Discoveries in Southern Tibet: Discussion

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Source: *The Geographical Journal*, Vol. 33, No. 4 (Apr., 1909), pp. 416-434

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1777214>

Accessed: 11-05-2016 03:50 UTC

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this white patch, on which only one single word had been perfectly correct, namely, the word *Unexplored*.

The following communications from Sir Clements Markham and Sir Thomas Holdich were read:—

SIR CLEMENTS MARKHAM: No one can read Dr. Sven Hedin's paper on "Discoveries in Southern Tibet" without being struck by the exhaustive character of his researches. In combining this essential part of an explorer's equipment with his qualifications as a surveyor and observer, I look upon Sven Hedin as the *beau idéal* of a Victoria Medallist, most fully complying with all the conditions laid down in the Council Minute by which it was instituted.

The so-called Nien-chen-tang-la mountains were unknown from the Tengri-nor to the Maryum-la pass, and I always looked upon their discovery, on those meridians, as the most important *desideratum* in Asiatic geography for many reasons. I now hail Sven Hedin as the discoverer, and I think that his name of Trans-Himalaya is the best and most convenient that could be adopted.

He also is undoubtedly the discoverer of the true source of the Brahmaputra, and his journey with this object strikes me as a most painstaking and accurate piece of geographical work. His discussion of the question of connection between Mansarowar and Rakas-tal is very interesting and instructive, but I am unable at this distance from means of reference to offer any remarks upon it, or upon the question of the source of the Sutlej. His paper is sure to give rise to an important discussion.

SIR THOMAS HOLDICH: I do not like the term "Trans-Himalayas" for several reasons. In the first place, it is not a name at all. Of course, Sven Hedin's mountains *are* Trans-Himalayas—that goes without saying; but why print such an obvious fact on the map? In the next place, the expression is not new—it is very old indeed, and has been applied for years to the mountain region (Trans-Himalayan) in the extreme north of Kashmir, including the Mustagh range from which the Hindu Kush takes off, the Karakoram, etc. So that, as Sven Hedin admits, the term Trans-Himalayas (why not put it in English—"beyond the Himalayas"?) would extend from the Hindu Kush to the Salwen, and would not be in the least distinctive of his *Trans Tsangpo* section of the system or "cordillera." The Indian Survey Department would no more think of printing "Trans-Himalayas" or "Beyond the Himalayas" across such an extent of Asia, than they would put "Beyond the Indus mountains" from near Karachi to Buner. Besides, it is only "beyond" from the Indian point of view. I cannot say that I remember the expression "Trans-Caspian" or "Trans-Indus" or "Trans-Himalayan" in our maps, though, of course, they are all convenient geographical definitions when writing. Trans-Alai, I believe, has got crystallized, but I always regarded it as a foolish definition due to the fact that no one had taken the trouble to find a name locally. Are those mountains "Trans-Alai" for India, by the way? I am not sure that they are not *Cis-Alai*. In naming the various sections of the one great, long-extended system or "cordillera," which begins with the Hindu Kush and ends in the west of Persia (or beyond), we always adopted such local names as we could find. If the mountains had no name, we took the name of the district. In the case of the Trans-Tsangpo, part of this Trans-Himalayan system, I think, Sven Hedin has the right to suggest a name, and he has already given a name to a large district in that white space of our Tibetan maps which we look to him to fill up. That name is Bongba. Why not apply it to that section of the Tibeto-Trans-Himalayas which forms the northern divide of the Brahmaputra? It is easy to remember, and we should know what we mean when we talked of the Bongba mountains,

which we certainly shall not know if we talk of Trans-Himalayas. Has the India Survey Department (which publishes the map of this part of Asia) been asked what they think about it?

Colonel GODWIN-AUSTEN: It is now forty-six years since I was in the Pangkong district of Ladak,* and took a last longing look from a high point near Radok to the eastward, over the flat-looking broad belt of elevated country stretching to the eastward, dotted with small lakes, and bounded by a snowy range on the south, the Aling Kangri of the Royal Geographical Society map. Dr. Sven Hedin often refers to the white patches on that map of 1906, but to me, looking back to their size in 1863, it is wonderful what an enormous amount of topographical information has been accumulated in the interval; a very large amount of this work has been executed by Dr. Sven Hedin. I congratulate him sincerely on having done it, and it has been a great pleasure to me to make the acquaintance of so admirable and zealous an explorer. Knowing something of the country, it is a marvel he is here after his journey in the depth of winter from the neighbourhood of the Karakoram pass, that death-bed of thousands of men and baggage animals; a place the name of which I never see without thinking of Dr. Stoliczka, a member of Forsyth's mission, and a friend of my own, who succumbed to the cold and height of the pass on the return journey from Yarkand.

In connection with Mansarowar lake and its outlet, on which so much has been said and written, I would refer to the pioneer work done long ago by two brothers, Henry and Richard Strachey, who were among the first to make surveys in this part of the Himalaya; Henry beginning in 1846 to 1848.† I would point out how very accurate their work has proved to be, for it must not be forgotten that they had no peaks in Ladak fixed by triangulation to guide them. I am glad to tell you that this talented officer, Colonel Henry Strachey, is still living; he is ninety-three this month. Unfortunately, his sight is quite gone, but his memory is wonderful, and he still enjoys talking of his explorations in Tibet, and that of other workers in the same field.

Dr. Sven Hedin has referred to what I have written on the 'Mountain Systems of the Himalaya,'‡ more particularly with reference to the "Trans-Himalayan Range," a term first used, I think, by Colonel Cunningham (1854), but he included in it the Zaskar axis. Several writers since have used the term in a very general way, more or less hypothetically, according to the period they wrote, and their knowledge of the country, few having personal knowledge of it. Assuming that the basis of any system of orography should be geological structure, when compiling and setting out the sections of the western Himalaya from south to north across the strike of the rocks, I drew largely on the writings and work of Medlicott, Blanford, Stoliczka, and Lydekker, and what I had noted and mapped myself, over a large extent of the northern frontier of India. As a whole, the mountain mass consists of many more or less parallel lines of gneissic rocks and gneissic intrusions, with intervening synclinal basins of stratified rocks, more or less altered. There is great continuity and similarity of structure on certain zones, occupying the same relative positions on sections across the mass; the same physical feature presents itself over and over again, showing that the forces playing a part in the elevation and crushing have been on a wide and gigantic scale. The north-west-south-east Ladak axis represented by the central gneiss of Stoliczka, is a characteristic feature in Ladak for 300 miles, the Indus flowing on its south side, the synclinal trough of

* "Notes on," *Journal of the Royal Geographical Society*, 1866.

† 'Physical Geography of Western Tibet.' With Map. *Proc. R.G.S.*, November, 1853.

‡ *Proc. R.G.S.*, February, 1884.

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Nummulitic age holding that position, and resting on it. I took this as a starting line, and the most southern of my Trans-Himalaya lines of elevation, including in it the Mustagh with its subsidiary ranges, the Shayok on the south, and the Karakoram on the north. South-east of Leh for 100 miles, the same gneissic ridge, the Ladak, bounds the Indus on the south, that river having cut through it, and it holds that position for quite 150 miles. The Mustagh axis, I consider, has its easterly extension to the Marse-mik La and the high mass of gneiss north of the Pangkong lake, crossing that to the high range south of the Rudokh plain, where I say, in 1883, "we enter unsurveyed ground"; whether it is continuous to the Aling Kangri (Gangri), of the Royal Geographical Society map of Tibet, is to be seen. Here, these lines laid down by me as Trans-Himalaya are hypothetical; all deductions, made without personal observation of the country, partake of that nature. In the map and sections of 1884, the Ladak range, and all I grouped with it at that time as Trans-Himalaya, I took great care to lay down in dotted lines eastward of lat. 32° and lat. 80° .

