

**Early Modern European Explorers  
at the  
Mountain *Jade* Quarries  
in the  
Kun Lun Mountains in Xinjiang, China**



Hermann Schlagintweit and Ferdinand Stoliczka next to a map of ancient Turkestan by A.Petermann, printed 1877 in Gotha, Germany

by

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## Part IV

### 7.0 The Geologist Explorer, Dr. Ferdinand Stoliczka, in 1873 at Gulbashen in the Karakax Valley.

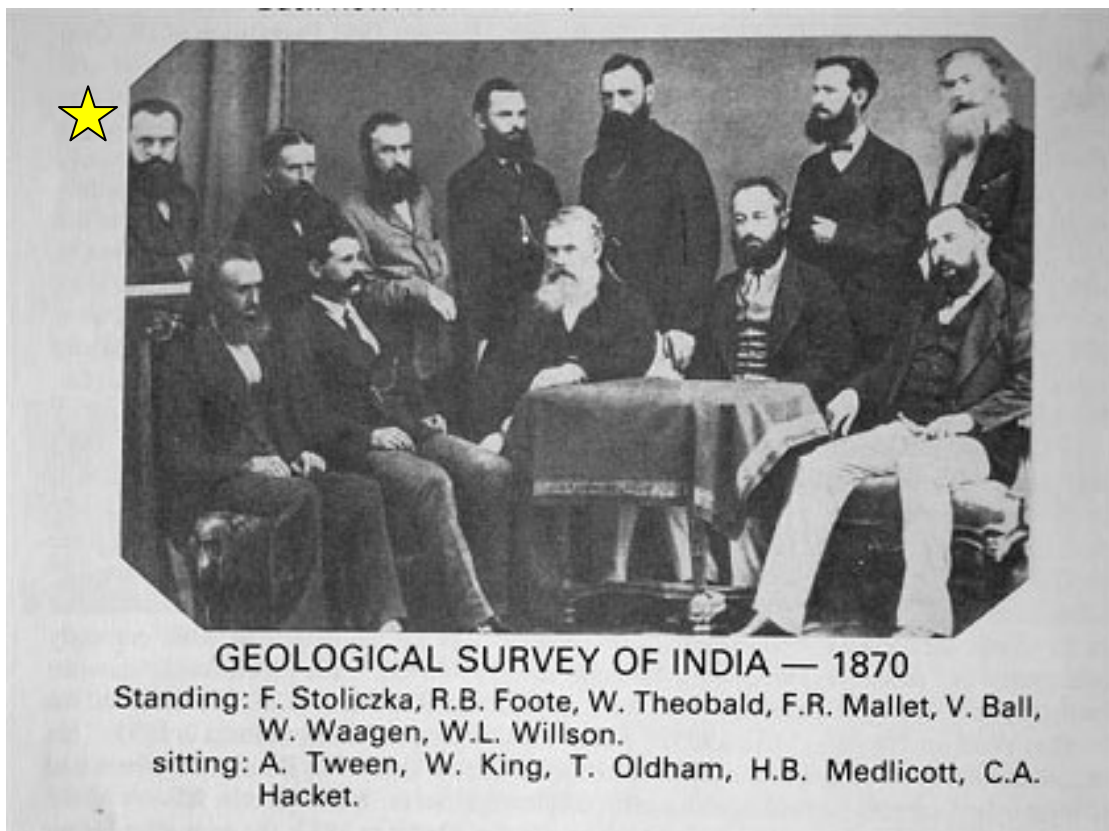
The explorations of the northern territories beyond the Himalaya and Karakorum chain increased in frequency as the power vacuum left by the weak Chinese empire brought an aggressive southward expanding Imperial Russia closer to the boundaries of the British Empire in India.

The two frontiers were, as the crow flies, just approximately 220 miles distant. The frontier of British India with Chinese Turkestan, was in Aktagh, a mere 30 miles from Shahidulla (now Xaidulla), and the "Great Game", between Russia and the British Empire was in full swing.

Several British missions, with scientists such as Dr. F.Stoliczka attached to them, traveled through this area on their way northward toward Kashgar and Yarkand.

Dr. Ferdinand Stoliczka was born the 7<sup>th</sup> of July 1838 in Bilany/Kromeriz in Moravia in an old family of foresters whose members had served on the local forest estate of the Archbishops of Olomouc for several generations. He studied natural history in Vienna and graduated as Ph.D at the University of Tübingen in Germany on the 14<sup>th</sup> of November 1861.

He was encouraged to work in geology and paleontology by Professor Eduard Suess and, as early as 1859, he communicated to the Vienna Academy a description of some freshwater mollusks from the Cretaceous rocks of the North-Eastern Alps.



Dr.F.Stoliczka, member of the Geological Survey of India, in an 1870 picture with colleagues and his superior, Prof. Thomas Oldham

In 1861 he joined the Austrian Geological Survey, and in the following year he was appointed, on the recommendation of Professor Suess, as paleontologist to the Geological Survey of India in Calcutta under the direction of Prof. Thomas Oldham, Superintendent of the Geological Survey of India.

The description of the "*Cretaceous Fauna of Southern India*" was placed in his hands, and resulted, with the assistance of the naturalist and geologist William Thomas Blandford, in the publication of four volumes with 1500 large sized pages and 176 full-page plates, in the Paleontologica Indica Series from 1863 to 1873.

He traveled, next to expeditions to Burma, the Malayan Peninsula, the Nicobar and Adaman Islands, twice into the Himalayas and published geological memoirs and numerous papers on all branches of Indian zoology, from mammals to insects and corals.

