

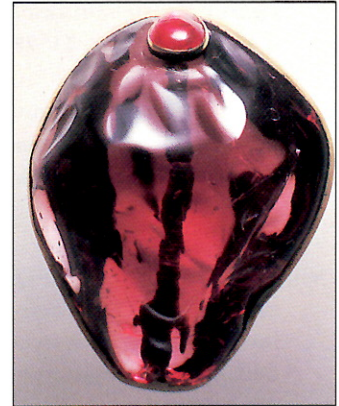
# SPINELS OF TAJIKISTAN

HISTORY – EXPLORATION - RESEARCH

BY

GARY W. BOWERSOX





CLOSE UP OF BLACK PRINCE'S  
RUBY/SPINEL © (BRITISH) CROWN  
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## THE ANCIENT SPINEL (LAL) (BALAS RUBY) MINES OF BADAKHSHAN (BACTRIA)

*I have seen the laal of Badakhshan  
I have considered Almaas [diamond]  
I have considered love of beautiful ones  
But you are something different*  
Author unknown, quoted by Ataliq Jafar Ali Shah

**T**he derivation of the name spinel is obscure, but it may have originated from the Latin word *spina*, meaning “thorn,” more than likely due to the shape of the crystal. Another possible derivation is from the Greek word *spitha* meaning “spark,” alluding perhaps to its fiery color. In olden times red spinel was often known as balas ruby, a name derived most probably from Balascia (Badakhshan), from where the earliest stones were said to have come.

The close spatial association of the spinel and the ruby is further indicated in this extract: “Balasius is of a purple or rosy Colour, flames and glitters. . . .Some think it is the Carbuncle [ruby] diminish’d in its Colour and Virtue; just as the Virtue of the Female differs from that of the Male. It is often found that the external part of one and the same stone appears as Balasius, and the internal a Carbuncle, from whence comes the saying, that the Balasius is the Carbuncle’s House. It gives help to Disorders of the Liver; and what is still more surprising, if you touch the four Corners of a House, Garden, to Vineyard, with the Balasius, it will preserve them from Lightning, Tempest, and Worms (Spencer 1937).

### LEGENDS AND LORE

Note: Throughout this chapter, historical sources refer to ruby and spinel as coming from Badakhshan. However, it must be noted that at present there are only indications of spinel. It may be that the red stones were confused with ruby in the past.

*"This stone will perhaps carry my name farther down through  
time than the empire of the house of Timur"*

—Jahangir Mongul, Emperor of India



19. A MAGNIFICENT GEM IN ITS OWN RIGHT, THE TIMUR RUBY IS MADE EVEN MORE FASCINATING BY THE INSCRIPTIONS OF ITS FORMER ROYAL OWNERS:

- TIMUR, SULTAN SAHIB QIRAN (A.D. 1405)
- AKBAR SHAH JAHNGIR SHAH, A.H. 1021 (A.D. 1611)
- SAHIB QIRAN SANI, MONGOL EMPEROR, A.H. 1038 (A.D. 1628)
- ALAMGIR SHAH, MONGOL EMPEROR, A.H. 1070 (A.D. 1660)
- BADSHAH GHAZNI MAHAMAD FARUKH SIYAR, A.H. 1125 (A.D. 1715)
- AHMED SHAH, DURR-I-DAURAN, KING OF KABUL, A.H. 1168 (A.D. 1758)

THERE WERE SEVERAL NAMES OF THREE EARLIER OWNERS ALSO INSCRIBED ON THE STONE, BUT THESE WERE REMOVED BY ONE OF THE SUCCESSORS: MIR SHAH RUKH, KING OF KHORASSAN (1405–1446), THE FOURTH SON OF TIMUR; SUCCEEDED BY HIS SON, MIRZA ULUGH BEG, KING OF SAMARKAND (1446–1449); AND SHAH ABBAS SAFAVI, SHAH OF PERSIA (1582–1627), WHO GAINED POWER AFTER THE WANE OF THE TIMUR DYNASTY. PHOTO BY THE ROYAL COLLECTION REPRODUCED BY THE GRACIOUS PERMISSION OF HER MAJESTY QUEEN ELIZABETH II



21. HER MAJESTY QUEEN ELIZABETH II WEARING THE IMPERIAL STATE CROWN OF GREAT BRITAIN WITH THE BLACK PRINCE'S RUBY/SPINEL (170 CARATS) IN THE FOREFRONT. COPYRIGHT © CECIL BEATON / CAMERA PRESS / RETNA.



20. THE TIMUR RUBY IS IN THE PRIVATE COLLECTION OF HER MAJESTY QUEEN ELIZABETH II. THE HUGE CENTRAL STONE OF THIS NECKLACE IS, IN FACT, A RED SPINEL WEIGHING 352.54 CARATS. "THIS STONE WILL PERHAPS CARRY MY NAME FARTHER DOWN THROUGH TIME THAN THE EMPIRE OF THE HOUSE OF TIMUR." MONGUL EMPEROR OF INDIA JAHANGIR. PHOTO BY THE ROYAL COLLECTION REPRODUCED BY THE GRACIOUS PERMISSION OF HER MAJESTY QUEEN ELIZABETH II



23. RECONSTRUCTION OF THE HEAD OF THE GREAT TARTAR EMPEROR TIMUR, ALSO KNOWN AS TAMERLANE, BORN IN SAMARKAND 600 YEARS AGO, CONQUEROR OF PERSIA, AFGHANISTAN, AND INDIA. RECONSTRUCTION BY GERASIMOV (HOOKHAM)

When color had strong symbolism, red stones were considered cures for hemorrhages and all inflammatory diseases, as well as prescriptions to soothe inflamed emotions, eliminating anger and conflict. An Indian belief reported by an Armenian writer of the seventeenth century was that powdered spinel taken in a potion eliminated dark forebodings and brought happiness.

One of the most interesting legends concerning the ruby (this is actually thought to be a spinel) was related by Pearse (1898). It is a story about the "Hermit and the Ruby."

*In a hamlet a fakir of old age dwelt. All of his worldly wealth seemed to consist of grain in the middle of the hut. He was a remarkable man who had traveled widely, and was the owner of a remarkable ruby. An old bai wanted to become the owner of this gem, and claimed that only through its ownership could a robber-chief be induced to spare the lives and property of his village. The fakir was moved and gave the gem to the bai. The bai offered money, but the fakir preferred to have grain so that he might augment his supply to feed weary travelers.*

*On the ruby was carved a small Zoroastrian altar cut in high relief in the center of the oblong face, and round the latter was a double cordon of letters of the Seytho-Bactrian alphabet. The stone was lustrous and about 150 to 200 carats. The ruby had been originally found about the time of Timur by an ancestor of the fakir in a cave near the famous shrine and Kafir city of Esh in the Bolar ranges.*

The inhabitants of Badakhshan had their superstitions and myths as related by Olufsen (1904). "When making one's way through the Amu Darya in Gharan one would think that there was scarcely a village to be found in the region, and it was not until one reached the slopes higher up that it came into sight—stowed away as on shelves in the mountains, one above the other along the rivers (photos 25 and 26).

The native Gharans told us that many of the inhabitants live up on these terraces without ever descending the mountains, partly it seems, owing to the difficulty in climbing up and down the heights, and partly owing to their dread of meeting wicked people and spirits and demons outside their native place which is all the world to them."

## DESCRIPTION AND LOCATION

The Kul-i-Lal spinel deposit is located 47 kilometers (29 miles) south of Khorog, Tadjikistan, across the Amu Darya from Shighnan, Afghanistan<sup>2</sup>, on the edge of the Pyandzeh river valley (Figure 4.1). A second part of the deposit is located 3 kilometers farther downstream on the Pyandzeh river in the lower part of the left tributary of the Zbordarya river.



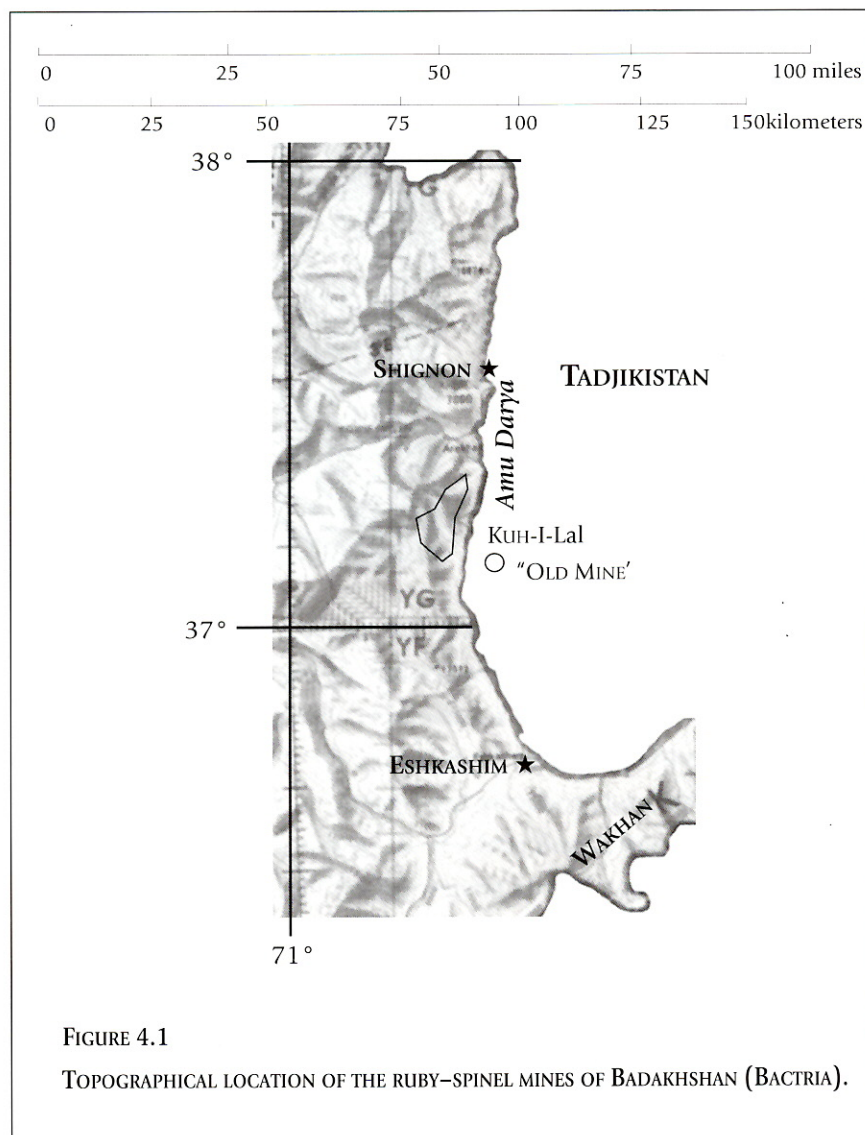
According to written history, the famous spinel mines of Badakhshan have been operated intermittently since A.D. 950 (photos 24 and 26). Most recently, the academician, Fersman (1947) claimed that the white marble mines at the mouth of the Kuga-Lial river in the Pamir region have been producing red stones for a thousand years, consisting of bright rubies and pinkish-red spinels called lal. Further research may indicate whether operations predate that time. There is, however, little proof of rubies being mined. In fact, according to Rossofsky (1980), only spinel has been found in Badakhshan, and ruby is found only at the Jegdalek deposit (chapter 5). The Ministry of Planning in its socioeconomic study of Badakhshan (1976) mentioned the existence of the rubies of Badakhshan, but claimed that the location of the mine has been lost as the coordinates on file differed according to various authors (Figures 4.2–4.6).