Where there is so much of intense interest, it is most difficult in a few minutes to know what to refer to; but among the many discoveries of Dr. Sven Hedin, the history and extent of the lake basins he has visited is one, and I look forward to reading his more detailed account of the country and what he has to say about them. There is an enormous field of observation in Tibet, and his suggestion of mapping the self-contained lake basins is one, showing their extent and former outlets. I only know those of the Pangkong lake and Tsomorhiri, with the extinct lake basins in Rupshu. In the case of Tsomorhiri, local alteration of level has been assigned for the damming of the exit, but ordinary silting up by wind action may have done this. The Pangkong lake, when at the period of the greatest level of its waters, and when fresh, must have extended very far to the eastward—how far would be a very interesting point to solve. No levelling has ever been carried out in either case to determine the height of the old lake deposits. I cannot follow Mr. Huntington that this lake was scooped out by a glacier; my own observations tended to show the dam was formed by talus accumulations from the mountains on the south side. This view is confirmed by Frederick Drew in his description of the lake,* yet I note that Mr. Huntington's glacial lake theory is considered applicable with respect to Pangkong.† The Pangkong has all the appearance of a river valley of ordinary depth eroded in the usual way, once filled up with water to the height of its dam, but which, since that step was reached, has been broken up into a series of lakes by the sedimentary deposits of its largest tributaries as at Ote. All the broad gravelly valleys so typical of this Pangkong country are silted up, having had, I imagine (when the climate was milder and moister), a section of the usual V form.

Sir HENRY TROTTER: So many references have been made by Dr. Sven Hedin to the exploration work of the Pundit Nain Singh, that I feel bound to say a few words on the subject—in which I take special interest, as I started him from Ladak on his great journey *via* Tengri Nor to Lhasa in 1874, in which he discovered and roughly mapped the great lake system of Central Tibet, and on his return to India I took his report and prepared his map.

It is extremely gratifying to find that both Dr. Sven Hedin and Major Ryder have expressed their admiration for the general accuracy and excellence of his work along his actual lines of route—*i.e.* north, east, and south of the great *terra incognita*—the topography of which has been so lucidly described to us this afternoon.

* 'Tummoo and Kashmir Territories,' p. 323.

† 'Geog. and Geol. of Himalayan Mountains and Tibet' (Colonel Burrard and H. H. Heyden), pt. iii. p. 263.

Dr. Sven Hedin has stated in his paper that the information gathered by the Pundits from native reports is almost worthless. From my own experience I know that for scientific geography hearsay information, whether collected by Pundits or any one else, is of little value. At the same time I was much struck by one statement made by the lecturer, referring to the lake of Teri-nam-tso, marked in dotted lines on Nain Singh's map, that he found its position "almost correct, although the Pundit had never seen it, but had only heard of it."

I must, however, take exception to the lecturer's statement that the result of the Pundit's different journeys can hardly be used for scientific purposes.

Their astronomical determination of latitude are admittedly excellent, and may be accepted as within one minute of the truth; and as regards the much more difficult question of longitude, I will cite two cases. As the result of the protraction and adjustment of Pundit KS's work, in 1874, in the preparation of the map of Eastern Turkestan, I shifted to the eastward by 23 miles the hitherto accepted longitude of Khotan (*i.e.* from $79^{\circ} 26'$ to $79^{\circ} 59'$), and I find that in the latest map of Khotan prepared by Dr. Stein, it is placed in longitude $80^{\circ} 1\frac{1}{2}'$, *i.e.* differing by $2\frac{1}{2}$ miles only from my original determination.

Again, in preparing Nain Singh's map in 1875, I fixed the position of Lhasa, from his work, at $91^{\circ} 5' 30''$ E. long., considerably to the east of former estimates. This also held its ground until the recent trigonometrically determined value of Major Ryder's Lhasa, $91^{\circ} 10' 46''$, showing a difference of about 5 miles, by no means a large discrepancy. I therefore maintain that the Pundit's work has been distinctly of value for scientific geography, although it must, of course, give way to connection by triangulation with our Indian system.*

Nain Singh was a Gold Medallist of this Society, and has been dead for many years, but I consider myself bound to vindicate his reputation for accurate and valuable work. It is due not only to his memory, but also to that of my former chief, the late Colonel Montgomerie, who instructed the first pundits and superintended their work.

To revert to Dr. Hedin's explorations. Nain Singh, in his passage through the lake district, fixed the position of numerous snowy peaks to the south of his route for a distance of several hundred miles; many of these correspond well with Sven Hedin's work. The most important of these peaks, Targot-Yap, the pundit estimated to be 25,000 feet in height, and it is undoubtedly identical with the Targ Gangri of Sven Hedin. Major Ryder, on the other hand, in his recent journey up the Brahmaputra, fixed the position of several snowy peaks to the north of his route, varying in height from 20,000 up to 23,150 feet; but between these two mountain ranges on the north and south, Dr. Hedin has found several other ranges whose existence was unknown. He has crossed seven times this *terra incognita* extending 500 miles in length, and of great and varying breadth, and his work will remain a splendid record of his zeal and energy, and will probably not be improved upon until our grandchildren or great-grandchildren, in future ages, shall explore and map the eight minor blanks which will have been left by Dr. Hedin between his seven lines of route.

To this newly discovered mountain system, Dr. Hedin has most appropriately given the name Trans-Himalaya, to which only one objection can be raised. The mapping of Central Asia has been chiefly done by Russians from the north, English from the south, and by the renowned Swedish explorer from many directions.

* It is interesting to note that in d'Anville's map of date 1733, the longitude of Lhasa is within a mile of Major Ryder's determination, while its latitude is in error by no less than $22\frac{1}{2}$ miles.

Indian map-makers would naturally call the newly discovered system Trans-Himalaya, but to the Russians it would be Cis-Himalaya. As, however, in a precisely similar case, the Russians have called the range south of the Alai, the Trans-Alai, and we have accepted that name, so we may hope that the Russian geographers will accept the term "Trans-Himalaya," although if *they* had discovered this mountain system, it would naturally have been called Cis-Himalaya.

A few words as to the source of the Brahmaputra. It must always be recollected that a river has several sources, and although both Nain Singh and Major Ryder ascended the great river for several hundreds of miles, up to *one* of its sources, in the Maryum La, yet neither one nor the other has laid claim to have visited its principal source; both of them indicated a much larger stream coming from the north-west; and about 30 miles short of the Maryum La, Nain Singh speaks of the gigantic range visible to the south, the large glaciers of which filled every ravine of that range, and evidently formed the source of the river. It is this glacier region that Sven Hedin has now visited and mapped—a great triumph on which we must heartily congratulate him, as no one can doubt that the area in question contains the principal sources of the mighty river.

The still more complicated and difficult problem as to the sources of the Indus and the Sutlej I must leave to persons having greater knowledge of the subject than myself.

Sir MARTIN CONWAY: The fact that behind the main range of the Himalayas there exists another great range, has long been understood by mountaineers, but between the recognition of such a fact and any kind of precise knowledge of the nature of the range in question there is a great gap, and it is this gap which Dr. Hedin's discoveries have done so much to fill. It is hardly necessary to say that no study-drawn outline of imagined mountains ever approximates to the actual facts of mountain-contour which an explorer reveals. This is true even in the case of small details—the ridges and abutments of a single peak, even when the form of its summit has been known, as in the case of K₂. To discuss, therefore, the relative inaccuracies in this or the other sketched-in approximation to what different geographers have believed might more or less vaguely represent the actual form of an unexplored range is to waste time. The man who actually traversed previously untraversed ground, is the first to replace deductions and hypotheses by actual knowledge, and thenceforward his information becomes the starting-point for all future developments in knowledge.