The geological work was duly recognized by his peers and W.T. Blandford wrote the following on this subject:

*"Very little, indeed, has been done toward elucidating the geological structure of the country (the Himalayas). This work was admirably carried out by Dr. Stoliczka. In the course of a single season's work, in a most difficult country, amongst some of the highest mountains of the world he clearly establishes the sequence of formations; and, from his extensive palaeontological knowledge, was able to do this with an accuracy, which has stood the test of subsequent research....."*

From this position he was attached to the Second Forsyth mission to Turkistan.

The Second Forsyth mission to Yarkand was an action of political strategy designed to compensate a commerce treaty concluded on 21<sup>st</sup> of May, 1872 by the new ruler of Turkistan, Mohammed Jakub Beg with the Tsarist Russia in Kashgar.

The Viceroy of India accepted a suggestion by Mohammed Jakub Beg to balance this tie with an equivalent treaty with the British Empire and to send Sir T.D. Forsyth, K.C.S.I, C.B., of the Bengal Civil service to conclude the negotiations in Kashgar where they arrived on the 4<sup>th</sup> of December 1873. This treaty was duly signed on 2<sup>nd</sup> of February 1874.

The European staff of the Forsyth mission consisted of Lieutenant Colonel T.E.Gordon, Dr. Bellew, Captain Chapman, Captain Trotter, Captain Biddulph and the Geologist Dr. Stoliczka. During and after the treaty negotiation each of these members of the mission traveled alone or in groups exploring and cartographing the area from the Karakorum through Yarkand to Kashgar and the Russian Frontier.

After a short visit back to Shrinagar in India, Ferdinand Stoliczka left on the 11<sup>th</sup> of September Leh in Ladakh and traveled, with a part of the Mission staff, along a more easterly route over the Chang Lang Pass into Tibet and then to the camp site of Kizil Jilga in the upper Karakax River valley.

He fell ill of spinal meningitis on the 1<sup>st</sup> of October at this location but recovered by the 13<sup>th</sup> of October sufficiently to welcome the main group arriving from Leh. From this camp site the group followed the Karakax River downstream and reached Shaidulla the 18<sup>th</sup> of October and Kashgar the 4<sup>th</sup> of December 1873. During this leg of his trip he visited and described the mountain Jade deposit.

The T.D. Forsyth's mission to Yakub Beg ended on the 16<sup>th</sup> of March 1874 and on the following day the whole expedition left Kashgar. According to the original plan the group, whose members included Stoliczka, was to return to India via the Pamir Plateau and Kabul.

However half way to Kabul, unrest there forced the group to turn back and return to Yarkand where they arrived by the 21<sup>st</sup> of May 1874. After a short rest they started on the 28<sup>th</sup> of May their return to India via the traditional trade route over the Karakorum Pass to Leh.

Their route led them through the Tisnab range (Eastern Kun Lun) and the Yangi Davan Pass and then upstream the Yarkand River valley to Kufelong and Aktagh at 5084m. From there it takes another 30 miles to reach the Karakorum Pass which culminates at 5575m above sea level. The pass region is totally barren with no vegetation, temperatures dropping to -30°C and storms and blizzards throughout the year

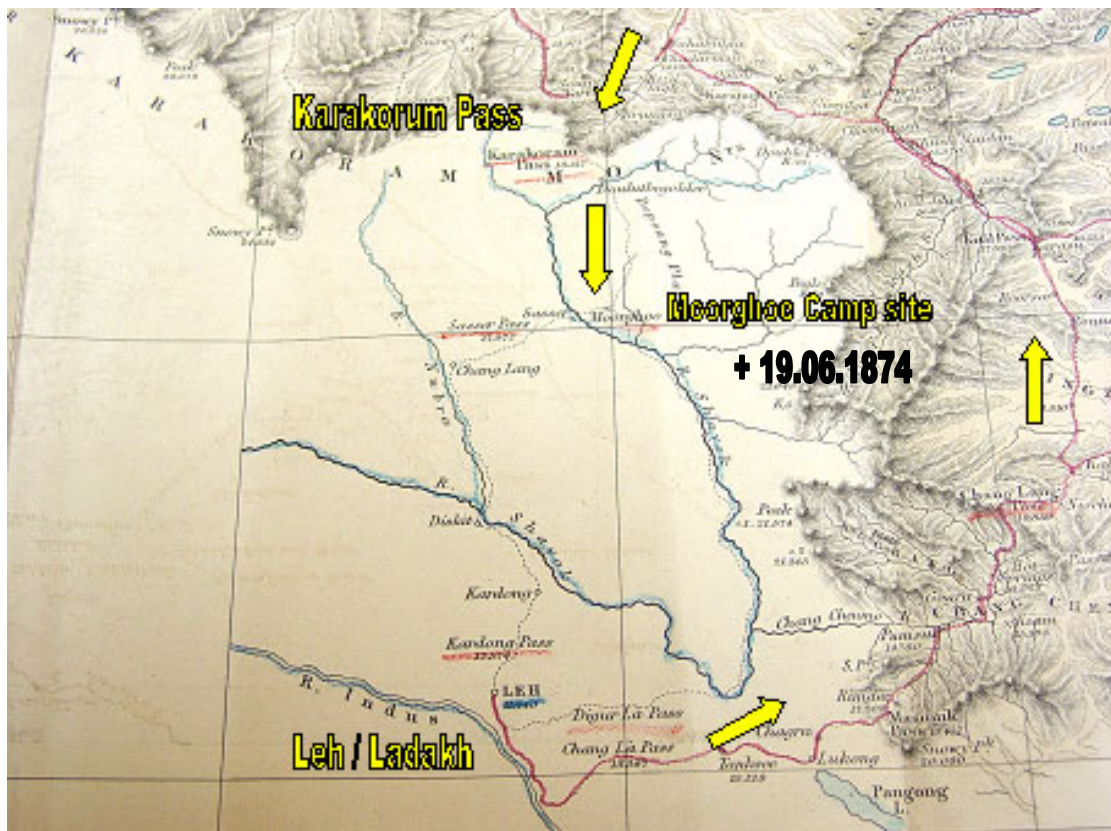
The route is littered, since ancient times by the bones and skeletons of dead men and animals, silent reminders of hostile conditions such as bad weather and rarified air that took the toll of so many lives when this route was used intensively for trade with Central Asia.