The Ministry speculated the rubies may be in Jurm or Shighnan. Mirzad, Sweetwood, and the Afghan Ministry of Mines (in 1966, 1968, and 1973, respectively), however, reported ruby mining taking place at 37°15' N, 71°28' E, which is on the left bank of the Amu Darya. Previous coordinates for the Shighnan mine were reported as 37°30'N, 71°28' E.

The authors went in search of these lost ruby mines in the summer 1993 expedition. Because of tribal problems and bandits, who were

24. PHOTO OF HISTORIC BALAS MINE  
TAKEN BY THE AUTHORS IN 1994.

<sup>2</sup> Prior to the Pamir Boundary Commission of 1897's delineation of the Afghan boundary, this was considered part of Afghanistan (see Historic Notes)



killing people for their horses and supplies, and other logistical travel problems, their journey was aborted after reaching within 80 kilometers (50 miles) of the area. Nevertheless, the authors successfully completed a well-reconnoitered expedition in the summer of 1994, with the help of the Scout GPS® (Global Positioning System), manufactured by Trimble Navigation. There was no evidence of ruby coming from the area; however, the authors did come across verification of spinel. In an attempt to locate the ruby, sapphire, and spinel mines between Eshkashim and Shighnan, the authors interviewed more than 100 villagers from some 20 villages and mountain homes. Many knew the story of Kuh-i-Lal but had no other personal experience. Three old shafts of mine tunnels were locat-



ed near the village of Gharan 37° 12'36"N, 71° 27'03"E at 2,440 meters. Locals stated that these shafts had been worked during Daoud's time (ruler of Afghanistan from 1973 to 1977) by the government. Subsequently, they were filled in and closed. The authors spent the night at one shaft located at 37° 09'45"N, 71° 25'28.8"E.

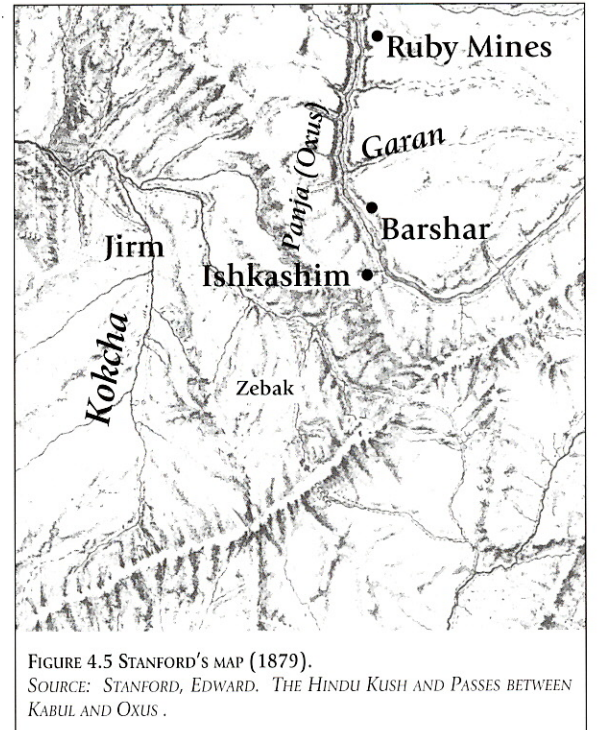
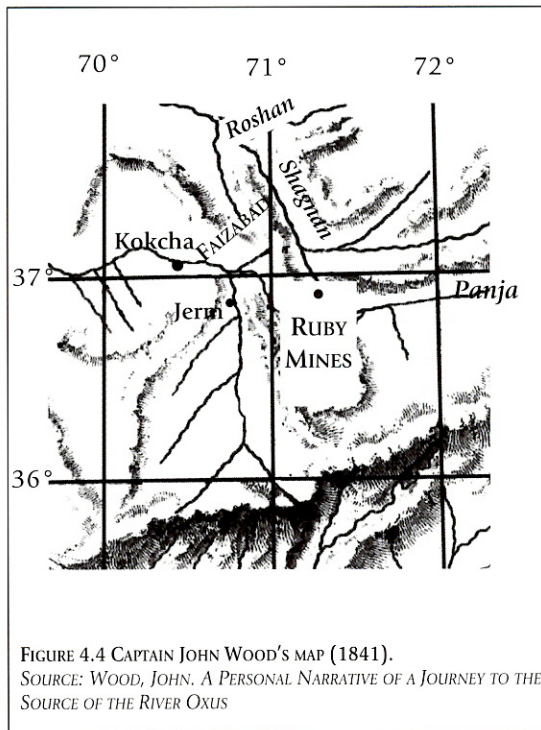
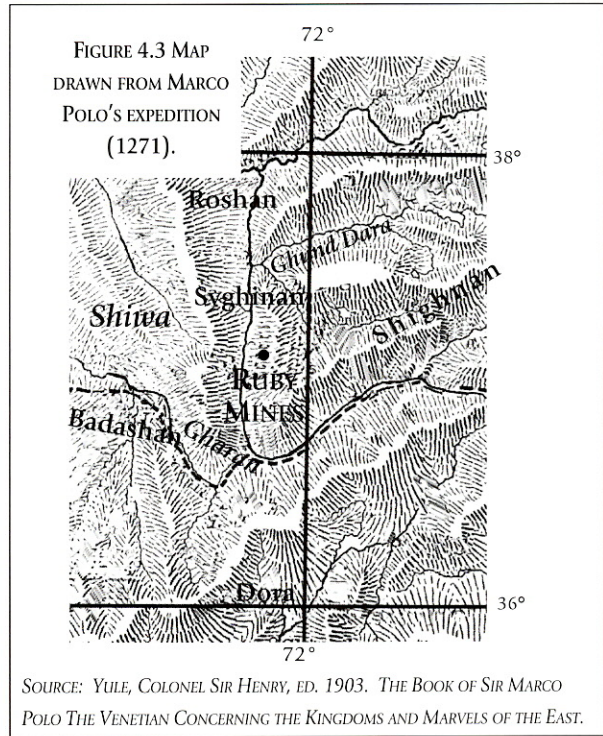
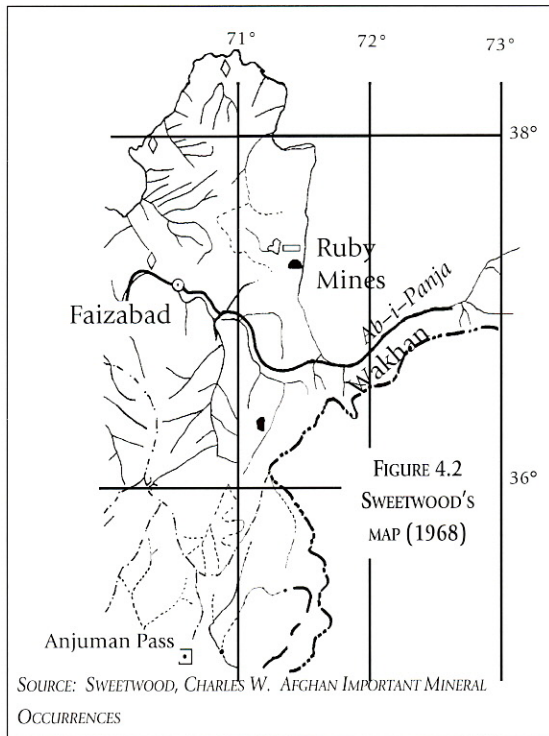
The historic mine of Kuh-i-Lal was located by the authors in July 1994. Due to the civil war between the Tadjik *mujahideen* and the government of Tadjikistan, the cable river crossing at Shighnan, 48 kilometers (30 miles) north of the mine, had been destroyed. The authors could only view the mine from across the Amu Darya and plotted the coordinates as 37° 11'13.9"N, 71° 27'40.1"E, at 2,377 meters (7,800 feet) on the Afghan side. The mine was about 1,000 feet above the Amu Darya at approximately 2,530 meters (8,300 feet). Several Afghans and some Tadjiks confirmed that the mine was being worked by the Russians; however, no activity was seen on three different occasions over a four-day period.

