

**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

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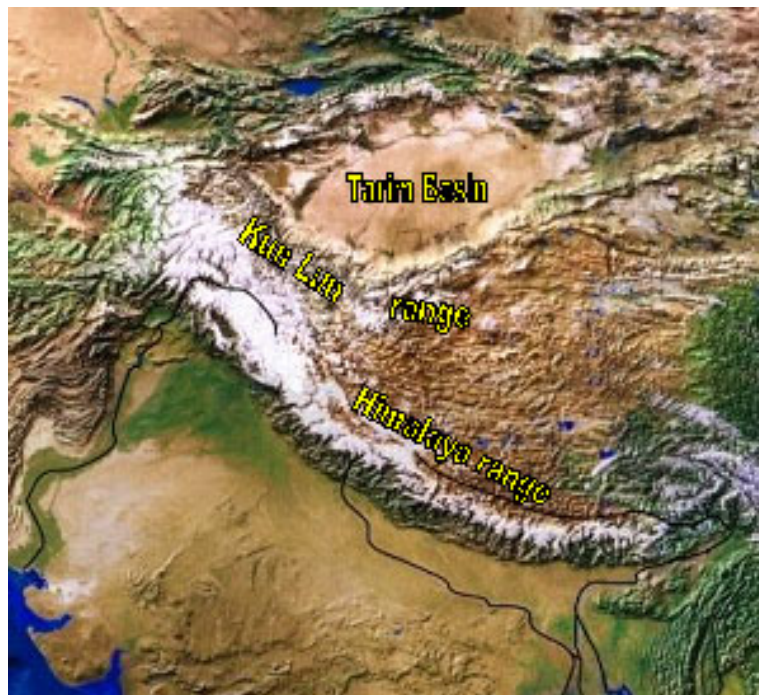
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Part III

5.0 - The Kun Lun Mountains

The Kun Lun range is one of the longest mountain chains in Asia, extending more than 3000 kilometers. It runs southwards beside the Pamir range then curves to the east, forming the border range of northern Tibet. The range has over 200 peaks higher than 6000m. The three highest peaks are the Kongur Tagh (7719m), the Dongbei (7625m) and the famous Muztagata (7546m).

The mountain range formed at the northern edge of the Indian plate during its collision, in the late Triassic, with the Eurasian Plate and which resulted in the closing the Paleotethys Ocean. The Kun Lun range stretches along the southern edge of what is now called the Tarim basin and the infamous Takla Makan or the “Sand buried houses” desert



Kun Lun range at the southern edge of the Tarim basin

The Kun Lun Mountains are well known in the Chinese mythology and believed to be a Taoist paradise. It is considered to be one of the ten continents and three islands of Taoist cosmology.

The first to visit this paradise was, according to the legends, King Mu (1001-947 BC) of the Zhou Dynasty. He supposedly discovered there the Jade palace of Huang-Di, the mythical Yellow Emperor and meet Hsi Wang Mu, the Royal Mother of the West which had also her mythical abode in these mountains.

Taoist teaching claims that the palace is nine stories high and whoever manages to climb to the top gains access to the Heavens. It also extends or nine stories below the Earth, thereby connecting the subterranean watery realm of the dead with the realm of the gods.