Ferdinand Stoliczka and his party crossed the Karakorum Pass on the 16<sup>th</sup> of June and were on the way down from the Pass via Daulat Beg Oldi or “the place where Daulat Beg, from Yarkand, died”, when a second bout of spinal meningitis hit him.

He firstly neglected the pain in the back of his head as just a little bit of high altitude discomfort and continued his geological explorations on the route through the Dipsang Plain and along a tributary of the Shyok River. However by the 18<sup>th</sup> he had difficulties in breathing and high fever, reaching with difficulty the camp site at Moorghoo or Murghi in the Shyok River Valley.

A native physician was called hastily but also he could not help anymore and Ferdinand Stoliczka died in the afternoon of the 19<sup>th</sup> of June 1874, at an age of only 36 years, surrounded by his travel companions Trotter, Biddulph and Gordon.

His body was buried the 24<sup>th</sup> in Leh, Ladakh with English military honors and in the presence of Mr. Forsyth and a large number of local dignitaries.



Section of the “Sketch map of Eastern Turkistan with all the routes from Ladak across to the Karakoram and adjacent ranges” drawn by G.J.W. Hayward and published in “Journey from Leh to Yarkand and Kashgar and exploration of the Yarkand River” showing the north- and southward routes of Ferdinand Stoliczka’s party.

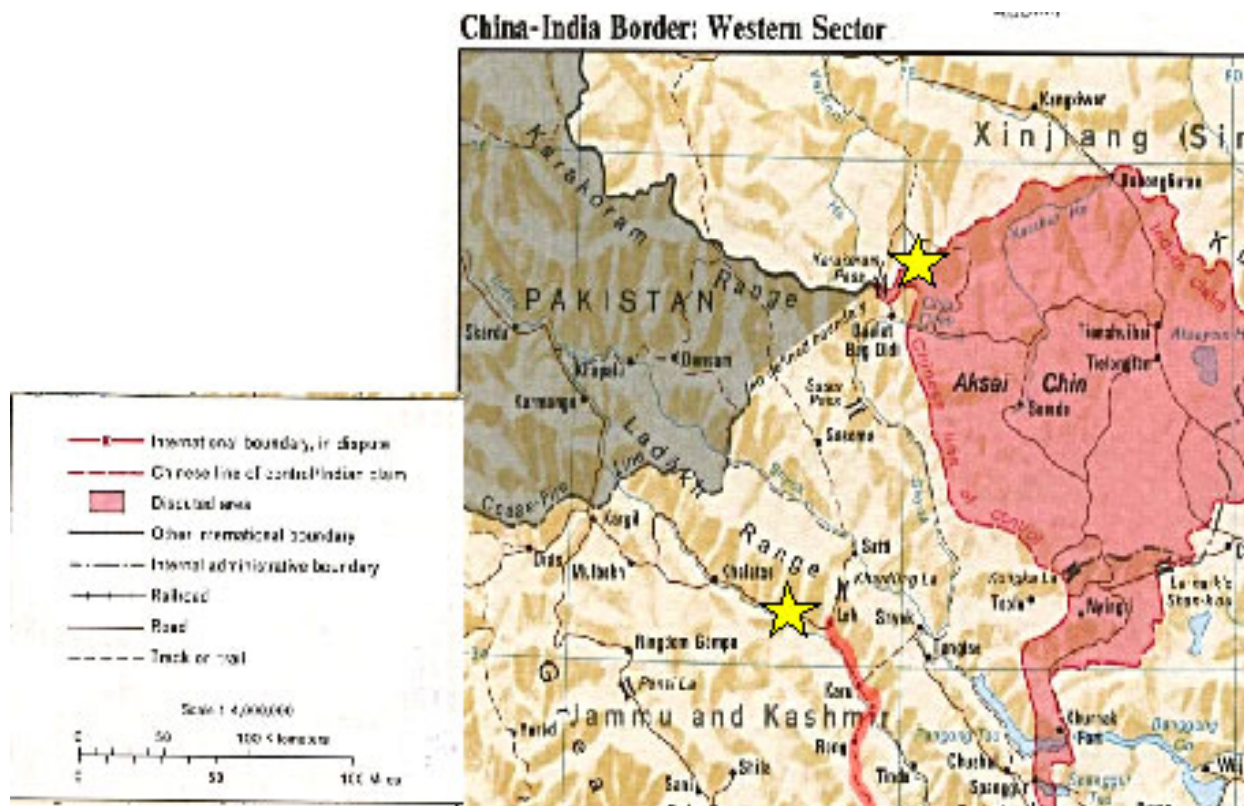




View of the Shyok River Valley on the route from the Karakorum and the Sasser Pass to Leh.



Further view of the semi-desert Shyok River Valley with extensive sand dunes (Courtesy Phillips)



Modern Map of the Leh-to-Karakorum Pass region showing the actual political boundaries after the India-China war and the ongoing India-Pakistan skirmishes.