The authors' location of the old mines was aided by the use of the following historic descriptions and maps:

*They are got in certain rocks among the mountains and in the search for them the people dig great caves underground, just as is done by the miners for silver. There is but one special mountain that produces them, and it is called SYGHINAN (Istakhri A.D. 950)*

*Of these stones [balas ruby] of fine quality and great value, they are embedded in the high mountains, but are searched for only in one, named Sikinan. In this the king causes mines to be worked, and through this channel alone, they are obtained; no person daring, under pain of death, to make an excavation for the purpose unless he obtains his majesty's license (Figure 4.3; Marco Polo 1271)*

Elphinstone (1815) also traveled to the ruby mines, as he wrote: *Rubies are found in Budukshaun, but not in the Afghaun side of Hindoo Coosh. The ruby mines are near the Oxus [Amu Darya], at some distance from the ridge. There are numerous streams issued from it, and join the Oxus and Kamma. In the roots along the left bank of the Oxus, it appears that in each day's journey from two to three streams are crossed coming from this ridge, from fifteen to thirty and forty yards broad, and knee and middle deep. The whole of the country between the Hindoo Koosh and Pamir ridges appears to be groups of*



FIGURES 4.2 TO 4.5 COMPARISON OF THE DIFFERENT LOCATIONS CREDITED TO THE RUBY-SPINEL MINES IN BADAKHSHAN THROUGHOUT HISTORY. WITH THE USE OF THE SCOUT GPS® FROM TRIMBLE NAVIGATION, INC., THE AUTHORS VERIFIED THE ACTUAL LOCATIONS IN THE SUMMER OF 1994.

*hills; but it is easy to trace some considerable ranges, from which inferior ones shoot out from right angles, and form these groups and narrow valleys. The hills are well wooded, and the low ones along their base are well stocked with fruit trees of various kinds.*

Wood (1841); (Figure 4.4) speaks of the rubies situated in the valley of the Amu Darya and close to Shighnan. While traveling to the ruby mines from Jurm, Wood passed a number of horsemen at Eshkashim who had just returned from the ruby mines 32 kilometers (20 miles) away where they collected the annual tribute at Gharan for Murad Beg, the ruler of Badakhshan. Murad Beg stopped the production in the 1890s. Gharan (translated as "caves" or "mines") is a district on the upper Amu Darya or Panja, consisting of a fort and a few hamlets, extending for some 38 kilometers (24 miles) along both banks of the river between Shighnan and Eshkashim. We lack further information from Wood, as upon crossing the Amu Darya at Eshkashim, the unstable weather and the breaking of river ice forced him to turn back, with the ruby mountains in sight.

Streeter (1877) pinpoints the site on the right bank of the Amu Darya near Shushan and Charan. In fact, Tagore (1879) claims the natives of these villages are under the impression that rubies occur in pairs, and when one is found, they hide it until the other is found. If this does not happen, they break the first in two. The mines face the stream and the entrance is 366 meters (1,200 feet) above the level of the stream.

Colonel Alexander Gardner (1826) described the setting of the ruby mines in detail (Pearse 1898):

*We visited the famous ruby mines. To reach them we had to diverge southwards. They consisted, somewhat to my surprise, of cave-like burrows about 1,000 feet above the river. They were cut in soft decayed sandstone stratified rock which both above and below alternated with a species of mountain limestone also in strata. There was a thick, whitish, and in parts, yellowish, saline-like crust formed on the sides of the cuttings, which exuded from the limestone rock, and which was in many parts strongly marked with green, yellow and dirty white spots, giving evidence of the presence of iron or copper oxides. The upper part and roofs of the burrows were utterly neglected and in ruins. After wading diagonally through the slush we emerged. Around were old, dismantled forts, which once commanded the passage of the river and the entrance to the mines. It was said that there were copper, antimony and lead mines in the vicinity, but they had not been worked since the day of Timur [1405].*



25. Trail Along The Amu Darya To The Legendary Spinel Mines Named “ Kuh-I-Lal” “ Mountain Of Red” .  
Photo by Gary Bowersox from Afghanistan side of the border.



26. The Historic Balas Ruby/Spinel Mines And The Surrounding Villages High On The Mountain Face Along The Amu Darya. Photo by Gary Bowersox from Afghanistan side of the border.

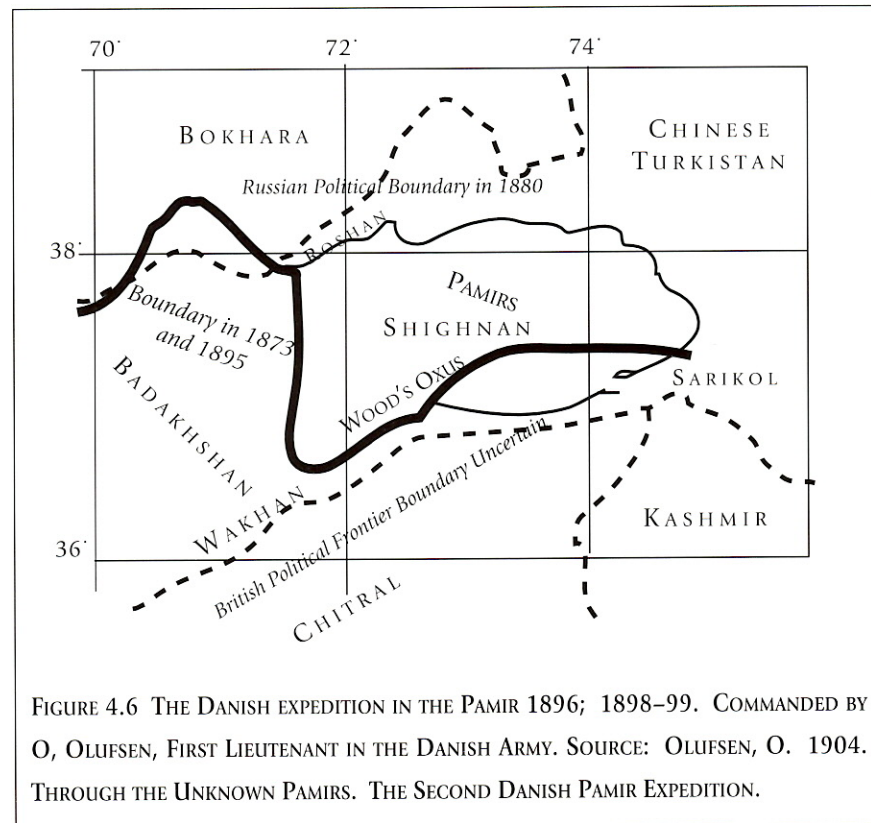


FIGURE 4.6 THE DANISH EXPEDITION IN THE PAMIR 1896; 1898–99. COMMANDED BY O. OLUFSEN, FIRST LIEUTENANT IN THE DANISH ARMY. SOURCE: OLUFSEN, O. 1904. THROUGH THE UNKNOWN PAMIRS. THE SECOND DANISH PAMIR EXPEDITION.

Like other explorers, Hamilton (1910) referred to both ruby and spinel on the right bank of the Amu Darya close to Eshkashim, in Gharan, and near the sources of the Kokcha. The ruby mines lie 366 meters (1,200 feet) above the Amu Darya, but the deposits are not worked regularly, although from time to time during the reign of Abdur Rahman projects for developing them were initiated.

According to Bandy (1924) in his master's thesis, the rubies of Badakhshan are found in the province of Shighnan on the bend of the Amu Darya. There are, however, conflicting reports on the type of occurrence: white earth, red sandstone, or more likely, crystalline limestone (marble). Most likely, they occur in a micaceous coarsely crystalline limestone about 46 meters (150 feet) thick, associated with a great quantity of garnet. The Carboniferous and crinoid limestone is altered to its present state by an inclusion of granite.

This quote from Fersman (1947) is one of the most detailed:

*After Eshkashim, pass Bar Shahr, about 4 miles below the Sar-i-Shakh ford, and a short distance above the point where the Amu Darya is joined from the east by the Boghaz-Su, a large stream from the valley of which a road goes to*

*the Shakhdara district of Shighnan. Towards Shighnan, pass Sheikh Beg on the right bank and 16 miles below Bar Shahr are the ruby mines. These are situated in a cavern with three entrances about 1,000 feet above the river and a mile from the bank. The rubies are found in a soft white stone embedded in the hard rock of the cliffs. They are dangerous because of the terrain. Also gold is found and washed in the stream.*

Wood (1841, 1872) then notes:

*The mines were easily worked; the operation more like digging a hole in sand, than quarrying rocks. Above Eshkashim, the Amu Darya is transparent, but after issuing from the mountains below Darwaz it is of a dirty red color. The galleries were numerous and running directly in from the river. The workers were handicapped by water filtering into the mine from above and by the smoke from their lamps. Whenever a seam or whitish blotch was observed, the miners set to work; and when a ruby was found it was always encased in a round nodule of considerable size. It appears that the mines have not been worked since Badakhshan fell into the hands of the Kunduz chief, who, irritated by the small profit, closed the mines, selling the inhabitants as slaves on the market in Kunduz .*

The mines were reopened in 1866. Rubies were formerly found in great numbers associated with the balas ruby (spinel). Coincidentally, perhaps, a stone the size of a pigeon's egg was found in Tibet in 1873, and a 2,000-carat ruby was located in Tibet in 1895. As there is no reliable information as to the existence of ruby mines in Tibet or the Tien-Shan mountains, it is thought that the great rubies were from these mines (Bandy 1924).

Fersman in his 1947 publication was very distinct in his descriptions, noting clearly the differences between the ruby and the spinel, so that one would not confuse the stones. For 1,000 years the white marble of the Pamirs produced rubies and spinel from mines at the mouth of the Kugu-Lial river. In particular, a ruby mine in the state of Gharan was not worked as it required shafts. After 1895 the mine belonged to Russia.

Komroff (1933) and Strachan (1934), in their independent works on Marco Polo, state:

*In this country are found the precious stones called balas rubies [balas meaning "false ruby" or "spinel"], of fine quality and great value, so-called from the name of the province. They are imbedded in the high mountains but are searched for only in one named, Sikinan, [also spelled Syghinan, but perhaps referring to the present-day Shighnan?], in the Balascia or Ballahia on the upper Oxus river where they were found below the surface of the soil. The miners dig great caves underground just as is done for silver.*

Marco Polo himself made a collection of the balas rubies in the latter half of the thirteenth century.

