
Review: Dr. Sven Hedin's Journey in Central Asia, 1899-1902: Scientific Results

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Source: *The Geographical Journal*, Vol. 33, No. 1 (Jan., 1909), pp. 65-68

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1777753>

Accessed: 27-06-2016 22:03 UTC

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am very proud, that now my name and those of my comrades may be included among these names, after having done some work in Arctic exploration. I only want to express my feelings of thankfulness and gratitude.

About the motor car. I do believe, when the surface is very hard, say on the inland ice, and you have a stronger motor car than we had, then it may very well act. The roughness of the ice is nothing, but on the snow the motor generally will be too heavy, and go through; on the inland ice where the surface is hard, I think a big motor car would be very useful.

DR. SVEN HEDIN'S JOURNEY IN CENTRAL ASIA, 1899-1902: SCIENTIFIC RESULTS.*

By Major W. BROADFOOT.

THE larger part of this work, on a great scale, was briefly examined in June, 1906 (*Geographical Journal*, vol. 27, pp. 606-613). It consisted mainly of descriptions of journeys about the Takla Makan and of the country round Lob Nor, a shifting lake in which the drainage of a vast horseshoe of mountains is ultimately received and lost in the expanse of surrounding sand. There now remain for consideration vols. 3 and 4, in which the detail of journeys through North and East Tibet and Central and West Tibet are recorded; it is not proposed to examine these very closely, for they have presumably received sufficient attention in the reviews of the popular edition of 1903.† Still, a few notes on these volumes may be of service to future students.

A commencement is made by describing in minute detail—as, indeed, all Hedin's descriptions in this book are—his first trip in North-Eastern Tibet. Starting from Kára Koshan, which readers will remember is the present Lob Nor, he set forth to cross the Astin Tágh (the Altyn or Altin Tágh of our maps) and various other ranges, chief of which is the Arka Tagh, back by the west side of Kum Kul to Temerlik. The letterpress, practically a diary, can be followed on his route-maps, which are beautifully drawn and distinct. They begin for this part of the work at Plate 29, and the text is more or less a descriptive commentary on the map. Taken together and fitted into the R.G.S. map of Tibet, a student will acquire almost as much information about the country passed through and its surroundings as is possible without an actual visit. All sorts of information concerning it may be gathered; its configuration, its capabilities in the way of supply of forage and water, and the presence or absence of wild animal life are recorded. Thus in one place we find camels, yaks, antelopes, hares, and partridges; whilst in another, not necessarily very far distant, animal life down to insect

* 'The Scientific Results of a Journey in Central Asia, 1899-1902.' By Dr. Sven Hedin. Stockholm: Lithographic Institute of the General Staff of the Swedish Army; London: Dulau & Co.; Leipzig: F. A. Brockhaus.

† 'Central Asia and Tibet.' By Sven Hedin. Hurst & Blackett.
No. I.—JANUARY, 1909.]

pests is absent, and there too, it seems, disintegration of rock is most rapid. This again leads to an abominable and treacherous surface soil, which was "as soft and spongy as a morass, and consisted of fine yellow plastic clay and mud. Owing to the *débris* on the top, it wore a deceitful appearance of being able to bear, and yet the animals sank in a foot deep."

Dr. Hedin rightly protests against the introduction of foreign names for the hills and localities in Tibet, and he seems specially to resent the use of the name Columbus, which appears plentifully in America and need not be transplanted to the heart of Asia. We agree with the sentiment; but it must be recollected that the native names about that part of the world seem more than usually casual and transitory. Thus Astin Tagh means merely "the lower range"; Kar-yakkak, "where the snow falls." And many others are scarcely distinctive in a country a network of hills where snow falls heavily over the greater part.

A fact noticed by Dr. Hedin in this Tibetan lake-land was that of two lakes at no great distance apart and connected by a river, in one the water was fresh, the grazing round it good, and the game abundant, whilst in the other the water was salt and its surroundings were desolate. Resulting from this mixture of fresh and salt water are in places a series of ice-sheets amidst tracts which were free from ice. The former might or might not be strong enough to bear traffic; the latter was so soft that animals sank in it to their knees. Where fresh water prevailed the ice was thick, where salt water predominated there was slush or no ice, and intermediate proportions of the waters gave, as might be expected, thicker or thinner ice. So when a stream of fresh water entered a salt lake, it is recorded that "The farther we advanced from the mouth of the stream the thinner grew the ice; thus it was evident that it was only the fresh spring water that had frozen, forming, at any rate in the western part of the lake, a coating of ice upon the top of the salt lake-water. This process is in a high degree facilitated by the extraordinary shallowness of the western part of the lake."