The report of the mission has been published by Forsyth under the title: *Report of a mission to Yarkund in 1873, under the command of Sir T.D. Forsyth, K.C.S.I., C.B., Bengal Civil Service, with historical and geographical information regarding the possessions of the Ameer of Yarkund; Calcutta and printed at the Foreign Department press, 1875; 573 pp*"

The scientific results are collected in "*Yarkand Mission- Scientific Results of the Second Yarkand Mission; based upon the collections and notes by the late F. Stoliczka and published by the order of the Government of India, Calcutta. Office of the Superintendent of Government Printing/London Taylor & Francis 1878-1891.*"

### **7.1 "Note Regarding the Occurrence of Jade in the Karakash Valley, on the Southern Borders of Turkestan" by Dr. F.Stoliczka F.G.S.; Naturalist Attached to the Embassy.**

His letter report on nephrite was read at the Geological Society of London on the 15<sup>th</sup> of April 1874 with above title and published in English in the Quarterly Journal of the Geological Society of London Vol. 13, p. 568, 1874. This report expands and complements the observations by the Schlagintweit brothers.

*..... The portion of the Kun Lun range which extends from Shahidulla eastwards to Khotan appears to consist entirely of gneiss, syenitic gneiss, and of metamorphic rocks, the latter being quartzose, micaceous, and hornblendic schists. On the southern declivity of this range, which runs along the right bank of the Karkash river, are situated the old jade-mines, or rather quarries, formerly worked by the Chinese; they are about seven miles distant from the Khirgiz encampment of Belakchi, which is itself about twelve miles S.E. from Shahidulla.*

*I had the pleasure of visiting the mines in company with Dr. Bellew and Captain Biddulph, with a Yarkundee official being our guide.*

*We found the principal jade locality to be about a mile and a half from the river, and at a height of about 500 feet above its level. Just in these portions of the range, a few short spurs spring from the higher hills, all of which, however, as is usual, are thickly covered with debris and sand, the result of disintegration of the original rock; the whole has an appearance as if an extensive slip of the mountain-side had occurred, (see also the NASA/JPL picture)*

*Viewing the mines from a little distance, the place seemed to resemble a number of pigeon-holes worked in the side of the mountain, except that they were rather irregularly distributed; on closer inspection we saw a number of pits and holes dug out in the slopes, extending over a height of nearly a couple of hundred feet and over a length of about a quarter of a mile.*

*Each of these excavations has a heap of fragments of jade and rock at its entrance. Most of them are only 10 to 20 feet high and broad; and their depth rarely exceeds 20 to 30 feet; only a few show some approach to low galleries of moderate length; and one or two are said to have a length of 80 to 100 feet. Looking on this mining operation as whole, it is, no doubt, a very inferior piece of miner's skill, nor could the workmen have been provided with any superior instrument.*

*I estimated the number of holes at about 120 but several had been opened only experimentally, an operation which had often resorted to, on account of the superficial sand concealing the underlying rock. Several pits also, which were probably exhausted at a moderate depth, were again filled in, their great number, however, clearly indicates that the people worked singly, or in small parties.*



18<sup>th</sup> century Chinese white Jade carving depicting Uighur (Turkestani) miners, recognizable by their pointed felt hats, as they remove a Mountain Jade boulder from the cavity dug into the mountain. (Courtesy B.Frey)

*The rocks at the base of the range are composed of a thin-bedded rather sandy syenitic gneiss, mica and hornblendic schist. The feldspar gradually, but entirely disappears in the schistose beds, which, on weathered plains, often have the appearance of a laminated sandstone; they include the principal jade-yielding rock, being traversed by veins of a pure white, apparently zeolitic, mineral varying in thickness from a few feet to about forty feet, and perhaps more. The strike of the veins is from NW to SE. or sometimes due EW; and their dip is either very much towards north, or they run vertically.*

*I have at present no sufficient means of ascertaining the true nature of the vein rock, as it may rather be called, being an aggregate of single crystals.*

*The mineral has the appearance of albite, but the luster is silkier or perhaps glassy, and it is not in any way altered before the blowpipe, either by itself or with borax or soda. (11)*

(11) The blow pipe or flame test is a quick method to determine a mineral. The mineral may color the flame, indicating chemical composition, or it may fuse, forming small, globular, bead like mass, or give off odors. Soda or borax is used as flux.

*The texture is somewhat coarsely crystalline, rhombohedric faces being clearly traceable in a fresh fracture: it sometimes contains iron pyrites in very small particles; and a few flakes of biotite are also occasionally observed.*

*This zeolitic rock is again traversed by veins of nephrite, commonly called "Jade", which however, also occurs in "nests". There appear to be two varieties of it, and only the one which I shall presently speak really deserves the name of "jade".*

*It is a white tough material, having an indistinct cleavage in two different directions, while in the other directions the fracture is finely granular or splintery as in true nephrite.*

*Portions of this material (which is apparently the same as that which is usually called "White Jade") have sometimes a fibrous structure. This "White Jade" rarely occupies the whole thickness of the veins, and most of the others, entirely consist of the common green jade, which is characterized by an entire absence of cleavage.*

*The hardness is always below 7, generally only equal to that of common feldspar, or very little higher, though the polished surface of the stone appears to attain a greater hardness after long exposure to the air (10).*

(10) Also Schlagintweit mentions that freshly mined nephrite extracted from a certain depth of the deposit was much less harder than rejected material found lying around near the deposit. The difference was noticeable already with the hammer and the difference increased by using a knife. The freshly mined pieces could be scratched with the knife, the others not. Schlagintweit mentions that at the moment of repackaging the samples 2½ months later in Shrinagar for shipping to Europe no such difference could be observed at the marked places of the same samples.