## GEOLOGY AND TOPOGRAPHY

Less known in recent times but evidenced in writings of old, are the spinel mines of Badakhshan, located in the Pamir microcrustal block. The Ab-i-Panja (at the mouth of the Amu Darya) spinel deposit has been documented at 37° 11' 05"N, 71° 27' 18"E.

The geology of the area was well reported by Olufsen in the Danish Expedition to the Pamirs in 1896, and again in 1898 and 1899 (Figure 4.6). To his team, the Hindu Kush resembled a majestic, immense Alpine range with wild, rugged, vertical peaks. Both the Pamirs and the Hindu Kush were more than 6,000 meters (18,000 feet) high, subjecting them to continuous snowstorms.

*This vast tableland averages 3,600 meters [12,000 feet] in height ringed by a rough horseshoe of mountain ranges, and intersected by snowy ridges and shallow trenches that deepen westwards, where the streams of the Oxus [Amu Darya] descend toward Bokhara. [The characteristic types of landscape are] tent-shaped, glacier coated mountains, divided by broad, easy gaps, bare heights naked of verdure and shorn of forests by the bitter winds and frosts, desolate lakes, a region where for the most part there is neither fuel nor fodder, an Engadine of Asia, with nine months winter and three months cold weather; the home of the wild sheep, the summer haunt of a few wandering shepherds, Nomads' land if not No-man's land (Bellew 1892).*

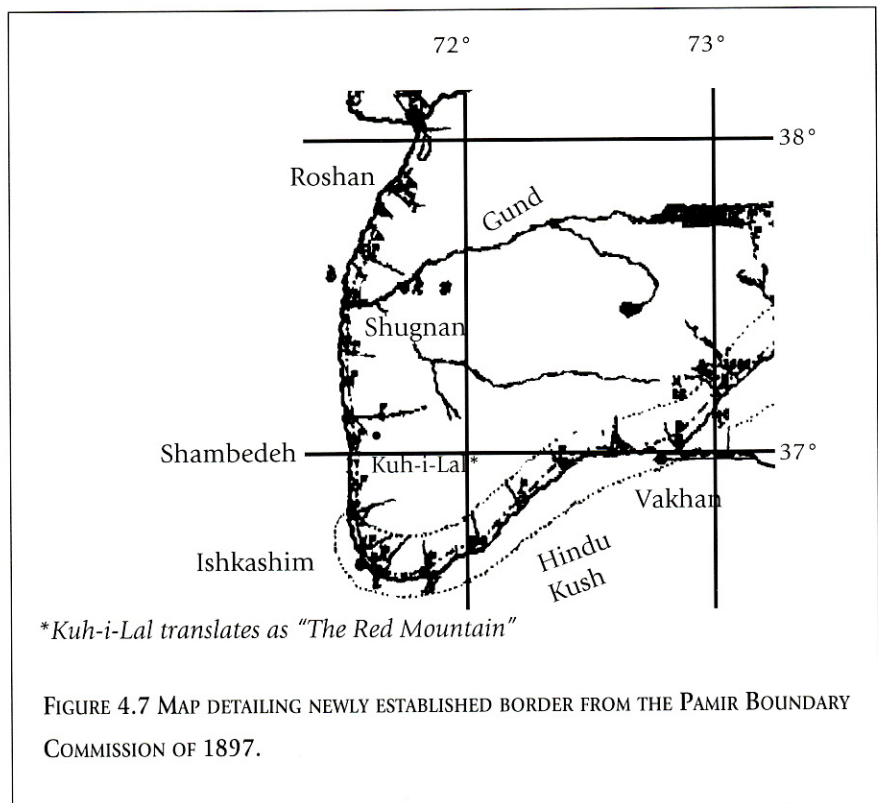
The northern boundary of the upper Ab-i-Panja was formed by the southern mountains of the Pamirs, which were of the same rock as the Hindu Kush. The mountains had large forms with flattened peaks like



plateaus that descended from the north and the south to the river. Because of the steepness, there were only a few places of access to the ruby mine. Once the wall was climbed, the hills were slate.

On the northern bank of the river was a line of hot geysers situated in 10 large craters, and a number of smaller ones. These were a sanctuary to the Gharans. The geysers contained salt, lithium, sodium, calcium, and zinc.

Olufsen (1904) described the trail between Shambedeh and Kuh-i-Lal (the ruby mountain) as "the devil's passes one, two, and three the passage along steep paths scarcely half a foot broad, along the border of precipices that go sheer down into the foaming river that roars several hundred yards below. Often there is no other path than the foothold that one may get in the small roughness of the steep precipice of gneiss. Here horses, donkeys, and baggage had to be hoisted with ropes from one terrace to another."



In September, October, and November the passages could be avoided since the Amu Darya was so shallow that the horses could wade along the edge. During the winter, all travel is hindered by the snow; and during the spring the trail is impossible to negotiate due to snow and avalanches.

## HISTORIC NOTES

*There is reason for thinking that many of the large historical spinels both in the east and in Europe may have come from the locality in Badakhshan or even from Afghanistan, rather than from the better-known localities of Ceylon and Burma.*

—V. Ball

The spinels of Badakhshan were famous throughout the Middle Ages in the Moslem world. Much of the controversy today revolves around the question of which country owns the mines (Figure 4.1). There was much unsettled borderland around Shighnan and Roshan, two small hill khanates high up on the Amu Darya and close to the Pamirs. The tribes had been allowed to live for generations in unrestricted independence and, like many chiefs of these mountain pockets, claimed descent from Alexander of the Two Horns and his Macedonian colonists (Eyre 1843).

The area around Shighnan was formerly an independent Tadjik state on both banks of the Amu Darya. It came within the sphere of Badakhshan influence in 1859. However, in 1873 an agreement between Britain and Russia decreed that the Amu Darya should form the northern boundary of Afghanistan. Since the upper Amu Darya has many branches, a middle course was adopted and was occupied as an Afghan province in 1883.

However, on March 11, 1895, an exchange of notes between the British and the Russians in London delimited the frontiers of the Pamir between Afghanistan and the principality of Bokhara under Russian protectorate. Badakhshan proper was left in the hands of the rulers of Afghanistan, while the territories of western Pamir lying north and east of the Pandj returned to Bokhara (Report of the Proceedings of the Pamir Boundary Commission 1897; Yate 1888). This cut across Shighnan (Figure 4.7). "Badakhshan, with its dependent district Wakhan, from the Sarikol on the east to the junction of the Kokcha river with the Oxus on the west, the stream of the Oxus thus forming the northern boundary of this Afghan province throughout its entire extent."

*From the sixth mile a rugged and inaccessible spur of the Sarikol range carries the boundary into regions of perpetual ice and snow to its junction with the main range [Hindu Kush]. Here, amidst a solitary*

*wilderness 20,000 feet above sea level, absolutely inaccessible to man and within the ken of no living creatures except the Pamir eagles, the three great empires actually meet [Russia, Britain and China]. No more fitting trijunction could possibly be found (Yate 1888).*

The Afghans continued to claim these states as part of Badakhshan. Eventually the amir of Afghanistan was allowed to have his way on all territory south of the Amu Darya or Ab-i-Pandja. The Trans-Indus portion had been surrendered with the acquiescence of all parties in Russia. The portion left to Afghanistan, known as Wakhan, lay between the Amu Darya and the Hindu Kush. The amir withdrew his troops from the right bank of the Ab-i-Pandja (true Amu Darya), and in compensation, the amir of Bokhara handed over to Afghanistan a piece of Roshan, known as Darwaz, which lies in a curve of the Amu Darya (Russian General Staff 1889).

The revolution of 1918 abolished the principality of Bokhara. In 1925 it became Tadjikistan, part of the USSR. With the breakup of the Soviet Union, the region that contains the historic mines is now the independent country of Tadjikistan. Some evidence, however, exists that because of traumatic earth and rock movements (watersheds, erosion and major landslides caused by earthquakes), spinels may be located on both sides of the Amu Darya between the villages of Kaza Siez and Andarab where the Garam Chashma (Hot Springs) river joins the Amu Darya ( $71^{\circ}28'30''$ ;  $37^{\circ}00'$  to  $37^{\circ}02'00''$ ).

Some of the earliest known spinel localities recorded are from Afghanistan, and, in fact, gemstones, other than the lapis, have been exploited in Badakhshan. Excavations in Badakhshan indicate early Greek settlement, and the "unearthing of perfect crystals and gems of beryl" suggests these deposits were known many centuries ago (Bariand and Poullen 1978). Reports have also come of gold along the Kokcha and Amu Daryas, and of other mines in the mountains further south. Herbert Smith (1949) stated that ruby had been found with spinel and garnet to the north of the lapis mines.

The balas ruby has furnished the poets of Persia "with many a simile." Most of the historical sources that mention ruby and/or spinel date from before the twentieth century; in spite of this, little knowledge exists. The documented chronology of ruby and spinel (balas ruby) found in Badakhshan is presented on the following pages.