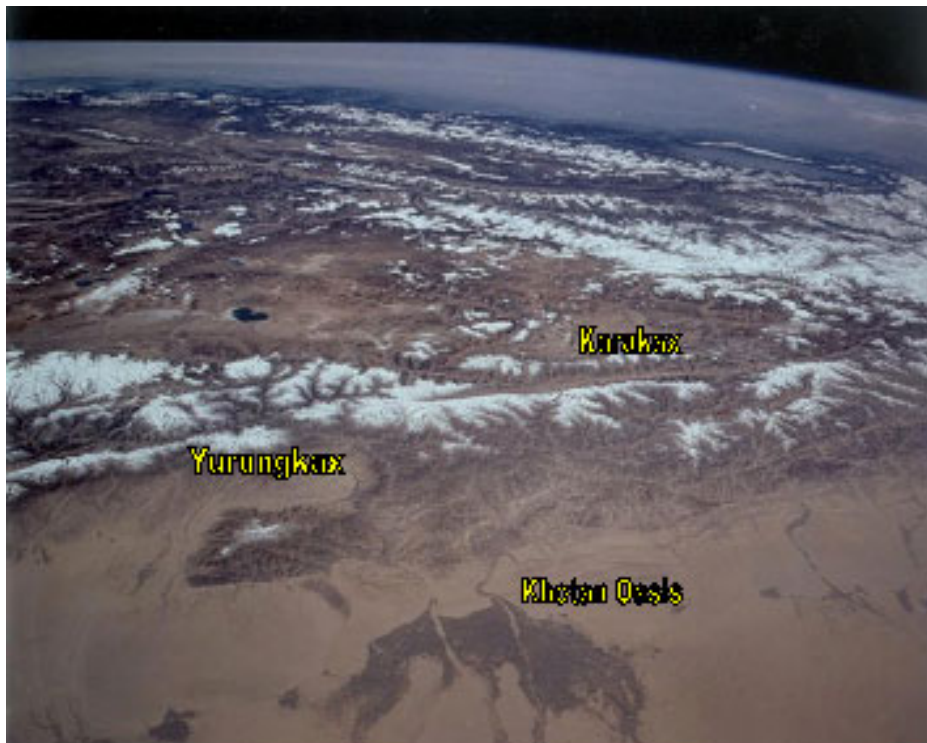
It is told that Xi Wang Mu later visited, riding on a white dragon, Emperor Wu Ti of the Han Dynasty (141-97BC) and gave him a fruit from the mythical peach tree which fruits ripen only once every 3000 years and revealed him the secrets of eternal life.

The Jade palace of the Kun Lun Mountains was the aim of numerous, but of course unsuccessful Taoist expeditions. Nevertheless, since the Han Dynasty, numerous descriptions of the mythical Jade Palace exist!



The Mutztagh glacier in the upper Karakax – Yurungkax valley in an aquerell painted in August 1856 by Hermann Schlagintweit (Courtesy St.Schlagintweit)

A more modern view of the Kun Lun Karakax valley was acquired by the Space Shuttle Endeavour on flight STS068 in 1994 and shown below.



Space Shuttle photograph showing the Karakax Valley (linear feature running from center to center right). The photograph is looking south; with the fan shaped vegetation of the oasis of Khotan in the Takla Makan desert in the foreground and the Tibetan Plateau in the background. The photograph is about 350km wide in the foreground. (Courtesy T.G.Farr)

The Karakax valley, at an elevation of 3600 to 4000m, is traversed by the famous Altyn Tagh fault and has been studied, as a case example, intensively by Western geologists. Numerous satellite images of the valley are therefore available and are shown below, courtesy of NASA and T.G. Farr of Jet Propulsion Laboratory Pasadena, USA.



Composite Landsat satellite image with the fan shape oasis of Khotan at the bottom and the Karakax valley in the center of the image running from left to right. (Courtesy T.G.Farr JPL)



Space borne picture of the East-West Karakax Valley. The Karakax River flows past the ancient Jade quarries at Gulbashan, and then turns, near Xaidulla, sharply northwards toward Khotan and loses itself in the Takla Makan desert. (Courtesy T.G.Farr JPL)



Three-dimensional perspective of the Karakax valley created by combining two spaceborne radar images using a technique known as interferometry. The image was acquired by the space shuttle Endeavour in October 1994. The image center is at $36^{\circ}10'$ North and $79^{\circ}20'$ East, looking westwards with Kun Lun chain to the right with peaks at over 6000m. The sloping line somewhat parallel the top of the chain is the Altyn Tagh fault. The position in the valley corresponds to a place approximately 15km East of Sumgal. The jade quarries at Gulbashan are approximately 70 kilometers downstream from this site. (Courtesy NASA Jet Propulsion Laboratory Pasadena USA)



Road leading in eastward direction into the Karakax valley (Fall 2000)
(Courtesy Wylie and Helene, Canada)



Meager green at the Karakax river's edge



Xaidulla village in Karakax Valley

(Courtesy Wylie and Helene, Canada)

6.0 Reports on Jade by the Schlagintweit Brothers

Whereas other Europeans, during their travel along the Southern Silk Road, reported of the River Jade from Khotan, Hermann and Robert Schlagintweit were in August 1856 the first modern Europeans to actually see and report on the Mountain Jade deposits in the Karakax valley. Adolph Schlagintweit visited the same area one year later on route to Kashgar.