*The color is very variable, from pale to somewhat darker green, approaching that of pure serpentine. The pale green variety is by far the most common, and is in general use for cups, mouthpieces for pipes, rings and other articles used as charms and ornaments. I saw veins of pale green jade fully amounting in thickness to 10 feet; but it is by no means easy to obtain large pieces of it, the mineral being generally fractured in all directions. Like the crystalline vein-material neither the white nor the green variety of jade is affected by the heat of the blowpipe, with or without addition of borax and soda.*

*Green jade of brighter color and higher translucency is comparatively rare, and on that account alone, no doubt, much more valuable. It is usually found in thin veins of one or a few inches; and even then it is full of flaws. Since the expulsion of the Chinese from Yarkand in 1869 (Note: by Mohammed Yakub Beg of the state of Kokan, Western Turkestan until 1877)*



White Nephrite Jade River pebbles from Khotan (10-30cm)



*The jade-quarries in the Karakash valley have become entirely deserted. They must have yielded a considerable portion of the jade of commerce; and though, no doubt, the workmen made a good selection on the spot, taking away only the best-colored and largest pieces, even now a great number of fair fragments measuring from 12 to 15 inches in diameter form part of the rubbish thrown away as useless.*

*The Belakchi locality is not the only one that yielded jade to the Chinese; for there is no reason to doubt the existence of jade along the whole Kun Lun range, as far as the mica and hornblende schist's extend.*

*The great difficulty in tracing out veins and following them, when once discovered, is due to the large amount of superficial debris and shifting sand, which conceal the original rock in-situ. However, fragments of jade may be seen among boulders of almost every stream, which comes down from the range.*

*We also observed large fragments of Jade near the top of the Sanju Pass, which on its southern side at least, mostly consists of thin-bedded gneiss and hornblendic schist.*

*Another rich locality for jade appears to exist somewhere south of Koten, from which the largest and best colored pieces are said to come; most of them are stated to be obtained as boulders in a river bed, though this seems to be rather doubtful.*

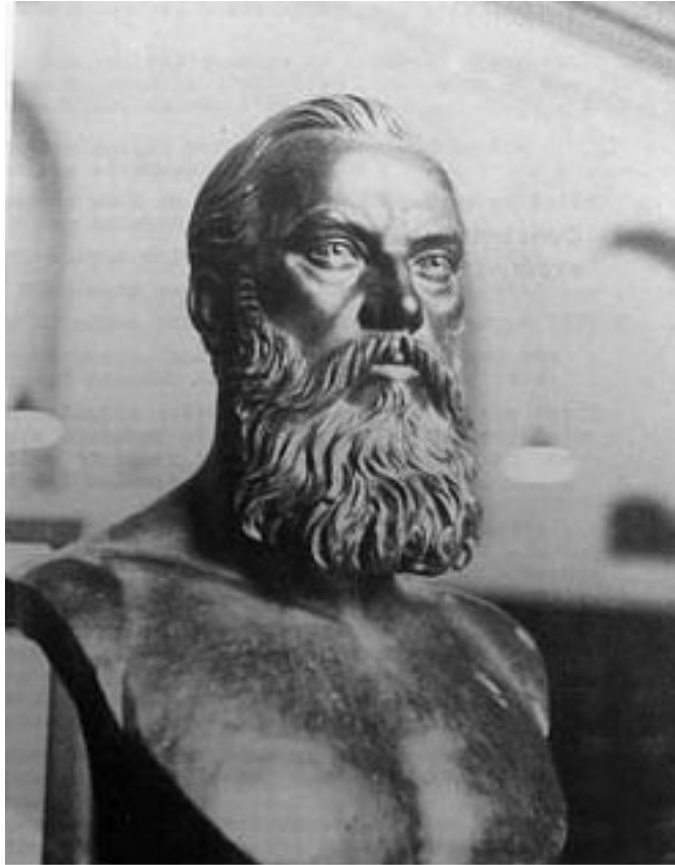
*Very likely the Chinese worked several quarries south of Koten, similar to those in the Karakash valley; and most of the jade from this locality was no doubt brought into Koten, this being the nearest manufacturing town.*

*A great number of better-polished ornaments, such as rings etc., sold in the bazaar of Yarkund, have the credit of coming from Koten. Possibly the Chinese workmen make them there; but the art of carving seems to have entirely died away; and indeed it is not to be expected that such strict Mohammedans as the Yarkundeers mostly are would eagerly cultivate it.*

*If Turkestan people will not take the opportunity of profiting by the export of jade, or if no new locality for that mineral is discovered within Chinese territory, the celestial people will feel greatly the want of the article, and good carved specimens of jade will become great rarities.*

*The Chinese seem to have been acquainted with the jade of the Kun Lun mountains during the last two thousand years; for Koten jade is said to be mentioned by Chinese authors in the time of the dynasty under Wuti (B.C. 148-86) (See Yule's „Marco Polo" vol.1, p.177).*

*Dr. Ferdinand Stoliczka, Yarkund, November 14, 1873.*



Bust of Ferdinand Stoliczka in the Indian Museum of Calcutta India

In the session of the 24<sup>th</sup> of June 1874, a further letter report from Dr. F. Stoliczka, dated Kasghar the 20<sup>th</sup> of December 1873, was read at the Geological Society in London and which describes the geological environment of the Sanju Davan (the Western one) Pass where Shaw reported saw-tooth cliffs of Jade.