Dr. Hedin has briefly indicated in his papers the central fact, which is to be revealed by the cumulation of all the explorations of Tibet, and the ultimate revelation of the detailed form of that great elevated region. It is the answer to the question, How was that region sculptured out into its present complicated form? Assuming the whole Tibetan area and the adjacent highland to east and west to have been elevated together, with the Himalayas for the southern, and the Kuenluns for the northern scarps, it seems likely that originally the general aspect of the whole region was such as is now characteristic of the central portion, north of the Trans-Himalaya. We may think of it as high undulating ground with ridges running roughly east and west, ridges which in time have weathered to their present condition. The strike of these ridges would naturally tend to shed off the water that fell on the region to east and west along the furrows. As the rain mainly came from the hot south, the southern streams would have been most active, and of the tributaries those draining southward facing slopes would have been the more vigorous. It is for this reason that so many of the principal east-and-west ridges are cut through by what were at first merely short torrents tearing down the slopes. It is, therefore, not at all surprising that Dr. Hedin should have revealed such a

complication in the northern feeders of the upper Brahmaputra, or that he should have found them penetrating through what were originally parallel and continuous ridges. Just as the Indus, the Sutlej, and the Brahmaputra itself cut through the main Himalaya range, having been captured by the more vigorous southward-flowing torrents of the plateau's original edge, so their upper reaches in their turn have cut back into the ranges behind, and doubtless are still cutting back and tending ultimately to gouge out and abolish the last fragments of the great plateaus, with their relatively few remaining salt lakes and wide expanses. Not until the whole detailed topography of interior Tibet is revealed shall we be able to form any complete account of the history of the growth of the great rivers and the various transformations their course has undergone. It is Dr. Hedin's great service to geographical science to have contributed materially to the reduction to relatively small compass of the unknown area which not long ago was so large.

MR. DOUGLAS FRESHFIELD: Dr. Sven Hedin will, I am sure, understand, if, under the pressure of time, I omit all compliments and congratulations on his wonderfully successful explorations of unknown Tibet.

There are two points, one in what he has said to-day, one in his first lecture, to which I should like shortly to return. I have never myself crossed the frontier of Tibet proper, but from a height of over 20,000 feet in the Debatable land I have looked over many hundred square miles of that country. It is not, I must confess, a region the natural features of which attract a mountaineer; for a proper mountain ought to have a bottom as well as a top. The Tibetan ranges, springing from a platform, as Dr. Sven Hedin has told us, of 12,000 feet, have no bottoms. Let the believers in the spadework done by glaciers explain it as best they can. The Tibetan glaciers have not succeeded in digging valleys. That feat has been reserved for the torrents of the southern slope. In upper Sikkim as you approach the watershed you can recognize the exact spot where the protection of the ice has ceased. This, however, is only an incidental remark; the subject is rather one for my friend and companion, Prof. Garwood, than for myself.

The point in Dr. Sven Hedin's recent lecture on which I wish to express some doubt, is his allusion to military geography. If I have not been into Tibet, I have at least made a study on the spot of some of the routes from Tibet into India.* Dr. Sven Hedin speaks of the eastern Himalaya as a granite wall impregnable to modern armies and sufficient to protect India from any fear of invasion. He thinks that any apprehensions on this score may fairly be called "exaggerated." At the present time this is in no sense a question of current politics, and I can refer to it without any fear of trespassing on forbidden ground. As a general proposition, I dissent from Dr. Sven Hedin's view; I do not think it is borne out by history. Mountain chains have never served—except in poetry—as efficient ramparts. In this particular case the evidence is at hand. The Chinese have never found any difficulty in sending troops to Lhasa. Of course they send them by the regular road, and not over the remote highlands Dr. Sven Hedin has been the first to reveal to the Western world. They have done more. As Dr. Sven Hedin has reminded us, at the close of the eighteenth century they sent an army of 70,000 men into Nepal and won a battle within a few miles of Katmandu. It is true that a modern army carries more impedimenta than a primitive force, but on the other hand the facilities for light transport and provisionment have increased. The Chinese may at any day imitate the Japanese in adopting and improving on European methods. In 1888 a Tibetan force crossed the Himalaya, threatened Sikkim, and alarmed Darjiling. We have

* See *Geogr. Journ.*, January, 1904; and *Journal of the Society of Arts*, February, 1905.

recently sent an army with light artillery over the outer Himalaya to Lhasa. No doubt in the Himalayas, as in the Alps, it is not so much the actual passes as the gorges on the south side of the chain that form the most formidable obstacles to the invader. But most gorges have a way round them, and there are too many to guard them all.

I do not anticipate that India will be invaded from the north-east in the lifetime of any of those here present. But I believe that if China were allied with a Western power and a Chinese force were collected in the Brahmaputra valley, it would necessitate the detention of a corresponding force to protect Bengal, and thus interfere with the adequate protection of the North-West frontier. I cannot but regret, therefore, that Tibet has been handed over to China, body and soul, in place of being constituted in some sense a buffer state. Dr. Sven Hedin suggests that the situation produced by an attempt to invade India on this side would be "amusing." It might be so to the disinterested observer at a distance, but I doubt if this would be the point of view of the officials at Calcutta responsible for the defence of the British possessions in India. Dr. Sven Hedin is so great an authority on all things Tibetan that I fear that his words—even in an *obiter dictum*—may be taken in a sense and given a weight which he possibly does not intend by some civilian and economical statesman. I have, therefore, ventured very briefly to suggest a view which is, I know, held by others far better qualified than myself to enforce it.

Captain RAWLING: I understand that the discussion of Dr. Sven Hedin's last journey which is taking place to-day will be confined to Southern Tibet, and will mainly fall under four heads—the mountainous region lying to the north of the Brahmaputra, the sources of the Brahmaputra, and the sources of the Sutlej and the Indus, and to that part of Tibet alone will I confine my remarks. I do not intend to argue on the pros and cons of the discoveries of former travellers, but simply to lay before you the more valuable geographical features as seen during our journey in 1904-5, in order that they may be compared with the latest information obtained by Dr. Sven Hedin.

It must be remembered that my expedition then was a political mission and not a geographical one. We were compelled to travel at express speed and to cover 1100 miles, the distance from Gyangtse to Gartok and Simla, in three months. Nevertheless, much fresh geographical information was obtained and 40,000 square miles of country surveyed. This work would have been impossible had there not been attached to my expedition a survey party under, and I say this without the slightest intention of flattery, two of the finest experts in survey work to be found in any country, Major Ryder and his assistant, Captain Wood.

The remarks I intend to make are based on the unanimous opinion of all of us, formed when we were on the ground, and from the closest observation that the limited time at our disposal would permit of. Of the perfect accuracy of Ryder's work, Dr. Sven Hedin bears generous witness. It does not profess to be a complete map of the entire basin of the upper Brahmaputra, but simply the country which could, with extreme labour and only by skilled hands, be accurately surveyed during a hard and rapid journey. A glance at Ryder's map will show that the Chata Tsangpo, opposite Saka Dzong, and some other tributaries, are entered in dotted lines, showing where the courses of the rivers appeared to lie, judged by the trend of the mountains as seen from a great distance.

Having mentioned Saka Dzong, let me break off for one moment, to pay a token of respect to the memory of that faithful servant of Sven Hedin who died here. Mahomed Isa was one of the finest characters it has been my fortune to be thrown with. Trustworthy and indomitable in his work, his knowledge of Asia was unequalled by any native, for he had accompanied Younghusband in his famous

journey from China, he was with Cary, with Dalgleish who was afterwards murdered, and with Dutreuil de Rhins, where he was a helpless witness of his master's violent death at the hands of the Tibetans. He acted as my caravan bashi in the Gartok expedition, accompanied Sven Hedin during his recent journey, and died, after thirty years of faithful service, at this desolate spot.