The report written immediately on their return to Leh in Ladak, revealed that Herman had an advanced knowledge about the Jade deposits in the area

He was probably familiar, before he left for India, with the contents of the book by Rémusat, *Histoire de la Ville de Khotan* published in Paris 1820, with the book by Ritter, *Erdkunde von Asien, Band Westasien*, Berlin 1837 and with the 1778 Russian/German translation of the Chinese book "Si Yu Wen Kian lo" or "The Description of Items Seen and Heard by Myself at the Western frontier of the (Chinese) empire" (Eastern Han Dynasty Annals)

In his report from Leh, Jade was called *Yashen* stone which has roots in the Persian word *Yashem* or *Yashim* and, by derivation, in the word Jaspis or Jasper. The Turki(stani) name for Jade is Kash which is reflected in the name of the rivers Karakash or Karakax and Yurungkash or Yurungkax.

A further source of information and help, which draw their attention to the Jade mining sites, was Mohammed Amir, a merchant from Yarkand which was guiding Hermann and Robert 1856 and then Adolph 1857 through the region and which was duly referenced by them in the 1856 report from Leh as:

„.....an aged Turkestani whom we found particularly useful on account of his general knowledge of the country".

1866 or nine years after returning from the Kun Lun's, Robert Schlagintweit met on one of his extensive conference tours in Bern, Switzerland, H.v.Fellenberg, the Swiss nephrite jade specialist. From this encounter 5 samples, brought from the Gulbashen, were analyzed by v.Fellenberg. The results are published in the "Jahresbericht der Verhandlungen der Schweizerischen Naturforschenden Gesellschaft p 39,1868. Four of them turned out to be real nephrite, the fifth one Saussurite.

Fischer remarks in his book on Nephrite and Jadeite published 1875, that these analyses constitute the first case in which nephrite samples, unequivocally from the Kun Lun and the Karakax valley, were analyzed for their chemical composition.

Hermann, now von Schlagintweit-Sakunlunski presented on the 5th of July 1873, or 16 years after his return to Europe, the report on Jade during a session of the Royal Bavarian Academy of Sciences in Munich

He showed the Gulbashan Jade samples and held a lecture titled „Über Nephrit nebst Jadeit und Sausurrit im Künlün Gebirge". This oral presentation was subsequently published 1874 in the "Sitzungsberichte der mathematisch-physikalischen Klasse der k.b. Akademie der Wissenschaften zu München" Vol III, p.227, 1873.

6.1 The Hermann von Schlagintweit-Sakunlunski Report to the Royal Bavarian Academy on „The Nephrite deposits in Khotan. Geological conditions. Quarries. Discoveries in River Deposits" on the 5th of July 1873.

The translation of the publication, inclusive relevant Schlagintweit footnotes, is presented below. In this translation the original, quite often truncated sentence structure was maintained.

.....We have found the Nephrites in Khotan in situ at both slopes of the Künlün (1) chain. I carried out the first investigation, in summer 1856 in the Khotan area, with my brother Robert. The following year Adolph penetrated, over a slightly more western route and also passing through Khotan, into the region of Yarkand and Kashgar. (2)

(1) The Künlün is the northernmost of the three main mountain chains of High Asia. Its geographical situation and structure in relation to the two other main chains, the watershed Karakorum and the more southern located Himalaya has been described in my Report „Reisen" Vol II, p.4

(2) Died in Kashgar on August 26th 1857 see also Sitzungsberichte d.k.b.Akademie 1869 p.181-190, Since we have now received his bequeathed paper (volume 46 and 47 of our „Beobachtungs-Manuscripte" next to numerous aquarelle's and maps) I was able also to report from his route observations about the nephrites in the Künlün (range) as below.

At the northern frontier of the presence of nephrite, we found 1856 and 1857 great groups of quarries in the vicinity of Gulbashan (3), a resting place at the right side of the Karakash river, Latitude 36°13' North; Longitude 78°15' East of Greenwich; Height of the river: 12252 English feet's. These quarries appear unused; they were deserted both years.

(3) In 1856 the name was given to us as „Gulbagashen"; however I found in Adolph papers "Gulbashén" and the same expression also in the publications of our successors; I have therefore taken this term. For geographical positions Hayward new data were used for the longitude. The heights, where our data are more complete, stayed the same. (Gul-baghtsche means rose garden in Persian Turkish language)



Upper Karakax valley panorama painted by Herrmann Schlagintweit on the 30th of August 1856 (Courtesy St. Schlagintweit)

One of the quarries, whose name was given to us as Konakán, is in Gulbashén itself, the other called Karalà, followed after 7 English miles of march, 6½ miles in direct distance downstream.