*Geological Notes on the Route traversed by the Yarkund Embassy, from Shahidulla to Yarkund and Kasghar.*

*In a former communication I had already occasion to notice that rocks composing the Kun Lun range, near Shahidulla, chiefly consist of syenitic gneiss, often interblended and alternating with various metamorphic and quartzose schist's. Similar rocks continue the whole way down the Karakash River for about twenty four miles. After this the road runs somewhat in a northwesterly direction, following a small stream leading to the Sanju (or Grimm) Pass. Here the rocks are chiefly true mica-schist, in places full of garnets.*

*Near and on the pass itself chloritic and quartzose schist's prevails, in which veins of pale green jade occur, numerous blocs containing this mineral having been observed near the top of the pass. All the strata are very highly inclined, often vertical-the slopes of the hills, and, in fact, of the entire range, being on that account rather precipitous, and crests of the ridges themselves very narrow.*

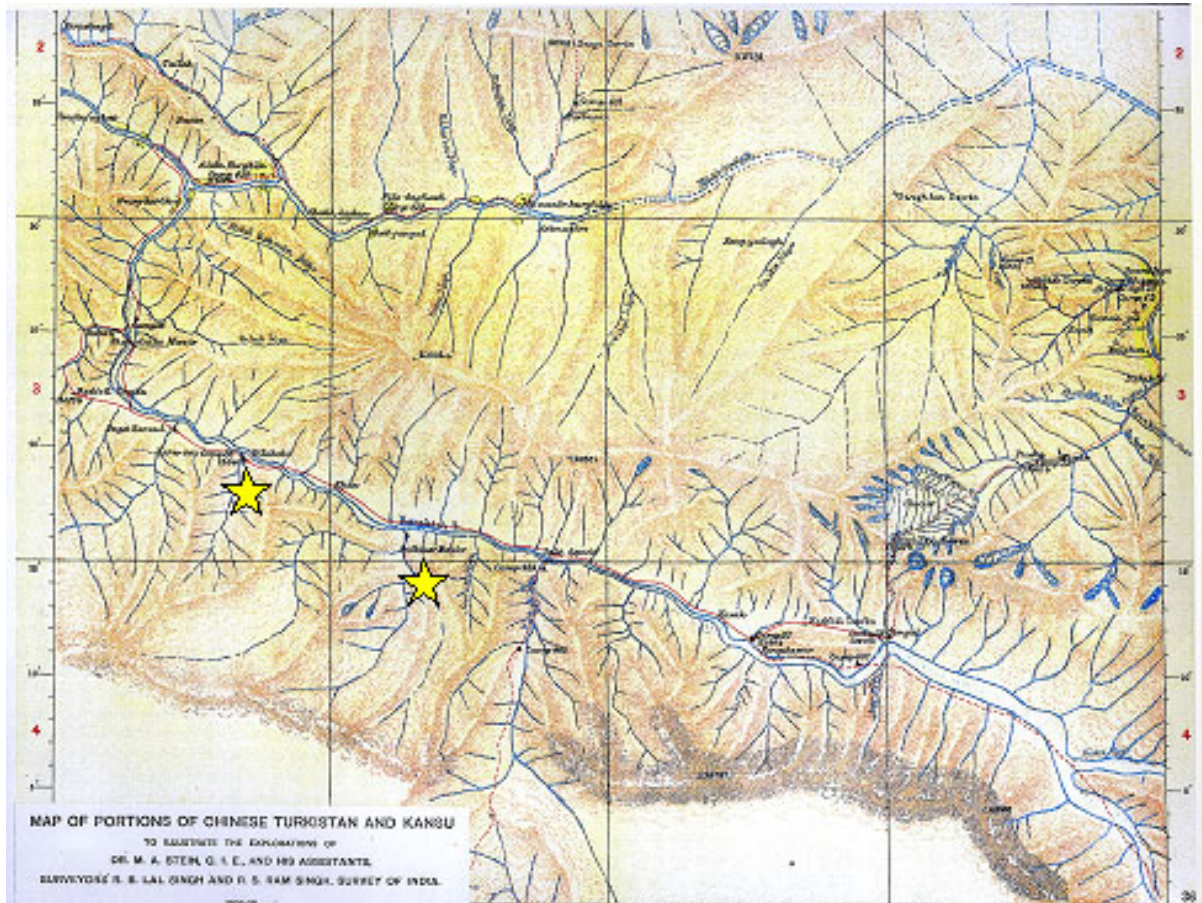
*To the north of the Sanju Pass, we meet again with metamorphic, mostly chloritic, schists, until we approach the camping place Yam, where distinctly bedded sedimentary rocks cap the hills of both sides of the valley.....*

Dr. Ferdinand Stoliczka, Kashgar, December 20, 1873.

## Part V

### 8.0 Additional Maps and Information on Jade Mines in Hotan.

In the following pages, maps by famous Khotan/Kun Lun Explorer Aurel Stein (1862 - 1943) and by E.Trinkeler (1896-1931) are included to round off the ancient geographical knowledge of the area.

