skill, of industry, and of courage, would have been in vain. For the utilisation of the Pundit's work they were indebted to General Walker himself. With regard to the Pundit himself, it would remain for the Council of the Society to consider in due course, as they had considered in previous instances, what might be assigned to him as an appropriate reward for the skill, the intelligence, and the courage he had shown in this journey; but in the meantime, while they left the reward of the Pundit in the hands of the Council, they might now as a body, at any rate, express their deep acknowledgments to General Walker for the support which he had given to the Pundit, and for the admirable manner in which he had brought his results before the meeting.