This quarry is situated a little further away from the river edge than the Konakán quarries. In both quarries the nephrite deposits appear just a little higher than the bottom of the valley which separates here the northern border of the Karakorum chain from the southern border of the Künlün chain.(4)

(4) The topographical conditions of the mountain formations at the southern slope of the Künlün mountains, but from a point upstream of the here discussed nephrite deposits, is shown in the table „The Chain of the Künlün from Sumgal in Turkestan“ which I have included as Nr. 29 in the atlas to the “Results”.

Previous positive information over their conditions (of the quarries) is not available. Mir Uzzet Úllah, which mentions a Jade quarry to the right of his route over the western Yéngi Daván, had just heard about them.

The road to the Konakán nephrite deposit leads from the river onto a talus of rock debris which contains numerous loose pieces of nephrite which derived partly from erosion and partly from waste of the mining activities. The nephrite in the large quarries is present in situ as metamorphic segregations in crystalline rocks.

These segregations are in average parallel with the slope and the inclinations of the veins of the rocks, which delimit them. But nephrite does not occur in these veins. The direction of the slope of the vein surfaces is quite similar to the slope of the mountain toward the river but the angle of the slope of the veins is steeper. Already here one can observe a complete succession of exposed rock types and their correlated positions.

The predominant rock type of the Konakán quarries is gneiss; granite is present but in lesser extent. The mica content of the gneiss is quite variable already on short distances. Gneiss is present above and below the nephrite. But next to the nephrite deposit itself also greenstone or diorite appears at both surfaces, which laces the gneiss at short distances.

The greenstone is here a mixture of hornblende and feldspar in which potassium feldspar or orthoclase is sometimes present but where albite or sodium rich plagioclase feldspar is predominant. The rocks are very solid.

Further upstream on the Karakax near Sikáandar Mokám (5) I have found such rocks of a granular, porphyritic mass. Here however it was possible to detect in the greenstone, from the position of the hornblende, the interrelation between the orientation of the veins and their local position.

The greenstone does not penetrate into the nephrite in a similar fashion and into the gneiss but is rather separated from the nephrite deposit by decomposed material of variable thickness.

(5) In ..Reisen in Indien und Hochasien" Vol. IV. Cap. II: 1 The Karakash valley from the Lake Kiúk-Kiól to Dera Súmgal.



View of the ruins of Sikandar Mokam fort painted by Hermann Schlagintweit on the 18th or 19th of August 1856. (Courtesy St. Schlagintweit)

The more downstream situated Karalá quarries, for which also detailed notes of Adolph are available, are in terms of their rock formation very similar to the above mentioned however the appearance of nephrite is still more important.

At Karalá the rocks of the mountain slopes are micaceous and greenstone like. They are not as pure as the gneiss and the greenstone of Konakán, but nevertheless very solid. The layer of crumbling and soft material in contact with nephrite is here much more important. This mass is partly of yellow, partly of red color, evidently a product of decomposition by penetrating water and mixed with talcum.

It is evidently not a "Klettenkluff". The nephrite forms here much thicker deposits of 20 to 40 feet thickness, which, at places where the rock formation is visible in profile, was measured directly. It is possible that pure nephrite extends further into the mountain in this thickness. But it seems that nephrite is predominantly surrounded at a certain depth by the various crystalline rocks.

The nephrite mass does not form a seam or domes, but distinct inclusions which follow, parallel to the orientation of the veins, the slope of the mountain.

The veins in the rocks, which include here at the southern slope of the Kūnlūn the nephrite masses, can be distinguished into two very different systems. In both places a dip toward the Karakāsh valley is observed. This dip (angle the rock strata makes with the horizontal) has in the Konakán quarries an orientation South 30° East with an inclination of 47° In the Karalá quarries the orientation is slightly changed to South 20° West with an inclination of 52°.

In the Konakán formation also a second well developed vein is present which falls very steeply in easterly direction South 82° East with a inclination of 70°. In the Keralá quarries such a vein seems not to be present. In the nephrite masses appear only fracture lines of different origin and orientation than that of the surrounding rocks. Even single large separation surfaces in the nephrite mass have another orientation than the above-mentioned veins.