TABLE 4.7 CHRONOLOGICAL OVERVIEW OF SPINEL IN BADAKHSHAN

100 B.C.	The earliest red spinel known to have been used as an ornament was found in a Buddhist tomb near Kabul, Afghanistan (Sofianides and Harlow 1990). A tope of Buddhist origin was also discovered with a relic casket of gold encrusted with balas rubies (Rapson 1922).
900s	<p>Mining of spinel began in Badakhshan (Istakhri and Ibn Haukal per Sersen 1991): "<i>They [rubies] are got people dig great caves under ground,</i>" (Istakhri per Sersen 1991).</p> <p>Afghanistan's ruby mines were mentioned in the Arabic writings of early travelers, including al-Muqaddasi and al-Biruni (Hughes 1990).</p>
1240	Teifaschi writes of the ruby mines (Hughes 1990).
1255	Marco Polo did not personally visit the mines, but nonetheless wrote in the thirteenth century: " <i>Occasionally the king gives them as presents, as they are not procurable by purchase from others, and cannot be exported without his permission. His object in these restrictions is, that the rubies of his country should maintain their high price; for if they could be dug for indiscriminately, so great is their abundance that they would soon be of little value</i> " (Yule 1903).
Late 1200s	"Towards the end of the reign of Kublai Khan [thirteenth century], one of the rich Mohammedan merchants sold a red la [balas ruby] to the emperor. It weighed one liang and three ts'ien, and was estimated at 140,000 ting paid in bank notes." It was placed on a ceremonial cap and thus passed from one emperor to another (Bretschneider 1887).
1300s	Timur ruby of 361 carats (Rutland 1974).
1325–1354	Ibn Battuta mentioned the following: " <i>the province of Badakhshan has given its name also to the ruby called 'badakhshi'</i> " (Dunn 1986).
1336–1405	<p>"Caused all the meezas and nobles in the land of Samarkland to come to this festival; amongst whom was the lord of Balaxia which is a great city where rubies are procured. And he came with a large troop of knights and followers.</p> <p><i>The ambassador went to this lord of Balaxia, and asked him how he got the rubies, and he replied that near the city there was a mountain whence they brought them, and that every day they broke up a rock in search of them. He said that when they find a vein they got out the rubies skillfully by breaking the rock all around with chisels</i>" (Ross and Power 1928).</p>
1403–1406	An early mention of the rubies of Badakhshan is found in the writings of the Spaniard, Ruy Gonzalez de Clavijo, who visited the court of Timur at Samarkand (Hughes 1990).

TABLE 4.7 CHRONOLOGICAL OVERVIEW OF SPINEL IN BADAKHSHAN

1472	<p>Joseph Barbaro had an audience with Yussum Cassam, the king of Persia. He was shown a handkerchief filled with the most valuable of precious stones of which one was a table-cut balas ruby at least a finger's breadth of the most beautiful color and weighing 2 1/2 ounces (Tagore 1879).</p> <p>An engraved ruby was shown to Barbaro along with a number of balas rubies by the shah (Uzun Hassan). One was fashioned like a date of good color, bored through and weighing 100 carats.</p>
1544	<p>Humayun, who succeeded to the throne of Babur, presented Shah Tahmasp the "Great Mogol" diamond together with hundreds of Badakhshan rubies upon the former's conversion to Shia Moslem (Prawdin 1963).</p>
1615-1619	<p>In relating the journey of Sir Thomas Roe to India, Foster (1926) stated that the favorite wife of the king of Bampore had received "<i>ten leckes of rupias in jewels, great pearls, and balasse rubies. Rubies give the best profit from three carats upwards of all sizes, so high in color and fair. Balas: fair and great of 60 carats upwards.</i>"</p>
1673	<p>A French envoy gave the gift of a balas ruby ring to the king of Persia, from the Prince's wife to the great pontiff "<i>two pendants for the ears of balas rubies of an ill form but clear and good of color.</i>" Each weighed about 2 1/2 drams (Chardin 1927).</p>
1677	<p>Tavernier viewed and subsequently wrote about the jewels and the thrones of the Great Mogul, the latter encrusted with gems, diamonds, and pearls. The principal throne was covered in gold inlay and enriched with numerous diamonds, rubies, and emeralds. In the middle of each of the four bars that supported the base of the throne was a large cabochon balas ruby, surrounded by four emeralds in the shape of a cross. Along the length of the bar were similar crosses in the form of the above and the reverse—an emerald in the middle with four balas rubies surrounding it. In total there were 180 cabochon balas rubies on the great throne, varying in weight from 100 to 200 carats, including a single gem that weighed 2 1/2 ounces, which Griesbach claimed was probably a balas ruby from Badakhshan. There were more emeralds than rubies. The building of the great throne began with Tamerlane (also known as Timur) (Ball 1990).</p> <p>Tavernier was also invited to see the emperor's jewels. Most of the major pieces of jewelry consisted of diamonds and pearls, both of great size and value. However, there was also a significant value of rubies and emeralds, and an oriental amethyst, which was a purple sapphire. A balas ruby cut in cabochon of fine color and clean was pierced at the apex and weighed 17 melscals (6 melscals = 1 French ounce). Another cabochon ruby weighed 12 melscals. Weighing 6 melscals was an oriental topaz (yellow sapphire) (Ball 1990).</p>
1725	<p>Reports in Russia of the rubies and lapis lazuli of Badakhshan and also of its alleged gold and silver mines.</p>

TABLE 4.7 CHRONOLOGICAL OVERVIEW OF SPINEL IN BADAKHSHAN

1735	<i>"The conquest of the rich country of Badakhshan" is mentioned as one of the aims of Russian policy in Central Asia (Russian General Staff 1889).</i>
1791	The catalog of the French Crown Jewels mentions two balas rubies. One weighed 20 $\frac{3}{8}$ carats and was valued at 10,000 francs; the other weighing 12 $\frac{3}{8}$ carats was valued at 3,000 francs. Perhaps this was the same ruby seen in 1472 by Joseph Barbaro in his audience with Yussum Cassam, the king of Persia (Ball 1990).
1826	<i>"On the ruby was carved a small Zoroastrian altar cut in high relief in the center of the oblong face, and around the altar was a double cordon of letters of the Seytho-Bactrian alphabet. The stone was lustrous and about 150 to 200 carats" (Pearse 1898).</i>
1832	Prinsep and Kalikishen (1832) covered the ruby/spinel deposit of Badakhshan: <i>"The mine of this gem was not discovered until after a sudden shock of an earthquake. . . which exhibited a number of sparkling pink gems the size of eggs its color and hardness were found inferior to the [ruby], it became less prized."</i>
1861	A 197-carat spinel with five separate inscriptions, detailing the names of the rulers from 1009, was cut down in England to form a rectangular-shaped jewel, about one-third of the original size. This spinel is later referred as the "Nadir Shah" spinel-ruby (V. Ball).
1867	Pandit Manphul reported: <i>"The ruby mines are situated in Ishkasham have not been worked the last twenty years in consequence of the labor not having been sufficiently rewarded. The mines are known to have yielded rubies of six different colours, viz, red, green, white, yellow, violet and rosy" (Yule 1903).</i>
1873	A stone the size of a pigeon's egg is said to have been found (Bauer 1968).
1879	The origin of the term balas ruby was credited as the ancient name of Baluchistan, Badakhshan, or Balascia (Ball 1990). However, the balas ruby was previously described by Marco Polo as being chiefly found in the Balascia or Ballahia (on the upper Amu Darya).  Rubies were found in Badakhshan, a part of Tartary. Some also were found on the slopes of the Amu Darya near Shushan and Charan (Tagore 1879).
1887	There are four kinds of red precious stones of the Mohammedans, which varied in appearance and in price: <ul style="list-style-type: none"> <li>• the la, a rose red color spinel;</li> <li>• the bi-dje-da, a deep red color and thin, thought to be garnet;</li> <li>• the si-la-ni, a dark red color, thought to be ruby;</li> <li>• a gu-mu-lan of irregular color, found in large pieces and least valuable (Cho Keng Lu 1887)</li> </ul>
Late 1800s	A balas ruby was found with the head of a Bacchanite engraved upon it. Runjeet Sing is said to have owned a largeruby weighing 14 tolas (812 carats) with

TABLE 4.7 CHRONOLOGICAL OVERVIEW OF SPINEL IN BADAKHSHAN

	the name of Aurungzebe Ahmad Shah and several other kings engraved upon it (Griesbach 1891).
1893	A spinel owned by Lady Carew with Persian characters inscribed upon it detailed the names of four of the Mongol emperors. It was reputed to be 133 <sup>1</sup> / <sub>2</sub> carats (Ball 1990)
1898	On writing of his expedition, Olufsen states: "Great numbers of garnets are found in the slate on all mountain slopes in Vakhan, Ishkashim and Garan. Near the Kislak of Kuh-i-Lal in Garan [Figure 4.6] are some caves in the rocks whence the natives have tried to dig out spinel. They told me that in former times pieces had been found of the size of a hen's egg, but the mines were no longer worked. The caves and the slopes round about them were full of little bits of this mineral, of which were examined in Copenhagen. In the caves we found thin veins of spinel amongst other kinds of stones" (Olufsen 1904).
1903	The author of the Masalak Al Absan said that the finest balas ever seen in Arab countries was one presented to Malek Adilkiboga at Damascus. It was a triangle form and weighed 50 drachms (Yule 1903).
1904	There is little mention and detail of the Badakhshan mines after Bauer (1968): "The ruby mines were famous in olden times, and they supplied some of the vast store of treasure amassed by the Great Mongul. They lie between the upper course of the Oxus and its right tributary the Turt, near Gharan sixteen miles below the town of Barshar, in the lower, not the higher mountain ranges."
1905	"The precious stones in which the oriental eye takes such a keen delight were largely to be found within the limits of Bactria. The balas ruby, a red stone only inferior to the Burmese variety, has been mined from the days of which there is no exact record on the right bank of the Oxus in the district of Ish Kasham on the borders of Shighnan" (Dalton 1905).
1913	"The true commercial source of spinel rubies is now almost entirely a locality called Badakhshan in Afghanistan on the bank of the Oxus. According to a Persian tradition these mines were first disclosed when the mountain was rent in twain by an earthquake. Besides the ruby spinel, the mineral occurs in several colors which may be used as gem, viz., red orange, green, blue, indigo and also black and white" (Marcell Smith 1913).
1933	Barthoux (1933) discussed the mines stating that they lay near the village of Siz on the right bank of the Oxus. After this date, discussion of the Afghan rubies was restricted to the Jegdalek mines.
1994	Authors' gem and mineral expedition to Kuh-i-Lal.

## ILLUSTRATIONS OF SPINEL USE

Spinel and rubies, not necessarily from Badakhshan, have been mentioned in other historical documents. Red spinel was used by the Romans of the first century B.C. Blue spinels have been found in England dating from the Roman period (51 B.C.–A.D. 400), and a ring set with a pale green octahedral spinel from the Eastern Roman Empire has been described. Gemstones, including emeralds, rubies, diamonds, and pearls, were also used to decorate the horses' tack and that of the war elephants (Sofianides and Harlow 1990).