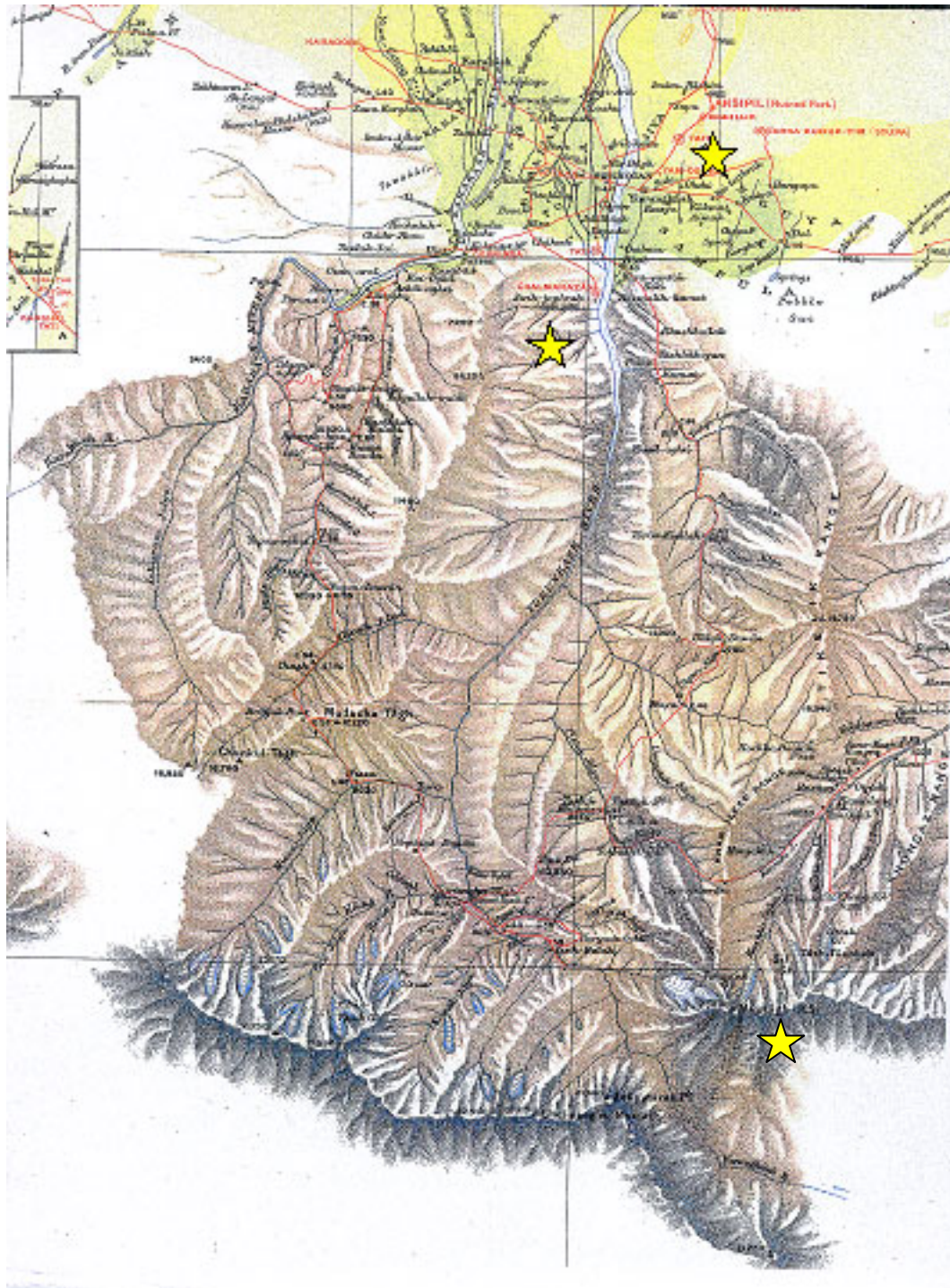


Map drawn 1906-1908 by Lal and Ram Singh, the cartographers of Aurel Stein, showing the expedition routes through the Karakax valley between Somgul and Ali-nazar-kurhan. The Mountain Jade sites are at Bilakchi and Gulbaser Mazar (Courtesy ETH Library Zürich)

Aurel Stein reports, in his book "Ancient Khotan" (1907) and in "Ruins of Desert Cathay" (1912), on the alluvial or River Jade collection in the gravel deposit of the Yurungkax, Karakax and its branch, the Yangi Darya River south of Khotan.

The following map was also drawn by the Singh cartographers and is of interest as it shows the Karakax River, its branch the Yangi Darya River and also the Yurungkax River flowing northward from the Kun Lun range toward Khotan.