The early reports which reached England respecting Dr. Sven Hedin's discoveries gave the impression that a great range, rivalling the great Himalayan chain, had been found far to the north of anything seen by us. As Dr. Sven Hedin has since informed us, the report was incorrect, no such range being in existence, and he has also proved that the range surveyed by Ryder, which runs parallel to, and distant 50 miles from, the north bank of the Brahmaputra, is not surpassed in altitude by any range of mountains right up to the Kwen Luen. But of equal importance to this negative proof are his discoveries of numerous self-contained basins formed by, not one, but many ranges, some of which constitute and define exactly the entire watershed of the upper Brahmaputra basin, and extend its limits far beyond what was formerly believed to be its area.

You will notice the similarity of the drainage system of the northern slopes of the Himalayas and what I will call at the present moment Ryder's mountains. The rivers on the northern slopes of both at first flow northwards, then, when stopped by another and lesser range, turn to the south, and, cutting their ways by devious gorges through their original ranges, join the waters of the southern slopes, and form a part of the great rivers which finally pour into the Indian ocean. Now, it is an established fact that the rise of the great Himalayan range has taken place during recent geological periods, and, as Colonel Burrard says: "The whole length of the great Himalayan range belongs to one geological age, and in the same geological age as the mountains of Afghanistan and Beluchistan, in fact the ranges of Central Asia appear to belong to one great system, and to have no separate existence from that system." But it has remained for Dr. Sven Hedin to prove that all these ranges are alike, and that the earth movements taking place in one are duplicated in the other. Alike in their formation, the final results are opposite: the basin of the Ganges cannot increase in area, but the basin of the Brahmaputra can and will, for as the tributaries, in the course of centuries, cut back into the plateau by head erosion, so will the self-contained basins to the north be absorbed and finally form part of the great Brahmaputra basin, provided there is no material decrease in the rainfall.

And now as to the name of the mountainous system. Personally, I do not like the term Trans-Himalaya, for by rights this belongs to the range lying immediately to the north of the Himalayas, and between that range and the Brahmaputra. Foreign names and duplication of names are, if possible, to be avoided. May I suggest such a one as *Peu Kangri*, or the Snow mountains of Tibet, or *Peu Lho Kangri*, a free translation of the Snow mountains of Southern Tibet. Kailas range, the name suggested by Colonel Burrard, is good for that particular range in which Kailas is situated, but, as Dr. Sven Hedin has demonstrated, this is only one of similar ranges, and therefore it hardly seems quite appropriate for the whole system.

I will now leave this district and move to the source of the river. Dr. Sven Hedin takes a too literal reading of certain remarks of Ryder and myself with regard to the Maryum La being the source of the Brahmaputra. Where the matter is dealt with in a more detailed and scientific manner it is evident that we clearly recognized the main source of the river: for, as Ryder says, when facing the Maryum La: "We could see the watershed range ahead of us, from the valleys of which innumerable streams issue to form the Tsangpo, the largest coming from the snowy

range to the south-west." Again, Ryder, in his map—and this after all is the best proof—distinctly shows the source in the glaciers far to the south-west of the Maryum La. It seems to me that the whole question can be summed up in the sentence: that the principal sources of the Brahmaputra were known to lie in the Indo-Tibet borderline glaciers to the south of Gunchu Tso, but it has remained for Dr. Sven Hedin to survey and locate more definitely than has ever been done before, the headwaters of the river.

Next comes the question as to the sources of the Suttlej. First of all, what is a source? I maintain, though it is possible I am in error, that it is the longest visible branch of a river system, and, if there are two branches of equal length, then that which carries the most water at its greatest flood. On this hypothesis I base the following problem and its solution. To start at the beginning, it will be granted that small rivers run into Manasarowar and that that lake and Rakas Tal are connected, for by photographs and the testimony of every traveller, except, of course, Mr. Savage Landor, such is proved to be the case. All that remains now is to determine whether the Suttlej is connected with Rakas Tal. At present there is no surface outflow, and none has been reported for many years. From my definition of a source, therefore, I am forced to draw the conclusion that the connection does not exist. Dr. Sven Hedin takes a contrary opinion, basing his view on the probable supposition (also held by Henry Strachey in 1846) that some of the water of Rakas Tal filters through the soil, afterwards rising as springs in one of the tributaries of the Suttlej. In 1905 Mr. Sherring reported that the natives likewise believe in this underground escape. But it is an extremely difficult thing to prove. Even the fact that Rakas Tal is fresh at the present time means nothing, for we know that the lake did regularly overflow forty or fifty years ago, and it would take centuries for a lake the size of Rakas Tal to become salt. Ryder, I consider, is correct in placing the present source in a branch flowing from the southern hills. I may be quite wrong in my reasoning, but the whole question appears to turn on the definition of the word "source."

I am to-night making observations based purely on personal experience, and as I have never visited the northern and main branch of the Indus, will not venture an opinion as to its source.

In spite of the interest centring around the sources of the Brahmaputra, Suttlej, and Indus, yet, as a matter of geographical value, they sink into comparative insignificance when compared with the definite elucidation of the northern watershed of the upper Brahmaputra basin, and the intricate system of ranges found in and beyond that region. And for this knowledge we are entirely indebted to Dr. Sven Hedin.

Dr. T. G. LONGSTAFF: I beg to congratulate Dr. Sven Hedin on the successful conclusion of his latest journey, a journey during which he had again displayed those qualities of endurance and determination with which we have always associated his name. May I particularly congratulate him on being the first traveller to force his way right across the centre of that great range of mountains which lies to the north of the Indus-Brahmaputra trough.

I have a few comments to make on this paper, but I feel that they are privileged for this is a scientific society, and the academic discussion of papers must always be one of its chief functions. I wish to draw attention to that range of snow mountains discovered by Nain Singh in 1874, and along the northern side of which he travelled for more than 800 miles ('Walker's General Report,' G.T.S., 1874-75, p. 20). I am uncertain whether Dr. Sven Hedin includes this in his own Trans-Himalaya. The lecturer identifies Nain Singh's Targot Lha with his own Targo-gangri, and I think that when he has worked out his observations we shall find that his own Shakangsham

is none other than Nain Singh's Shyalchikang Jang. I was sorry to hear that remark deprecating the value for scientific purposes of the work of such very remarkable men as the late Nain Singh, c.i.e., and Kishen Singh, r.b. Many of us must recall the very different opinion of them which was expressed before us by such authorities as Sir Frank Younghusband and Major Ryder less than four years ago. I may be excused for recalling this testimony, since I am personally indebted to Kishen Singh. The methods of any traveller may be considered antiquated by those who follow in thirty or forty years' time. It is almost a truism to say that no explorer can expect to produce an original map in which corrections will not be made by those who come after him.

It is rather surprising that the lecturer is so unappreciative of Trelawney Saunders. His delineation of Dr. Sven Hedin's 'Trans-Himalaya' in the 'Atlas of India' (Stanford, 1889; 12 Maps and Memoir) is based on the work of the Pandits, including Kishen Singh's later journeys, and I still venture to recommend it to the notice of any one interested in this discussion. Saunders calls it the Gangri range, because it is *par excellence* the snowy range of Tibet; although, as was pointed out in 1877, and again in 1896, Brian Hodgson had already adopted the name "Nyenchenhangla." ('Selections from the Records of the Government of Bengal,' Calcutta, 1857, p. 88, etc.) In the Memoir, Saunders begins his description as follows: "The northern side of the great Tibetan trough culminates in a range that, for extent, importance, and altitude, may well stand alongside of the parallel ranges of the Himalaya."