The Hindus considered spinels to be rubies and divided them according to caste. Members of each of the four major castes would wear the appropriate stone to benefit from the virtues attributed to the class of stone: Brahmin priestly caste, the true ruby; knights and warriors, the rubicelle (orange–red); landowners and merchants, the ruby spinel (deep red); laborers and artisans, the balas ruby (rose red) (Foster 1926).

Throughout history, the balas ruby and the ruby itself have been mistaken for the spinel. Proper classification and characteristics of gems did not begin until some 200 years ago, and thus the ancient classifications often led to false conclusions. In 1677, Tavernier stated that although spinel was a constant associate of ruby, it was frequently misidentified—a statement reflecting the times and lack of equipment. It is, however, an affront to the intelligence of early cutters that they may have failed to recognize the difference in the two gemstones. The confusion was more likely due solely to terminology: red spinel from Badakhshan was probably referred to as balas ruby because of the color, whereas true ruby was ruby.

Two famous spinels that have passed through great adventures are both thought to be from Badakhshan and now are integral pieces in the British Crown Jewels (Natural History Museum 1987)(photos 19 and 22). To the English, the most legendary balas ruby is the historic Black Prince's Ruby (approximately 170 carats), which is set in the cross at the front of the Imperial State Crown of Great Britain (photo

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2 The harder stones, ruby and spinel, were engraved with the names of their owners and with messages using a pen tipped with a fragment of diamond.



22). It is in fact a rich red spinel, polished but irregular in shape and some 5 centimeters (2 inches) long. Originating in Badakhshan it made its first authentic appearance in 1367, when the Don Pedro (Pedro the Cruel), the king of Castile, slew Abu Said, the king of Grenada (Moors) to obtain it. Within a year, however, he gave it to the Black Prince, Prince of Wales and son of Edward III, as a reward for vital help in the battle of Najera, near Victoria in northern Spain. Henry V wore the stone in his coroneted helmet in the Battle of Agincourt in 1415. He owed his life to the helmet, as it deflected the nearly fatal blow struck by the Duc d'Alençon. Fortunately, the ruby-spinel escaped any damage.

In an inventory taken by the Commonwealth, the stone was valued at only £4 (H. Smith 1949). With every allowance made for greater purchasing power of money in those times, compared to that of today, the valuation was absurdly low. Prior to its position in the Imperial State Crown, it was worn as a pendant (the holes are now plugged with the small ruby).

An even larger red spinel among the private collection of Queen Elizabeth II of England is the Timur Ruby (352 1/2 carats), also called *Khiraj-i-Alam* ("Tribute to the World"), famous throughout the East for nearly 600 years. It was presented to Queen Victoria by the East India Company in 1851. The stone is unique in that it bears inscriptions<sup>3</sup> written in Arabic script, but in the Persian language dating from the Moslem year 1153 (A.D. 1743; photo 19). "This is the ruby among the twenty-five thousand jewels of the King of Kings, the Sultan Sahib Qiron, which in the year 1153 from the collection of jewels of Hindustan reached this place [Isfahan]." Sultan Sahib Qiron is what the Moslems called the great Tartar emperor Timur, also known as Tamerlane, born in Samarkand 600 years ago, conqueror of Persia, Afghanistan, and India. He wore the ruby set in a headdress. The names of subsequent owners including Mongol emperors and shahs of Persia are also engraved on the stone. Part of its history was spent decorating the fabulously enriched Peacock Throne. At present it is set in a necklace made for Queen Victoria in 1853 of diamond trident-shaped links between two other large spinels, weighing 94 and 72 carats each; a spinel of 34 carats is set in the clasp (photo 20; H. Smith 1949).

<sup>3</sup> The harder stones, ruby and spinel, were engraved with the names of their owners and with messages using a pen tipped with a fragment of diamond.

The Timur is the most historic of the balas rubies and has remained uncut, but it is not one of the largest. The second largest red spinel of distinction goes to one mounted on top of the Russian Imperial Crown made for Empress Catherine II in 1762, which weighs 414.3 carats and is also uncut. According to Meen, 425 significant spinels are an integral part of the Crown Jewels of Iran. He claims that they were probably from Badakhshan on the upper Amu Darya, where the world's largest known collection of red spinels is found. Of these spinels, 15 exceed 100 carats in weight and include the largest and fourth largest red spinels on record, 500 carats and 270 carats, respectively.

Henry VIII had two great collars set with balas rubies. There were 13 of them set in the larger collar, some square and some oval. Best known among the Tudor jewels was a pendant called the Three Brethren after the three large rectangular balas rubies of almost exactly the same size and color (Bruton 1986).

Balas rubies were also prominent decorations on the pope's tiaras. The traditional red stone, a 120-carat balas ruby, was mounted on the tiara of Pope Julius II (1502–1513) for his coronation.

Throughout history, the ruby has been referred to by many different names and as coming from different localities:

The *Persians* will have it, that the Mines of *Egypt* yield likewise the *Oriental Ruby*, the *Topaz*, and the *Carbuncle*; that Stone merely nominal, which is to be met with no more, and was very probably never any thing else but an *Oriental Ruby* of a higher Colour than usual. They call this imaginary Stone *Icheb Chirac*, the Flambeau of the Night, because of the Property and the Quality it has of enlightening all things round it; *Cha Mohore*, Royal Stone, and *Cha Devacran*, King of the Jewels. They attribute to it Supernatural Virtues; and that their Relation should not fail of being fabulous enough, they tell you, that the *Carbuncle* was bred either in the Head of a *Dragon*, a *Griffin*, or a *Royal Eagle*, which was found upon the Mountain of *Caf*. The *Orientalist* gives this Name to the Hyperborean Mountains. As to the Ruby, they call it *Yacut Eeylani*; and *Yacut* is apparently the Radix or Root of the Term *Hyacinth*, a Name which we give to Rubies that are soft and tender. It is true, there are Mines of precious Stones in Ceylon, but then there are none of them but what are soft and tender. They likewise call it *Balacchani*, the Stone of *Balacchan*, which is the *Pegu*, from whence I judge might be deriv'd the Name of Balays, which they give to the Rose-colour'd Rubies. It is natural that the East, being the Source of the Mines from whence our precious Stones come, we should likewise have their original Names come from thence along with them. Even the name of *Jeweller*, which is given to the Traffickers

that way, came undoubtedly from thence; for in all the Eastern Countries, they called them *Jeuæry* (Tavernier 1677).

In his interpretation of Tavernier's journeys Ball (1889) stated:

The stones from this locality [Badakhshan], which is on the banks of the Shignan, a tributary of the Amu Darya, are not, however, rubies, but spinelles; at the same time it would appear that according to some authorities the term balass has been transferred to true rubies of a particular shade of colour—hence a considerable degree of confusion has arisen in this branch of the nomenclature of precious stones. After Ibn Batuta's testimony, derivations from Baluchistan and Baluchin—an old name for Pegu [Burma]?—need perhaps only be mentioned in order to be dismissed; but with reference to the latter, Chardin, *Voyages*, tome iv, p. 70, Amsterdam ed. of 1711, says: —“*On l'appelle aussi Balacchani, Pierre de Balacchan, qui est le Pegou, d'ou je juge qu'est venu le nom de Balays qu'on donne aux Rubis couleur de rose.*”<sup>4</sup>

## MINING METHODS

Since they are not currently worked, information on mining methods can only be gleaned through documents. The King of Badakhshan was invited to the great festival held by Timur in Samarkand in the 1400s. Near his capital city was a mountain where the balas rubies were found. Men broke into the rocks daily to find the stones. The vein was carefully followed until the stones were reached. They were then cut out little by little with chisels until all the matrix was removed. They were then polished on millstones. Timur had established a strong guard at the mines to protect his rights (Ross and Power 1928).

According to Prinsep (1844), who quoted the ensuing passage from an 1830 manuscript, rubies from Badakhshan were extracted in the following manner: “Having collected a party of miners, a spot is pointed out by experienced workmen, where an adit is commenced. The aperture is cut in the rock large enough to admit a man upright: the passage is lighted at intervals by cotton mashúls placed in niches; and as they proceed with the excavation, the rock is examined until a vein with a reddish appearance is discovered, which is recognized as the matrix of the precious gem. This red colored rock or vein is called

<sup>4</sup> One would also call Balacchani, a stone from Badakhshan, which is the Pegu, from where I judge the name of balas comes from, which is the name for the pink ruby.

rag-i-lál, or, the vein of rubies. The miners set to work upon this with much art, following all its ramifications through the parent rock. The first rubies that present themselves are small, and of bad colour: these the miners called "piadeh" (foot soldiers): further on some larger and better colour are found, which are called "sawars" (horse soldiers); the next, as they still progress in improvement, are called "amirs," "bakshis," and "vazirs," until at last they come to the "king jewel," after finding which, they give up working the vein, and this is always polished and presented to the king."

These accounts of the mining are particularly interesting because they provide examples that ancient mining groups were not only capable of operating sizable underground mines efficiently, but they knew how to make the best use, economically speaking, of the products of the mines, as the king of Badakhshan had the balas ruby trade "buttoned up."

### *PRODUCTION*

The revenue of Afghanistan was drastically affected by the redrawing of its border in the British–Russian agreement of 1872–1873. This deprived Afghanistan of more than 1,550 square kilometers (600 square miles) of land, with some 13,000 inhabitants and a revenue of some £1300 (Yate 1888).

### *PROPERTIES*

The difference in composition between spinel and true ruby is not great: ruby is aluminum oxide and spinel is magnesium aluminum oxide. However, spinels are more variable because the magnesium can be replaced by iron, manganese, or zinc; and chromium and iron may replace aluminum. These variations give rise to a range of colors and cause differences in density and optical properties. Pure spinels are colorless; reds and pinks are due to small amounts of chromium, iron causes green and blue colors, and zinc spinel is blue.