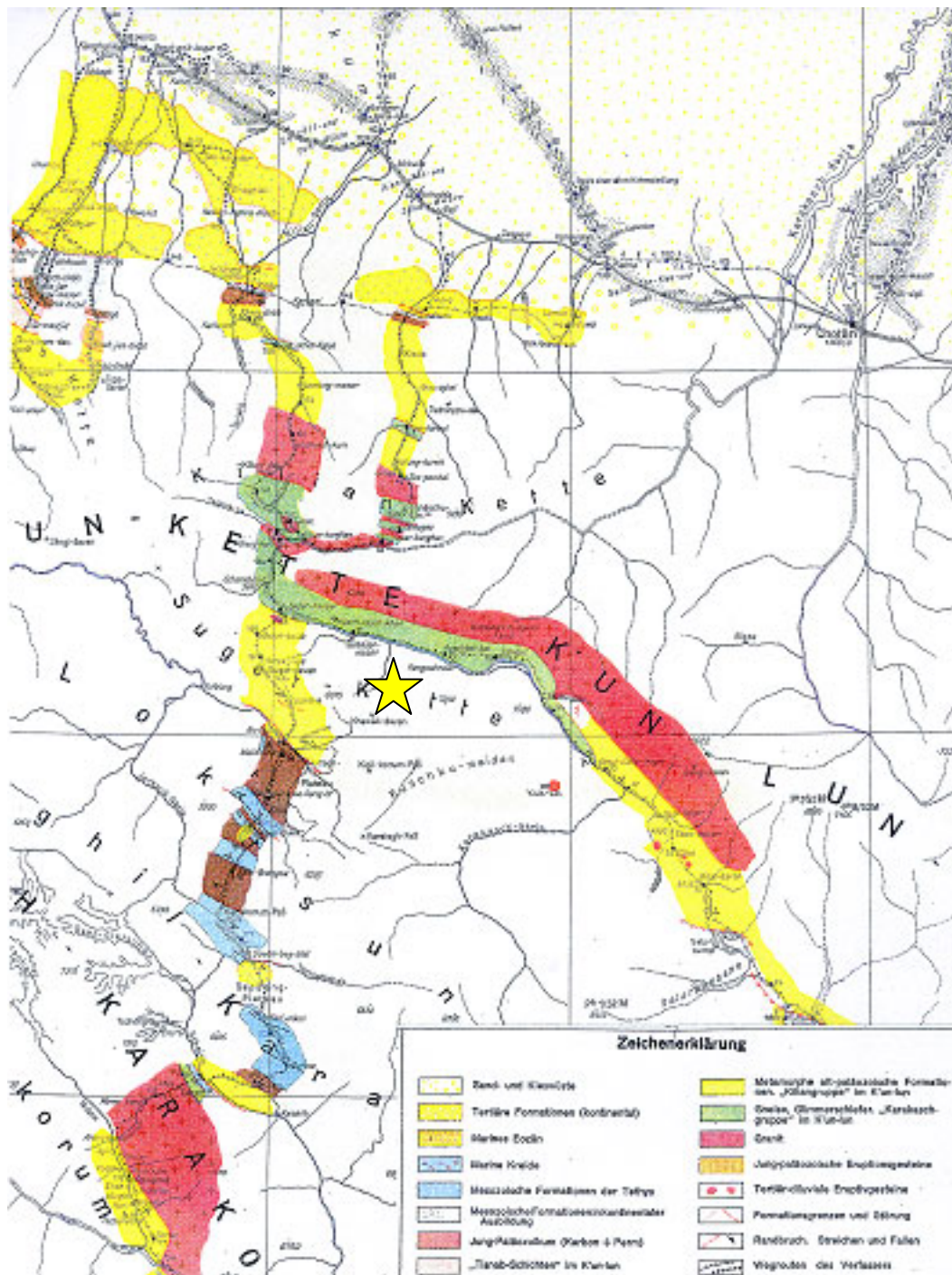


Map drawn by L. and R. Singh showing the Yurungkash River valley in the center reaching down from the main Kun Lun crest toward Khotan. The Jade pits where River Jade i.e. alluvial pebbles were collected, are situated according to A. Stein and S. Hedin at the ancient sites Chalmakazan and Tam-Öghil. The Muztagh or K5 peak is in the lower right corner. (Courtesy ETH Library Zürich)

Note: Several peaks in the Kun Lun range carry the name Muztagh as it was a generic name given to a Kun Lun mountain with a permanent snow/ice cap.



Another more recent and modern style geological map has been published by Emil Trinkler and Helmut de Terra 1932, as a result of their "Zentralasien-Expedition" carried out 1927 to 1928. This map points also to Kosh-tasch-khan (Konakan?) near Gulbasar-masar in the Karakax valley as a site of Jade mining.



Geological map of selected areas of the Kun Lun range as visited by E.Trinkler and H. de Terra during their 1927 -1928 expedition. (Courtesy ETH Library Zürich)

More recent information about Jade mines in the Khotan/Hotan area in Xinjiang is contained in the report "Jade in China" by Chunyun Wang and published in the Bulletin of the Friends of Jade, Volume IX 1996. Their approximate locations have been superimposed on the modern map below.



Location of Jade mines near Hotan according to Chunyun Wang (1996)

The sites are the following:

Site	County	Name and location of the mine
1	Pishan	Kanxiwar Mine, in the Karakax valley between Saitura and Kanxiwar
2	Pishan	Tibermie Mine, east of Tirik and south of the Karakax river
3	Pishan	Highway Mine, hillside north of the Xinjiang -Tibet Highway
4	Pishan	Karadaban Mine, grove west of Karadaban, east of Tirik
5	Pishan	Saitura Mine, north of Karakax river east of Saitura, Pishan.
6	Hotan	Hara Mine, Mount Hara west of the upper reaches of the Yulong river
7	Hotan	Agayjunger Mine, upper reaches of the Hanirak River in Heaishan
8	Hotan	Omisha mine, South of Omisha Village, Kashtash Town, Hotan.
9	Celie	Nanurde Mine, west of Nanurde Hayati grove
10	Yutian	Almas Mine, 40km southeast of Liushi Village, Kunlun Township
11	Yutian	Saidykuramar Mine, southwest of Lishi River and southeast of Lishi village
12	Yutian	Igerangur Mine, west bank of Pixiger river in Aqiang Town
13	Yutian	Yabukaka Mine, southwest of Chiarlik Village in Aqiang Town.

## 9.0 Acknowledgments

The author wishes dedicate this work to the late Bob Frey of Friends of Jade.

Sincere thanks to Dr. Stefan Schlagintweit of Bad Wiessee, Germany for the copies of the Hermann Schlagintweit aquarelles of the Karakax valley

## 10.0 Abbreviations and bibliography

F.G.S	Fellow of the Geological Society
E.I.C	East India Company
R.S	Royal Society (England)
R.G.S.	Royal Geographical Society
K.b.Akademie	Royal Bavarian Academy of Science
v. or von	Title of nobility in Germany and Austria equivalent to the English Sir.

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