On the way back to Temerlik the gold-mines at Toghri-sai were visited; they seem to be worked by small bodies of men, from thirty to forty, for about a month at a time, and the yield is said to be poor. Further on rock pictures of animals and hunters were seen, and at one of the camps evidence that Mongols had travelled that way was found. The Turgut Mongol pilgrims, on their way to Lhasa, pass through Temerlik and Tsaidam. Temerlik was made a headquarters, whence many expeditions were carried out; these need not be considered in detail. Hedin's great excursion was through the Astin Tagh as far as Anambaruin-Ula, across the deserts of Gobi and Lob, along the Kuruk Tagh, by Kara Koshan and Charklik, and was described for the most part in vol. 2, which has already been reviewed. Of the Tibetan portion (Akato Tagh) of the journey he writes, "Everything was dead and desolate,

not a sign of either animal or plant; even the ravens, which were generally wont to keep company with the caravan, failed to find their way in here. The region was perfectly still and peaceful." The country traversed became more and more difficult, till at last it became impassable and steps had to be retraced. The Russian map of the General Staff is severely criticized; it was found all wrong, adorned with an imaginary range on which the extent of perpetual snow was duly recorded, with as much insistence as if it had been "the Arka Tagh, the very backbone of Asia. On sheet 62 of 'Stieler's Handatlas' this imaginary range has been a good deal toned down, but on the map of Tibet and the Surrounding Regions, issued by the Royal Geographical Society, it figures in all its pseudo-splendour. Thus as one result of the first few days of this present excursion I was able to eliminate from our maps a misleading and vexatious blunder."

Dr. Hedin tells us he has crossed the Arka Tagh in spring, summer, and autumn, on each occasion having been caught in a snowstorm. On this journey he records that it was twilight at noon; the glen, absolutely barren, was covered sides and bottom with snow, constantly deepening as the fall continued, the only relief being the stream whose course was marked as by a dark winding ribbon. He pushed on towards Lhasa, but was turned back by the Tibetans when within one march from Nam-tso, or Tengri Nor. Thence he journeyed west, following the general direction travelled by Bower, Littledale, and others, to Ladak and Kashmir. *En route*, when on the top of a high mountain, seeing the numberless ranges like waves at sea, he moralizes and justly remarks on the insignificance of a single exploring itinerary in a country so large and so hilly, and he recognizes that as regards the geography of Tibet we merely possess a glimmering of its main features, but cannot say that we have even the rudest reconnaissance map of the *whole* of Tibet.

Certain journeys and reports by other travellers are examined and commented on, special importance being assigned to Grombchevski's in the Pamir, Karakoram, and Western Tibet. Robert Shaw (1867) is mentioned as the first traveller since Marco Polo to give an account of Charchen, valuable though based only on hearsay. Forsyth's mission to Yakub Beg (1873-4) is referred to, and finally Younghusband's mission to Lhasa, with the action of the British Government thereon, is mentioned.

Volume 4 closes with a description of the orography of Tibet, in which reference is made to a general map which has not been provided; the omission will no doubt be rectified when the account of more recent travel is published. Vol. 6, Part iii., "Racial Types from Western and Central Asia," consists of a number of remarkably clever sketches of the natives of those parts; we may repeat now, what has before been affirmed, that the author's attainments as an artist both in figure and

landscape-drawing are among his greatest accomplishments, if, indeed, they are not supreme.

We have also commented on the system of transliteration followed in the English edition of this work, and of the unnecessary trouble caused by it, and by the use of foreign standards of measurement, to English readers. It is comical and a little puzzling to recognize the well-known Zoji La under the disguise of Sodschi-la, and Takht i-pari, the fairies' throne, as Dschinri (Tokta-pärä); but what is to be made of Nesamorsajuschtscheje, or the "Non-freezing," a name given by "Prschevalskij" to a lake?

The out-turn of the volumes, the reproduction of photographs and sketches, and the fewness of the printer's errors, are in the highest degree creditable to the Lithographic Institute of the General Staff of the Swedish Army.

ON THE IMPORTANCE OF AN INTERNATIONAL EXPLORATION OF THE ATLANTIC OCEAN.*

By Prof. OTTO PETTERSSON and Prof. GERHARD SCHOTT.

I. THE INVESTIGATION OF THE ATLANTIC OCEAN IS ONE OF THE MOST IMPORTANT OCEANOGRAPHICAL PROBLEMS TO BE ATTACKED IN THE NEAR FUTURE.

1. IN regard to Oceanography and Climatology. All deep-sea expeditions of later years have started from Europe to the southward, and have occupied themselves principally with the eastern half of the South Atlantic. But about the interesting and complicated conditions of the western half of the North Atlantic ocean, within the boundaries of the Gulf Stream and the Labrador Current, no systematic deep-sea research has been made with modern instruments and by modern methods since the days of the *Challenger* expedition, excepting some observations of the U.S. s.s. *Albatross*. There can hardly be any doubt that what is going on in the western part of the ocean will furnish a key to what is going on in the eastern part, that is to say, on the European side.

We know nearly nothing about the magnitude and laws of the changing variations of the Atlantic currents in regard to strength or temperature. In this respect a foundation ought to be laid for all later investigations. The non-periodic changes in the temperature of these currents, principally those of the Gulf Stream, are of vast importance for western Europe. Their causes must be looked for in the Gulf Stream itself. Hence the necessity of following it up to its origin further westward. By careful investigations of different scientists it appears very probable that these non-periodical changes in the Atlantic temperature have a deep and far-

* At the ninth International Geographical Congress, which met at Geneva from July 27 to August 6, 1908, Section VI. was devoted to oceanography. In the absence of Sir John Murray, of Edinburgh, senior representative of oceanographic research, Prof. Krümmel, of Kiel, presided. Prof. O. Pettersson, of Stockholm, and Prof. Schott, of Hamburg, each of them, read a paper explaining the necessity of commencing as soon as practicable an exploration of the Atlantic on an international basis in respect to its physical and biological conditions. The substance of the two papers is given in this article.