Spinel like corundum form in highly metamorphosed, thermally altered, and especially dirty limestones transformed into marbles. Spinel is easily distinguished from ruby by its single refraction and consequent absence of the dichroism, the characteristic feature of ruby. The finest gem material of spinel occurs in crystalline limestones and schists and in the alluvial deposits that result from the disintegra-

tion of these rocks. In fact, most spinels are produced from alluvial concentrations from weathered primary sources; however, there is no evidence that this also holds true for Badakhshan.

Spinel crystals as a rule are poorly formed. They are observed as separate, isometric (cubic), tabular, and lamellar forms. Very rarely are the crystals regular and euhedral, having octahedral form. The color is grayish violet, violet, reddish-rose, rose, and cinnamon.

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### Backside story on spinel chapter:

After researching and traveling in Central Asia 1972-1995, the chapter on Afghanistan/Tajikistan spinels was ready to print. As most authors know it can take months to obtain permission for the use of materials and photographs. In the case of the spinel chapter, one of the photos to be published belonged to Queen Elizabeth personally and not the British Government. Problem!!! I had traveled to London and visited with gemologists and museum employees to obtain a photo and permission to print the photo. During the trip I was given a photo but failed to obtain copy rights from the British Museum.. The next step to contact the queen's jeweler who stated "this is a legal matter, you need to contact the Queen's attorney (Barrister). After obtaining the Barrister's phone number, I was informed that I would need to hire an attorney to talk with him. Weeks went by in attempting to just get an estimate of a price for the written permission to print the photo. I was totally frustrated at this point. The book was ready to go to print.

The only solution I could come up with was to either write directly to Queen Elizabeth or cancel publishing the photo. I sat down with a pen and paper and hand wrote: Dear Her Majesty Queen Elizabeth, I have been working on a book for five years and now find that I need your personal permission to publish a photo of The Timur Ruby which is actually a spinel from the mine now located in Tajikistan. Apparently you own the piece personally. I have attempted for months to get permission via the British Museum, your jeweler and your Barrister. I'm now totally frustrated as to a next step. Included in this message, you can see all the pages of correspondence in my attempt to obtain permission. The message and enclosures was sent on May 18<sup>th</sup>. **On May 31<sup>st</sup> I received the following message directly from Buckingham Palace. WOW! This Fax sure made my day!**

*DO NOT  
All clear  
Shay*

*Left  
msg  
5/31/95*

  
BUCKINGHAM PALACE

FACSIMILE MESSAGE FROM THE PRESS OFFICE, BUCKINGHAM PALACE

TO: Gary Bowersox  
FACSIMILE NUMBER: 001-913 338 1019  
FROM: Felicity Murdo-Smith  
DATE: 31st May, 1995

Gemstones of Afghanistan

Thank you for your faxed message of 18th May and for forwarding copies of all the papers.

This is to say that permission is granted for you to reproduce the photographs as proposed and, in view of all the problems and delays you have experienced, I am prepared to waive the reproduction fee on this occasion. However, could the caption please be altered to read :- "... reproduced by gracious permission of Her Majesty Queen Elizabeth II". This would then make it absolutely correct and also be much appreciated.

The fact that the Natural History Museum appear to hold two photographs that belong to The Queen is a matter that will be taken up separately with that body but in the meantime it has, I fear, contributed to the delay.

I hope that your printing can now proceed and that the publication will be a success.

*fm5*

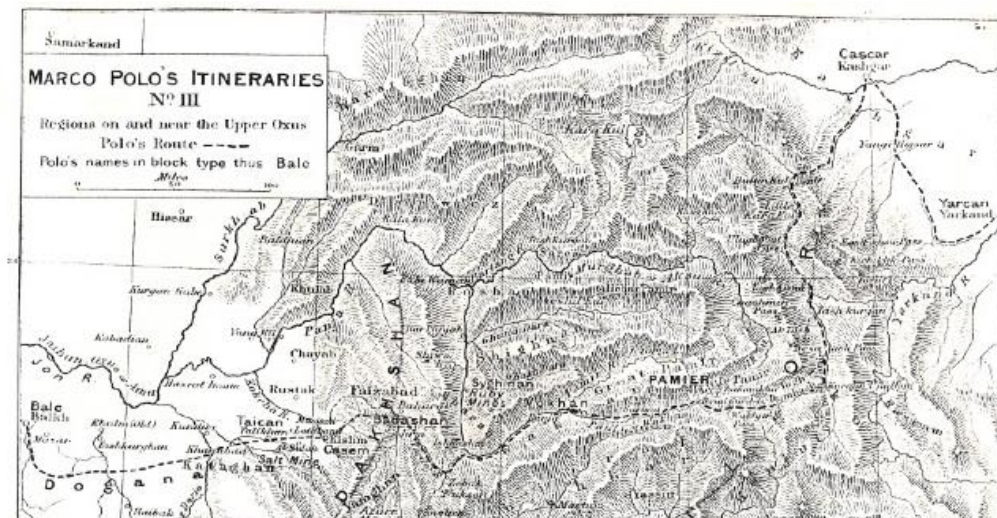
BUCKINGHAM PALACE PRESS OFFICE FACSIMILE NUMBER: 071-321 0380  
TELEPHONE NUMBER: 071-930 4832

## THE EXPLORATION AND RESEARCH STORY

In February of 2022 both the Gemological Institute of America (GIA) and The Explorers Club agreed to work with Gary Bowersox, known as Mr. Gary in Central Asia to research and report on the spinel and ruby mines of Tajikistan. GIA signed the letter of intent (see back cover) and The Explorers Club granted Gary the right to carry an Explorers flag on the expeditions to Tajikistan.

As written in the preceding chapter Mr. Gary's search for information on gemstones of Tajikistan included used book stores, the Library of Commerce, and foreign libraries to locate gemstone mines. An important find was a book on Marco Polo (1254-1329) written by Henry Yule around 1871. Marco Polo spent 24 years traveling through Asia and along the Silk Road between 1271 and 1295, and spoke Mongolian, Persian, Arabic and Turkish. Using maps from Marco Polo's descriptions (1200's), British Capt. John Woods (1800), and Danish explorer Olufsen (1800), Mr. Gary was able to locate this historic spinel mine at Kuh-i-Lal - "mountain of red". In addition to the maps, a GPS (Ground Positioning System) was used by a party of three as they walked the 100 miles along the Amu Darya river (formally the Oxus) to find the mine. The mine dated back over 2,000 years and has produced many of the crown jewels.

**Photo taken from the Afghanistan side of the border between Ishkashim and Shignon in 1994**



Visiting the Kuh-i-Lal mines in Tajikistan from passed years until today is not an easy task. During 1989 Mr. Gary located an old Marco Polo map showing the location of ruby mines in a friend's book collection. It was 1993 before Mr. Gary was on the trail to the mines starting from Peshawar, Pakistan. However, after three weeks the trip failed due to Russian and Afghan thieves in the border area of Afghanistan. It was deemed too dangerous as the bandits were killing people for their supplies. In the summer of 1994, after six weeks of traveling, Mr. Gary reached Shignon on the Afghan side of the Oxus to find that the Tajikistan rebels fighting against the Russian Army and the Tajikistan government had destroyed the bridge between Afghanistan and Tajikistan. The river is wide and swift!

In 1999 Gary arrived in Dushanbe, Tajikistan but could not arrange permission to visit the mines. The next year (2000) the Tajikistan government was fighting the rebels again, making the trip too dangerous. In 2001 Gary and three Tajikistan University scientist were granted permission to visit the mines from the Ministry of Foreign Affairs and Ministry of Industry in Dushanbe. However, when arriving in Khorog, Tajikistan the local officials did not grant permission. In 2004 plans were made with Khudai Nazar Akbari to travel across the bridge at Ishkashim, Afghanistan. However, Khudai did not arrive and the trip was cancelled. Finally in 2005, Gary and his friend Ilhom Narziev were allowed to travel into the mining tunnels and take samples and photos. The mine geologist and supervisor, Ali, provided a guided the tour of the mine during which he chipped a specimen out of the wall shown in the picture below.



Since 101 BC and maybe before that time, miners worked in small tunnels. Pictured below is a map drawn by Russian scientist with the discovery of more than 400 tunnels. Miners in the old days were smaller than Gary and Ali and when squeezing through the small tunnels the sides of the tunnels were breaking. Before entering the older tunnels, Gary and Ali held up an archeology study map of the Kuh-i-Lal tunnels known to be over 900 years old. Ali stated that the oldest tunnels on the front of Kuh-i-Lal mountain dated to 101 BC. Many have collapsed killing hundreds of miners over the years. The miners continually find bones of past miners as they work.



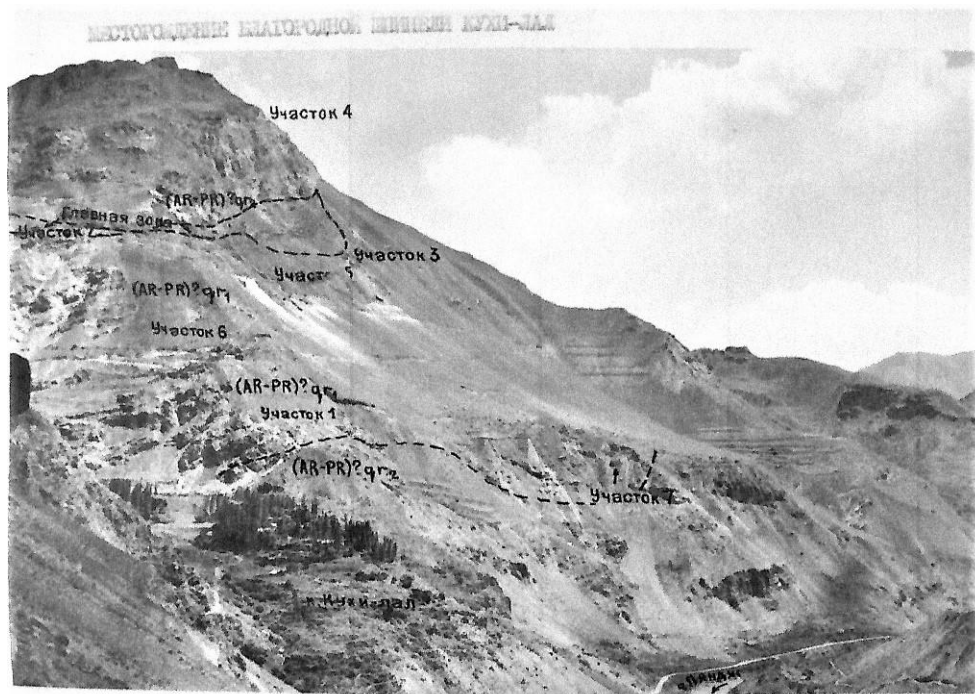


Рис. 1.1.2

Jumping forward to June of 2022, Gary completed another trip to Tajikistan to establish ground work for a trip in May of 2023 to visit the mines, gather samples and complete the drafts of the GIA articles to be published.