This range is included in that great mountain-system described by Burrard and Hayden in their 'Sketch of Geography, etc., of the Himalaya and Tibet,' as the Kailas range. It is definitely known to extend for more than 1400 miles. Their frontispiece shows its middle section of about 600 miles extending eastward as a continuous range from the 80th meridian until it is joined by the Ninchinhangla at about the 88th meridian. In this middle section they give a list of a dozen peaks ranging from 20,000 to upwards of 23,000 feet. These, with numerous lesser points, were fixed (mostly by Captain Wood) by trigonometrical methods of the first degree of accuracy, in the course of the expedition to Gartok under Captain Rawling's leadership. The series may be considered an extension of the G.T.S. of India. Certainly its parentage is irreproachable.

I am quite sure that the lecturer did not realize what he was showing us in that Chart XVII. of Colonel Burrard's, and upon the blanks in which he laid so much stress. That diagram is entitled 'Chart to illustrate how the great Himalaya range terminates firstly at the Indus, secondly at the Brahmaputra.' To render that chart clearer, such insignificant details as the Sutlej river, together with *all* the mountain ranges both north and south of the great Himalaya, except those at its two extreme ends, are purposely omitted; therefore, naturally, the Kailas range is omitted with the others. But in any case, as I understand him, Dr. Sven Hedin excludes this great range from his own Trans-Himalaya, because Wood's peaks are not situated on the actual water-parting. Yet how could we describe, and by what name should we call, the loftiest peaks in the world if we applied a similar line of argument to the Himalaya itself?

As to nomenclature, we already have Ninchinhangla, Gangri, and Kailas. The latter name was first applied to the whole range by Cunningham in 1847. You will find the name Kentaisse (a misprint for Kenlaise, the old form of Kailas) on Rennell's map of 1782, but he gave it to that well-known peak only. Now "Trans-Himalaya" is suggested to us. As the lecturer has himself admitted, Cunningham has already bestowed the name Trans-Himalaya on that range which in Ladak and Western Tibet separates the valley of the Sutlej from that of the Indus ('Ladak,' p. 43 and

plate 1). Morphologically, this range is continued eastward north of the true Himalaya, though it is broken through by the Sutlej. It culminates south of Mansarowar in Gurla Mandhata (25,350 feet), the highest mountain situated entirely within Tibet. It extends eastward again right up to the bend of the Brahmaputra, carrying twenty-five measured peaks of over 20,000 feet. It is quite a distinct range from the Great Himalaya. Standing on Gurla Mandhata, the Himalaya of Nepal seem almost as far to the south as the Kailas range seems to the north, so that the beholder realizes that he is already standing on a truly trans-Himalayan range, and if any range is to be called Trans-Himalaya, it should be this, as Cunningham perceived. But Himalayan nomenclature is already too complicated. We have Upper, Lower, Outer, Inner, Mid, Sub, Lesser, Great, Central, and Trans-Himalaya. It was to obviate any further extension of the name that Burrard and Hayden labelled the whole of this range (I mean the first range north of the Great Himalaya) the Ladak range, and applied the name Kailas range to that system still further to the north and across the Indus-Brahmaputra trough. The analogies of Trans-Caucasia and Trans-Caspia do not, I think, hold good. Such terms are very convenient to apply to a region whose exact limits you do not wish to define, but they are not sufficiently distinctive to apply to a mountain system. For many years we have read of the "trans-Himalayan regions" and of the "trans-Himalayan sources" of Indian rivers. Let us also speak generally of trans-Himalayan ranges; but we must give up this useful adjective if the name is to be affixed to one particular mountain system.

Discussion as to the exact location of the source of any great river system is complicated by the absence of any universally accepted definition as to what actually constitutes the ultimate source of a river. Since it has already been mentioned this evening, I will begin with the Brahmaputra.

In 1864 Mr. T. W. Webber, Colonel Edmund Smyth, Henry Hodgson, and the Hon. Robert Drummond (who in 1855 launched his collapsable boat on Mansarowar lake) were at Taklakar, in Purang. Thence they crossed the lofty Dak Eo pass to the south of Gurla Mandhata, a route seldom traversed even by natives. This led them over into the very head of the Brahmaputra valley. That river is described as taking origin in the glaciers or a great peak called Limi. Of course this is a Bhotia and not a Tibetan name. They followed down the main stream to within sight of Truksum, 80 to 90 miles from the source, and only 50 miles above Tradom. This expedition is described by Mr. Webber in his 'Forests of Upper India' (chap. xi.), and I think he and his companions must be given the credit of being the first travellers to reach the source of the Brahmaputra. At the same time it is obvious that Dr. Sven Hedin is the first to give us a detailed survey made on the spot, although he substantially confirms Nain Singh's general accuracy.

The whole question of the hydrography of the Mansarowar basin is, I know, a very complicated one, for, as the lecturer evidently perceives, we are watching a change in the "Pulse of Asia," but I would venture to urge that the chief credit for its solution must always remain with Henry Strachey. Burrard and Hayden, after reviewing and summing up all the evidence, definitely include it within the Sutlej drainage area, a conclusion with which Dr. Sven Hedin seems in entire agreement. The hypothesis of an underground communication between the two lakes was advanced by Colebrooke in 1816 ('Asiatic Researches,' vol. 12, p. 376), in consequence of Moorcroft's failure to find a visible efflux. I think any one who examines Sherring's panoramic photograph ('Western Tibet,' p. 271), which shows the whole channel between the two lakes, will see where that underground communication is situated. The reason Moorcroft did not find this channel is quite simple. In his anxiety to miss nothing, and he rarely did miss anything, he

walked along the actual lake side of Mansarowar, and the shingle bank over the effluent channel, beside which he was walking, effectually concealed that channel from his view.

The source of the Sutlej was formerly that stream which enters the Gunchu Tso on the west side of the Maryum-la. It is interesting to recall that Alexander Gerard placed it there ninety years ago ('Account of Koonawur,' etc., p. 139). This lake formerly discharged into the Tokchen river, and so reached Mansarowar. Now the first link in the chain is broken. The Gunchu Tso, shrunken and salt, is no longer able to find an exit towards the west. So we regarded the Tokchen river, with a course of about 30 miles, as the prime source. Now Dr. Sven Hedin finds that the Tagi-tsangpo carries a greater volume of water down to Mansarowar, and so makes this stream the genetic source of the Sutlej. But, as he himself perceives, another link in the chain is giving way between Rakas Tal and Tirthapuri, and when this process is complete, and the Mansarowar basin is quite cut off from the Sutlej, another source will have to be found. Perhaps this may come sooner than we expect. In August, 1905, I forded the Sutlej a mile above Tirthapuri, and about 6 miles above the point where the Chukar joins the main river. During the same month I crossed the Darma Yangti and the Guni Yangti at a point distant about 23 miles from the Sutlej. These two streams unite with the Chu Naku and the waters from the Gyanema lagoons to form the Chu Kar, which discharges into the Sutlej. Now I found as much water in both the Darma and the Guni Yangti as I found in the Sutlej at the point named, though they are not so wide as the latter river. The united volume of the Chu Kar itself must therefore be very considerable. Indeed, if we accept Dr. Sven Hedin's own definition, we cannot even now locate with certainty the genetic source of the Sutlej. Let us suppose some future traveller proves that the Chu Kar itself carries more water than the head-stream of the Sutlej after it has been joined by the Missar river. He may then seek the source of the Dharma Yangti amongst the Nui peaks to the south. Should he return and tell this or some other Society that he has discovered the true source of the Sutlej, some one would, I trust, make the comment that, in 1846, Henry Strachey said, "It is a question that can be decided only by actual measurement perhaps, whether the main source of the Sutlej be not in the Darma Yankti" (*Journal Asiatic Society of Bengal*, 1848, p. 157).