In the quarries one notices principally the use of a mining technique consisting of crude galleries in which cave-ins are very frequent. Only at places of steeper inclination the exploitation of the nephrite has been carried deeper. The quality of the stones (nephrite) in the quarries at Gulbashén is on the average a quite good one and the thickness, like at the Karalá quarries, an exceptionally advantageous one.



Panorama of the Karakax Valley and the Yangi Davan, painted by Hermann Schlagintweit on the 18th of August 1856.(Courtesy St. Schlagintweit)

At this time and probably since a long time, the quarries have not been exploited. No nephrite was found on the southern slope at higher altitudes, nor more closer to the crest of the Kūnlūn range, or along our route across the Élchi Pass or the more westerly Kílian Pass. Adolph's manuscript contains many details on the Kílian route.

The predominant rocks up to the pass, is greenstone. Quite often granular gneiss is present but also gray slate in the shape of small strips. Veining is always visible. Our way over the Élchi Pass was geologically quite similar to that over the Kílian Pass. No nephrite was found along Adolph route on the northern slope of the Künlün down to the Turkestan plains. Nephrite did not appear at all to the West of the province of Khotan.

At the route over the Élchi Pass (the Hindutash Davan) to Élchi (Eltchi or Itchi was the ancient name of the town of Khotan i.e. the modern Hotan), the capital of Khotan, two nephrite quarries are seen. We could however not visit these two quarries due to the political difficulties of 1856.

But Mohammed Amin knew of them and has mentioned them again in his official report which he had to deliver 1862 at his arrival at the bazaar of Lahore (6).

(6) Contained in .Report of the Trade and Resources of the Countries on the Northwestern Boundary of British India. Lahore, Government Press,1862)

The upper one of the quarries lies near Ámsha, a village of approximately 50 houses, distant toward 25 English miles from Élchi. The quarry seems not to be anymore exploited. The deposits accessible at the present time in the quarry offer relatively little very pure nephrite. Much more favorable are the quarries near the village of Kámat.

The quality of the nephrite available there in situ is so excellent that it sells in great quantities. The site, next to the edge of the mountain and only 15½ miles from Élchi, shows a height differential of only 1500 feet, which facilitates the distribution of the extracted nephrite and adds to its value, which in the simplest oriental way is determined by weighting it against silver.

Mohammed Amin mentions, in his official report in Lahore, that during the period 1850 to 1860 this nephrite was so much valued that it was worth an equivalent amount in weight of silver.

Nephrite is found as river pebbles down to the plains of eastern Turkestan. It is also in this form very valuable for the carver because its purity can be recognized immediately and sometimes facilitates the manufacture of extravagant objects.

The rivers where such pebbles are found are the Karakash, the Khotan, the Yurungkash and the Keria River. From the more westerly Yarkand River, I know no findings of river pebbles. This seems to be confirmed by the absence of nephrite in the province of Yarkand. (Bogdanowitch invalidated, in 1892, this statement in a later report).

The Karakash (Black Jade) river has his source on the northern slope of the main chain of the Karakorum and the depression, which the river follows, cuts through the Künlün Mountain a little to the west of Gulbashén.

The route to Bushia led us to the source of the Khotán River (Élchi glacier height 14810 feet), which has his complete hydrological basin at the northern slope of the Künlün chain.

The Yurungkásh (White Jade Picking) River, which according to some sparse information was always considered a independent river, is, based on the now available information from Mohammed Amin, just a eastern tributary of the Khotan river. The bifurcation is situated in the delightful flat, westerly valley of Kámat.



Collecting and selling River Jade on the market in Hotan
(Courtesy Nippon Hosokoyaki)

The Keria River, which follows further to the east seems to have, like the Karakash River its source in the South of the K n n crest. He seems to receive the mayor part of his waters, coming on his left side, from regions north of the K n n chain.

From later observations by Europeans the following has to be added concerning nephrite areas in Turkestan.

Johnson, Civil Assistant of the Indian Trigonometric Survey was the next one which penetrated from Tibet into Turkestan to  lchi, the capital of Khotan 1865.(7)

(7) Lt.Col.J.F.Walker, Superintendent Grt.Trig.Survey of India, General Report for 1865-66. Dhera Doon, 1866.App A. A Letter from Mr. Johnson describing his visit to Kothen.