In reference to the Indus, the lecturer has told us how Nain Singh crossed it at Giachuruff, some five marches below its source. But we must not forget that at Giachuruff, in spite of the imminent danger of his position, this intrepid surveyor voluntarily separated himself from his companion, despatching the latter up stream in search of the river's source (*Proc. R.G.S.*, vol. 39, p. 151, etc.). This second pandit made his way up the river for nearly 50 miles, and was only stopped at Jiachan by the unwelcome attentions of a party of robbers. These may have been the fathers of some of those friends of Dr. Sven Hedin's about whom he told us the other night. At any rate, these robbers did him a good turn, for they prevented the pandit from reaching the Lion's Mouth itself, and in consequence, Dr. Sven Hedin has gained the distinction of being the first traveller to reach the ultimate source of the Indus.

May I add in conclusion, though it must be obvious to all of us, that Dr. Sven Hedin has only been able to place before us to-night a very small portion of his vast store of observations, and that until these come to be published in full it is almost impossible to realize the great importance and the very solid scientific results achieved in the course of his latest expedition.

Major LENOX-CONYNGHAM: First, looking at the name as a whole, there are two grounds of objection:

In the first place, the name, as Dr. Sven Hedin has mentioned, has been used before. It was applied in 1847 by Sir Alexander Cunningham, to a range which lies to the south of Ladak. It is no longer in use, but to resuscitate an old name and apply it to a new locality is to sow a seed of future confusion.

In the second place, a great many names of the same sort as Trans-Himalaya have been used in the past, there have been Upper-Himalaya, Lesser-Himalaya, Outer-Himalaya, Lower-Himalaya, Sub-Himalaya, Inner-Himalaya, Great-Himalaya, Central-Himalaya. To add yet another to this confusing series is a course which is much to be deprecated.

Next, considering the use of the prefix "trans."

Unless used with the sense of motion, as in Trans-Atlantic steamer, this prefix should always be in contradistinction to "cis," and even though the word with the prefix "cis" may not be in general use, there should be something which could be called by that name. There should be a distinct line of demarcation separating the cis-side from the trans-side. Thus, in the case of Trans-Caspia, the Caspian sea is the dividing-line, and we have a Cis-Caspian region corresponding to Trans-Caspia. So with the Caucasus, there is a Cis-Caucasian region balancing Trans-Caucasia. But in the case of the proposed Trans-Himalaya there is no Cis-Himalaya, but the plains of India, which could not appropriately be called by that name, and which forms no adequate "pendant" to the highlands of Tibet.

Again, in the case under discussion, the Himalayas do not form the line of demarcation, the Indus-Brahmaputra valley is the dividing-line between the Himalayas and Dr. Sven Hedin's Trans-Himalayan system, so that Trans-Tsangpo, or some such name, would be more suitable if the prefix "trans" is to be used at all. It is true that the case of the Alai and Trans-Alai ranges affords a precedent, but it is an unfortunate piece of nomenclature, and is rather an error to be avoided than an example to be followed. It was quite correct to speak, as Montgomerie and others did, of Trans-Himalayan exploration, for then the Himalayas formed the dividing-line, and everything on the other side of them was included in the term.

But the most serious objection to the name Trans-Himalaya does not lie in the prefix "trans," but in the word Himalaya. The important, the primary, geographical feature of this part of Asia is the great Tibetan table-land. This is the dominant fact. The Himalayas are merely the southern rampart of this mighty mass—an incident of its configuration. To take the name Himalaya and apply it to the parent mass is to call the greater after the less, the cause after the effect. This is a course which should at all costs be avoided. Moreover, the term Himalayan already covers a very wide area, and from a practical point of view it is undesirable to extend its use. When Colonel Burrard was writing his 'Sketch of Himalayan Geography,' he decided, in agreement with Sir T. H. Holland and others, that the name Himalaya should be strictly confined to the southern rampart of the Tibetan mass, and that the number of compounds, such as sub-Himalayan, should be cut down as much as possible. These authorities view with dismay the suggestion to bring yet another of such compounds into use, and to carry the name Himalaya further into Tibet.

In a recent letter, Colonel Burrard says—

"I trust that Dr. Sven Hedin will not think that the objections raised to the name trans-Himalaya are frivolous or obstructive. I can assure him that they are considered weighty by men who have devoted their lives to the study of geography and geology, and who wish to avoid all risks of future inconvenience and controversy."

The PRESIDENT (after the discussion): If nobody else wishes to speak, I should like to make one or two general remarks in bringing this interesting discussion to a close. My remarks will be quite general, because I am not an expert in matters of Tibetan geography. I have always been taught to concentrate my mind as far as possible on things and facts, and to consider that words and names are far less important. The misuse of words, of course, may do harm, but words and names in themselves are of comparative little importance. Now, facts may, broadly speaking, be divided into two classes—facts which are known, and facts which are not known. To-night we may add a third class—facts which are known to Dr. Sven Hedin and which are not known to us. I make this remark, because it does seem to me extremely hard that an explorer, after coming back from a great expedition like that which our distinguished guest has undertaken, should be expected immediately to give his results to the world in a full and complete form. It is absolutely impossible for any man, work he ever so hard, to give the full results of his labours until after many, many months' labour. If time had permitted, it would have been interesting if Dr. Sven Hedin could have given us a few more specimens out of his huge storehouse of information; for there are so many important subjects he has yet hardly touched on. There is, as a single example, that great question of the desiccation of Tibet—whether this country is getting drier quickly or slowly, temporarily or permanently. With regard to the known facts concerning the white patch on the map, which Dr. Hedin has covered with his exploration, we all know what was done by Nain Singh on the west and north, by Littledale on the east, by Ryder and Rawling on the south, and concerning the peaks which have been observed by Wood at a distance. These facts are all known, and on record. Those discoverers have had due credit given them; and I am quite certain that Dr. Sven Hedin would be the very last person to wish in any way to detract from what they have done. Then, with regard to the question of what I may call "hypothetical map-making"—the filling up of white unexplored places on slender information—I fully agree with Dr. Sven Hedin that the best thing is that some one should go to these places and ascertain the facts as he has done. This is not always possible, and in these circumstances we must be permitted to fill up these blank spaces as well as we can, a work which is useful if clearly indicated as hypothetical.

I have always been struck with the profound wisdom of the words of Bacon, who said "that the truth comes sooner out of error than out of ignorance." The filling up of a blank space in a map may be erroneous, but it may also be a step in the right direction. I think, if Dr. Hedin will look back, he may possibly recognize that where maps have been filled up even erroneously they have stimulated his imagination and helped him forward in the path of exploration in which he has done such wonders. But the making of these hypothetical maps, this filling in of blank spaces on slender information, is a totally different thing from filling up the map from actual knowledge. The two operations are quite different, and need not be discussed together. One is a hypothesis for the purpose of facilitating discovery, whilst the other is actual work done, for which the same credit is due whether preceded by a correct hypothesis or not. Lastly, with regard to the facts which are indisputable concerning Dr. Sven Hedin's work. If we take two points in Tibet, and if we draw a curved line between them some 300 or 400 miles long, we shall find there is all along that line a complicated system of mountains which Dr. Sven Hedin has called the Trans-Himalaya range. Now, it is a fact that no civilized man ever put his foot on any part of that line of mountains before Dr. Sven Hedin did, and that is a fact that will remain for ever recorded to his honour. With regard to the name of this range, I intend to say but little. He has told us that his

proposal has been approved by the Viceroy. Possibly he will think I am prejudiced when I tell him that my belief is that this question will be settled in a way I have been taught to believe an immense number of questions have been always settled, and that is on the principle of the survival of the fittest. Several objections have been urged against this name, some of which, I think, are of little value. The only objection that strikes me at the moment as of weight is that to which Dr. Sven Hedin has himself alluded, namely, that if you look at this range from the north the name Trans-Himalaya is inappropriate. He also mentioned the name Anti-Himalaya, and I allude to it for two purposes. In the first place, because the title Anti-Himalaya seems to be perfectly correct, and not open to this objection to which I have alluded. I also want to place it on record that if Dr. Sven Hedin should see that name Anti-Himalaya on any map—whether he will do so or not I do not know—I ask him to remember that he with them still occupies the honourable position of godfather to this enormous range of mountains. But I am not here to sit in judgment on a technical matter of this sort, and I do not intend to do so, because I am not an expert, and because I do not think that the question of a name is one of prime importance. In short, in my opinion, on an occasion of this sort, what we ought to do is to concentrate our minds on the deeds of a great explorer, and not on the words by which those deeds are described. Dr. Hedin, without doubt, has done magnificent work, and the deeds he has done in filling up the white spaces in Tibet will stand on record for all time in the book of geographical discovery, greatly to the honour of our distinguished guest.

Dr. SVEN HEDIN.

I wish to express my very hearty thanks to those gentlemen who have been so kind as to take part in this discussion, and for the very kind things most of them have said of me. Specially was I glad to hear what Sir Clements Markham had to say, as he had taken such a great interest in the development of our knowledge of Tibet. I have already mentioned my own opinion about Sir Thomas Holdich's suggestion to call the range the Bongba system, and so I do not need to enter upon that. We have heard several propositions for the name: the Bongba range, the Trans-Tsangpo, etc., and I think the real name that is to survive, as the President said in such a beautiful way, will have to go through some kind of a struggle for its existence; but I think it will clear itself out of the struggle. Then as to Colonel Godwin Austen's communication, I found it extremely interesting, especially what he said about lakes Panggong and Tsomahiri, because the problem of these two lakes is exactly the same problem as the hydrographical problem of Rakas-tal and Mansarowar, although the problem of Panggong is advanced much further, and I think it is extremely easy to find the valley through which the effluent of Panggong flowed out and became a tributary to the Sheyok river. I measured the beach lines of the Panggong lake at some places, and found the highest of them to be 175 feet over the present level of the lake, so I suppose the height of the threshold in the valley must be something like 175 feet; but I quite agree with Colonel Godwin Austen that the problem cannot be definitely solved, unless a precise level has been carried out in the valley. This is extremely easy to do; any Commissioner of Ladak could do it on a holiday.

Now as to Mansarowar and Rakas-tal, they have not yet advanced so far as Panggong. Panggong is, as we know, salt because it is absolutely cut off from the Indus system. There is no underground connection with the Indus, but in Rakas-tal there is an underground connection, and I cannot agree with Captain Rawling when he says it would require centuries for the lake to become salt. I do not

think it would take centuries. I believe it would take only a few years, as I have seen the lakes situated on the right side of the lower Tarim filled artificially by the natives by opening small channels on the river, and as the ground is lower than the river itself, the depressions become filled when the channels are opened. Sometimes the natives close the connection between the river and the lake, then in three years the water becomes salt, as I have proved myself. They do it because they profess that the taste of the fish becomes much better when the water is salt; and that is only a question of three or four years. Of course, it would take a longer time for Rakas-tal, as it is much deeper; but anyhow it would not take centuries, I am quite sure.

Now as to Sir Henry Trotter. I emphasize what I said about the native explorers and the Pundits. I have said several times how I admire their work, and I admire specially Nain Singh, and nobody has admired him more than I, because nobody has travelled so much in the same country as he as I have both up the Tsangpo and on his journey of 1873-74. I have said that the Pundits' topographical work, especially in any country they have seen with their own eyes, is always correct and always admirable. Their reports, however, are useless for scientific purposes. When I talk about scientific purposes, I do not mean astronomical points, as I know how well those determinations agree with other observations; I mean a description of the physical geography. A pundit can easily pass a very great lake, and never tell you whether it is salt or fresh. He can cross a river, and not tell you whether it is a big or small river. He can cross a mountain without telling you whether it is solid rock or loose material. I mean it is impossible for a geographer to draw any valuable physico-geographical conclusions from a report of a pundit, and what we get from them is the topographical idea of the country. I have also said that their information on any parts of a country which they have not seen with their own eyes, but about which they have collected information from the natives, has proved to be absolutely impossible, and I will show that presently on the map. Sir Henry Trotter will remember, as he worked out the map of Nain Singh of his journey from Leh to Lhasa, that Nain Singh filled up the map south of Dangra-yum-tso, and placed a river he calls Dumphu or Hota-tsangpo, which goes round in the most extraordinary way I have ever seen for a river; it goes round like a semicircle, and that in the part of Tibet which is situated south of the watershed, and in a country where most of the water goes to the Brahmaputra and the Indian ocean. That is what I mean. I admire the Pundits. At one time we had nothing else to do but train the natives, but I agree with Delmar Morgan, who says that they are not trained as we are, and their education is not sufficient for the solving of the problems of modern scientific geography. For instance, it is very difficult to use the information Nain Singh gives us of Tashi-bup-tso in the middle of Tibet, which I passed twice. It would have been extremely important to know from the Pundit the exact length of Tashi-bup-tso. I passed it, but to my eyes it had absolutely disappeared. It was a salt lake, and at the place where Nain Singh puts his big lake of Tashi-bup-tso I did not find anything except shining white salt, and not a drop of water; but, on the other hand, Tong-tso still exists. I mean that it would have been interesting to get some detailed information from the Pundit about Tashi-bup-tso, and as I saw it in 1908, that is to say, some thirty-four years after him, I should have been able to get a really correct figure of the rate at which one of the salt lakes of Tibet has dried up. That is what I mean by scientific physical geography. But, of course, I like the Pundits; and I like Nain Singh just as much as Sir Henry Trotter, if not more.

It was very interesting to hear what Sir Martin Conway had to say; and as to Mr. Freshfield, I think it was a very important remark he had to make. Of course

the Trans-Himalayas begin from a height of 12,000 feet; I do not intend to enter upon that. On the strategical question I really did not mean the Chinese when I was speaking about a "northern enemy," who could put the safety of India into any danger. I did not mean the Chinese at all—I meant somebody else. So when the Emperor Kyang-lung in 1792 sent his 70,000 Mongolians and Chinese through China to Tibet and down on the ordinary way to the neighbourhood of Katmandu, he did not go the way I meant at all, because I meant the roads I knew myself. I meant to say the whole of Tibet is impossible for an army to cross. Mr. Freshfield refers, in a very interesting letter I got from him the other day, to the fact that the expedition to Lhasa proved that field artillery can easily be brought up to Tibet. But I would say that it would be impossible to carry field artillery through Tibet from the north; and it is almost impossible to cross Tibet with an army, even if you have only field artillery. I have crossed Tibet several times, and I have found that 90 per cent. of the caravan is lost *en route*, and if that is the case with a little caravan, it must be still more the case with an army; very often you come to a spring, or some lakes, which prove to be sufficient for your own little caravan, but which would never be sufficient for an army.

Captain Rawling's communication is important, and I know from his book and his publications that we agree very well on most of the points—I believe even as to the Sutlej problem. As to the geological details he mentions, everybody will understand easily, that there is no possibility for me to enter upon such details now. But I do not agree with Captain Rawling when he calls the northernmost range of the Himalayas the Trans-Himalaya; I regard it as belonging to Himalaya, so much the more as it is the water-parting range. Then he proposed that the name Peu Kangri, or the snow mountains of Tibet, or Peu Lho Kangri, the snow mountains of Southern Tibet, should be given to this range. That is all right, but it is quite unnecessary to introduce any Tibetan names into Tibet.