As on his way north down from the K n n chain he (Johnson) mentions K mat as one of his stopping places he must therefore have also passed at the places of the in-situ nephrite reported by Mohammed Amin without giving them attention; Mohammed Amin's reports were officially published 1862. Johnson found nephrite river pebbles in an affluent of the Khotan river (quite above the K mat quarries), near Karangotak (height 8735 English feet's). His road was a little easterly to the passage used by us and also later by Mohammed Amin.

Shaw, which was traveling 1868/69 for the promotion of the Himalayan tea trade (8) and as an escort with Sir Forsyth's first official mission, mentions in-situ nephrite at two places. One site is his „stopping place" on 6th of November 1868 without name. From his report the place seems to be on the Karakash river near Gulbashan, were nearby some Jade quarries are found which however are now abandoned" (p.83). "He calls the rocks of the central mass of mountain" (p.40) "granite" although crystalline rocks in the normal appearance of granite only appear very sporadically. The "greenstone, which surrounds here always the nephrite, is not mentioned by him (Shaw).

For the north slope of the K n n he reports (p 406) "on the very top of the Sanju Pass (the Grim Davan) leading over the northern crest of the K n n Mountains, I saw coarse Jade in situ. It (the Jade) formed a saw-tooth cliff"

(8) R.Shaw, Reise nach der Hohen Tartarei, Yarkand and Kashgar. Translated from English by J.E.A.Martin, Jena, Costenoble, 1872.

Hayward (9) which reached Gulbashen 12 days after Shaw, also reports of the nephrite quarries and emphasizes (p 48) „ They were, as long as the Chinese owned the land, very strongly worked but are now, after the expulsion of the Chinese, very neglected.

(9) G.W.Hayward, Journey from Leh to Yarkand and Kashgar, etc. Journ.R.Geographical Society, London, 1870.

The expulsion of the Chinese can be considered only so much disturbing the exploitation of the nephrite deposits as with it a long interruption of the traffic was connected. Also under Chinese sovereignty it was caravans of Turkistanis which brought nephrite to China and imported from there other merchandise.

The quarries of Gulbashen have therefore to be viewed as abandoned since a long time or visited only under especially advantageous conditions because, as already mentioned, they are situated at an elevated and isolated place and 5 days of difficult travel distant from the next inhabited place. Our Turkestani escorts found this deplorable but quite natural.

Dr. Cayley, which was stationed in Leh as Indian Commissar for the control of the trade facilities between India and Turkestan consented by Kashmir, has traveled a short time before Shaw a part of the high desert north of the Karakorum chain. He reported to Shaw that he considered it likely that an exploitation of the quarries took place just before the 1863/64 Musulman revolt against the Chinese due do the presence of pieces of wood etc. (Shaw, p.405).

The "report" of Mohammed Amin allows to conclude that the value of the beautiful nephrite stayed in China at least the same since years and that the need for such merchandise will not disappear due to this interruption (of trade and exploitation) but increase. The value of the best of the so called "noble" nephrite is, according to European notions, in value similar to that of semiprecious stones.

The appreciation (of nephrite) may have been in the Orient quite different and higher than today. Carl Ritter gives, in the above mentioned part of „Erdkunde" from 1836, an very extensive report on the use, the distribution and the relative value of the nephrites without however separating what may be exaggerated in the Oriental literature.

Very unknown was then (1836) also to a Carl Ritter, the appearance and the very large distribution of nephrite in the prehistoric period of the (European) lake dwellings. Our investigation of the quarries offers some unexpected reference point to this subject.

In his presentation to the Royal Bavarian Academy of Sciences Hermann von Schlagintweit-Sakünlunski mentions also the raging scientific discussion, "Die Nephritfrage". This scientific controversy concerned the origin of the Nephrite of the Neolithic stone axes discovered in large numbers in European lake

Some scientists argued, in absence of known nephrite deposits in Europe, that the nephrite for the Central European Neolithic artifacts could have arrived by trade from the Kun Lun's as the distance between Central Europe and these mountains was just barely twice as long as the trade route from Khotan to Beijing.

In 1907 Kalkowski, known for his discovery of nephrite in Liguria Italy, put this theory to rest and published in the „Neues Jahrbuch für Mineralogie, Geologie und Paläontologie" p. 159 a renewed analysis of v.Schlagintweit samples with the title „Geologische Deutung des Nephrites von Gulbashen".

Zürich - Spring 2003
FOJ resized 2004
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