As to Dr. Longstaff, he has brought forward a great many details; I could, if wished, come with many more details about this country, but there is no time now. Those ranges seen to the south by Nain Singh on his journey are by no means the head range of the Trans-Himalaya. That is a mistake. I do not see what Shakangsham has to do within the limits of this discussion at all. Of course everything north of the upper Brahmaputra belongs to the Trans-Himalayan system, but I say from the valley one cannot see anything except those mountains situated close to the route. As a rule those mountains coming down to the upper Brahmaputra valley hide everything that is behind. It is very comfortable and easy to sit down in your study at home and write down a lot of hypotheses; go out and try to observe the facts; it was open to everybody as well as to me. Sir Martin Conway has just pointed out the difference between deductions and hypotheses and actual knowledge. It is very surprising, but anyhow a fact, that one member of the Council of the R.G.S. has maintained that only 100 miles of the Central Trans-Himalaya belong to me, whereas all the rest was known before, and that I had no right to call it a discovery. Those who are not familiar with the exploration of Tibet will very likely be taken in by all the names, dates, longitudes, latitudes, and figures in Dr. Longstaff's remarks, but the experts present in this hall will not agree with him. The whole of his argumentation is built on a foundation of extremely fragile and valueless hypotheses and theories brought forward at different epochs, more specially by Hodgson, Saunders, and Atkinson, and it is not surprising that the whole construction must fall to pieces when brought face to face with the real mapping of the country. I need only remind you of the fact that all three have *one* mighty range in the middle of the Bongba country, and that there are in reality ten absolutely different and sharply defined ranges with broad open

valleys between them. Nevertheless, Dr. Longstaff says that Atkinson's map and my sketch-map are "practically identical." I think it is a great pity that any member of the R.G.S. should ever have published anything of that sort, and it is a bad excuse when Dr. Longstaff now explains that he meant the map that I had published in the *Times* of November 10, as that map was a photograph of the sketch-map on which I have demonstrated my last journey to-night. Major Ryder and Colonel Burrard believe that the peaks seen and measured by Wood and Ryder from the route along the river belonged to *one* range, which was also supposed to be the watershed of the Upper Brahmaputra. That this is Burrard's opinion can directly be seen on one of the maps in his and Hayden's splendid monograph of the Himalayan and Trans-Himalayan mountains, a map representing the drainage area of the upper Brahmaputra. Now those peaks are situated on different ranges, so from whatever point you regard the orography of this part of Tibet, you can never talk of a *range* joining those peaks. There is one reason more why "The Kailas range" has to disappear—it does not exist in reality. But if you are going to speak of the Kailas system, you can do so if you like; I will anyhow take the liberty to call the ranges on both sides of the watershed the Trans-Himalayas. And the signification which is the strongest will be accepted by geographers, and will survive long after the golden inscription on your graves and mine has disappeared.

Well, the situation is this: Dr. Longstaff has never touched the country of which I am speaking now, that is why he has been obliged to quote half a dozen travellers and geographers who have never been in the country either. They have probably collected their information from native explorers who have never been in the country either, and who have thus got their wisdom from natives. Is it surprising, I ask you, that the result of this uncritical criticism is a hopeless confusion? I won't enter upon the question of Mansarowar any more. As Dr. Longstaff mentioned, it is not so much the question whether it is the chief source or not, that is why I called it the genetic source and nothing more. I mean to say that in my theory those two lakes belong to the system of the Sutlej. That is the important thing, not whether any other of those rivers coming from the north have more water or not.

Mr. Thomas Webber never pretended to have discovered the source of the Brahmaputra; he simply says (p. 129), "Here were the sources of the great Brahmaputra originating from the glaciers of Gurla," and he tells us that the Indus, Sutlej, and Brahmaputra take their rise from the glaciers of Gurla Mandhata. But Mr. Webber, if alive, would now be agreeably surprised to learn that Dr. Longstaff has suddenly discovered that Webber discovered the source of the Brahmaputra forty-five years ago. I beg everybody, who takes any interest in this discussion, to look up the sketch-map in Webber's book. Here the uppermost Brahmaputra is so like Nain Singh's map that one must almost believe the two maps stand in some relationship to each other. They are both absurd, but Nain Singh's is much better than Webber's, so far as the Brahmaputra is concerned. On Webber's map we find the words, "Snowy ranges unexplored," just in the very part where the real source is situated, and Webber's route is a good long way from there. South of Rakas Tal and Manasarowar we find the words, "Sources of the Indus," but I don't know whether Dr. Longstaff regards Webber as having discovered the source of the Indus. Only when my maps are worked out and published will I be able to show the value of Dr. Longstaff's communication that Webber was the first traveller to reach the source of the Brahmaputra. Webber has never been to the source of the river, nor has Nain Singh or the Gartok Mission. I am the first who has been up the Kubi-tsangpo, a river that is four and a half times as big as the Maryum-chu.

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I should like to say one word about a matter which has not been under discussion to-night, with reference to a letter which has appeared in the *Standard*. It was about the maps, very well known by historical geographers, which have been painted on the walls of the Ducal Palace in Venice. I need only say Prof. Mittag-Leffler, of Stockholm, asked Prof. Volterra in Rome to make an investigation into the matter, and that he sent a rather detailed description, together with photos of those maps, and that the chief librarian of the Royal Library at Stockholm, Dr. E. W. Dahlgren, gave me some other very interesting communications about them. Those four maps were painted in the middle of 1500 by Gastaldi in place of some maps which were destroyed in 1483, and those four maps represent Asia, from the mouth of the Indus to China, the Pacific, and a part of America. The second is Western Asia, the third Africa, and the fourth Italy. I do not need to say that nothing on the map of Asia is like the reality. The Asiatic maps were renovated in the middle of 1700 by Grisellini, and the mountains and rivers form a very hopeless confusion. It is impossible, for instance, on the map of Tibet to tell which mountain range is meant to be the Himalayas, and which river is meant by the Ganges or Brahmaputra, so everybody will understand that those maps, as far as Tibet is concerned, have no value at all. Moreover, as we know they were painted just to immortalize the memory of Marco Polo, and the memory of some other Venetians, and as neither Marco Polo nor any other Venetian of that time ever were in Tibet, it is very easy to understand that these maps could not possibly contain anything that has been found by me during my last journey.

Finally, I give my heartiest thanks to the President for the most flattering and amiable words he has addressed to me. He touched upon one extremely interesting problem of the physical geography of Tibet, namely, the desiccation of the lakes. I think the fact that the erosion of the sea-going rivers enters more and more into the heart of the continent is one of the causes why the salt lakes dry up. But we must remember that it is not only the salt lakes of Tibet, but the salt lakes of the whole of Asia that are drying up; so it is not a local problem, but the root and cause of this phenomenon must be sought for somewhere outside our planet. I am very glad to hear that the President agrees with me to the name of Trans-Himalaya, and I hope the Royal Geographical Society will accept it.

I take the liberty to mention one other matter which does not belong to this discussion, but anyhow to the subject of it. The *Pioneer* of February 6 contains an article—"The Sven Hedin Mountains," signed "Astrabadi." This article does not contain a single important or original point of view, so I need not waste time on it.

Before I finish, I should like to ask one question—What is the result of this discussion? I will leave it to everybody present to reply to it in silence for himself. I have my own opinion. But I agree with the President, the material has to be published before any one is in a position to judge it. It is surprising that certain people seem to believe that I should have begun this expedition without knowing exactly what was left to be done. I started on my fifth expedition rather well prepared, and I had decided to do my utmost to find the source of the Indus and the Brahmaputra, and to fill up as much as I could the great white patch of absolutely unknown country north of the Tsangpo. I have done it now, and I have solved many other problems of physical geography which have not even been mentioned during this discussion.