In recent years Gary has been able to cut and sell spinel from the Kuh-i-Lal mines while waiting to return to Tajikistan and the spinel mines. Below are some of the spinels currently in The Gem Hunters stock that are for sale. See Photos of Current Inventory below:



Oval Pair  
7.83 carats



Pear Shape  
9.39 ct



Triangle  
3.86 carats



Winn Cut  
11.60 ct



Emerald Cut  
5.79 carats



Explorers club flag #222

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Stuart Overlin  
Managing Editor, *Gems & Gemology*  
Gemological Institute of America (GIA)  
5345 Armada Drive  
Carlsbad, California 92008

February 24, 2022

To Whom It May Concern,

I am writing to you on behalf of *Gems & Gemology*, the professional journal of the Gemological Institute of America. The bearer of this letter, Mr. Gary Bowersox, is a noted author and lecturer on the gemstones of Central Asia. For more than forty years, he has traveled extensively throughout the region to visit important gem sources. He has shared this knowledge internationally through journal articles, books, and films.

Mr. Bowersox has written several major articles for this journal and is traveling to Tajikistan to prepare additional studies of its deposits of ruby and spinel. These will be published in upcoming issues of *Gems & Gemology*.

I respectfully request your cooperation with Mr. Bowersox's travels, which are for scientific purposes and of considerable importance to the gem industry.

Kind regards,

Stuart Overlin  
Managing Editor, *Gems & Gemology*

PLEASE REFER TO IMPORTANT LIMITATIONS AND DISCLAIMERS ON THE BACK OF THIS DOCUMENT

## **THE GEM HUNTER - Part II**



### **CHAPTER 1** **(2004-2005)** **“Stoned in Tajikistan”**

My mission was exploring the “Stans” (Afghanistan, Pakistan, and Tajikistan) for gems and minerals. Later in life I will add Kazakhstan, Kirgizstan and Uzbekistan to my list. I have visited all these countries but have not concentrated on their gem and mineral potential.

It is July 28, 2005 and I have the following missions to complete:

1. Work on training programs for the Afghanistan gem miners.
2. Research the gems and minerals of Afghanistan, Pakistan and Tajikistan for the 2006 Gemological Institute of America scientific symposium.
3. Attempt to obtain rights to film the lapis mines in Tajikistan for as documentary film.
4. Supervise the completion of my lapis desk top in Peshawar.
5. Visit and photograph the lapis, spinel (Kuh-i-lal) and ruby mines of Tajikistan.
6. To hunt for some new and/or exciting gem inventory.
7. To give my eyes a feast of new exciting territory and people to form new friendships.

After months of planning for the expedition, I'm finally packing for my trip. I have alerted my friends in Peshawar that I will be arriving on July 30<sup>th</sup>. I plan to finish packing in two hours and then get seven hours of sleep before my 5AM wakeup call. That was the plan until my Dad, age 93, announced that he just passed over one pint of blood in his urine. Not Good!

I packed my Dad and my 87 year old Mother and their two walkers into my car and drove to the emergency entrance of the Vicksburg, Michigan hospital. After three hours of blood testing and doctor consultations it is determined that my Dad's blood was too thin caused by a recent change in his medications (Coumadin?) He is going to live and my trip is back on!

Back at my parents home I checked my E-mail to find that my friends Khalid and Ilhom were both having problems. Khalid's E-mail said he could not obtain my air ticket to Dushanbe without my passport and Ilhom informed me that he was having difficulty obtaining permission for us to visit the lapis, spinel and ruby mining areas of Badakhshan –Pamir in Tajikistan. What's New! We always have these problems on a regular basis over the last thirty four years. It is just very frustrating when you are on a tight schedule.

It was 2:10AM when I finished packing my clothes, satellite phone, GPS (ground positing system) and my Pepto Bismol, etc.

Finally placing my head on the pillow I reviewed my New Year's 2005 resolutions:

I'll be sixty-five on July 23, 2005 and it is time to plan the next ten years of my life.

Besides studying the gems and minerals of the "stans" I wanted to build a gem museum/store in Waikiki, Honolulu, HI. This would be my retirement program where my gem mining friends could bring their goods to sell eliminating 90% of my travel as I aged.

Very important to me was to nest in Hawaii with a real home and a personal, loving relationship with a wonderful women. This I had discovered was not possible being homeless on the road traveling ten to eleven months per year. One girlfriend said "I was just a homeless man on the road with a trailer and a box of rocks." Not too appealing to most women. I had now traveled over 500,000 miles in the USA to promote my gem shows in every state in the USA except Alasaka. The packing and unpacking was wearing and becoming very boring!

It seemed like I had just fallen to sleep when the alarm went off! I can get by on five hours of sleep per night but two hours is a bit short. By the time I showered my mother had a full breakfast of eggs, sausage, toast, coffee and juice ready for me to consume.

I hugged my worried parents and left for the airport.

In London I switched flights to Gulf Air believing it was safer on an Arab airline for the parts of the world I would be traveling. People involved in the recent bombings in Europe and the very recent London subway bombing had been traced to Pakistan connections.

There were several Pakistani's on my flight to Bahrain. However, the flight from Abu Dhabi to Peshawar appeared to be all Pakistani's except for me. I did not attempt to verify this data!

Instead, I slumped in my seat still wearing my American coat and tie and slept until the plane arrived in Peshawar at 5:30AM on July 30<sup>th</sup>.

Immigration checked my passport and visa, snapped a photo of me with their computer camera, stamped my passport and said "Welcome." With bags in hand I located a cab in the busy airport. The driver wanted 500 rupees to take me to the Green's Hotel. There were many more cabs than passengers so I told the driver that I had been coming to Peshawar since 1982 and the cab fare should be 300 rupees. He agreed with a smile and delivered me to the Green's Hotel. Of course, a local person would only pay 150 rupees for the same trip!

At Green's Shuja met me with a smile saying Sabir had called him about my arrival. The bell boy recognized me and carried my bags to my regular room #101. Once in the room I pushed the



TV button and up came General/President Pervez Musharraf. He was holding an international press conference about terrorism and the recent London bombing. He stated that the Pakistan Government was investigating each and every phone call made by terrorist between London and Pakistan. He further announced a new law to be passed that required all madress students to be registered. Then he went so far as to say "Britain is regarded as a safe haven by extremist because it has failed to crack down on them despite urging of other countries to do so." He totally omitted to mention any plan to capture the Taliban leader, Mullah Omar or Osama bin Laden and Amen al-Zawahire of al Qaeda. This may be good for me as I'm about to go through the tribal areas and prefer that it not be in a war mode.

I turned off the TV and slept three hours until the home secretary's office opened. As I walked into Muhammad Zarrar's, office he looked up and recognized me from visiting him in previous years when I need a permit to enter the tribal areas. I handed him my passport, copies of the front page of my passport and visas for Afghanistan and Pakistan. While we talked about the tribal situation his male secretary prepared my permit for his signature.

I left the Home Secretary's office knowing that the tribal elders are very upset with the Pakistan Government over invasion of their autonomous regions privacy. Of course, they are protecting al-Qaeda and the Taliban personnel.

With permit in hand I traveled by three wheeled rickshaw to Sabir's office in Namak Mandi. Moin Khan Jagdalek was waiting with Sabir to see me. Over lunch of nan bread and potatoes, bean soup and tea we talked about travel plans and the political situation which appears to be barely OK at the moment. This could change any moment as the Taliban is a major influence in Peshawar and NWFP politics.

Before parting Sabir, Moin and I visit the room where Abdullah from Kabul was putting the final polish on my lapis desk top. It had been a year since I had delivered the lapis to Abdullah. The top and sides were rich blue with gold flecks of iron pyrite, mosaic lapis glued to a white 6' X 3.66' X 1" white marble slab. The perfect dimensions "golden rule" according to Martin Ohm (1835). The lapis desk top was wrapped in local newspaper and on saw horses awaiting my unveiling/inspection. As Sabir and Abdullah removed the newspaper wrapping all I could say was WOW!!! It was beautiful and very highly polished. The polish was so good that when I took a digital photo our images were reflecting on the table top. This is exactly what I wanted for my new office in Waikiki. But, we had to find a way to ship it!

Sabir escorted me to a private room where he had stored my personal items including clothing, medical kit, even a bullet proof vest and a binocular scope. I selected the items I would need for my trip including gem and mineral identification books. Leaving behind some 25 kilos of rough lapis scraps from my table top production and some sphene specimens which Sabir had located. Back to research! I visit with Arif Chaudry, Green's Hotel manager, checked my E-mails and met Nancy Steinbeck and John from the American Consulate in Peshawar at the Pearl Intercontinental Hotel to get a further read on the situation. The assessment was that Peshawar was relatively safe at the moment. However, Nancy and John were surprised that I planned to travel to Kabul by road through the tribal areas. They would never be allowed to take such a journey while working for the US Government. As a matter of fact they had trouble receiving permission to travel in parts of Peshawar. Most markets were off limits to them.

Back at the Green's I tried to call home on my satellite phone. The screen message read "Blocked" Whoops! What is this? I went directly to the Internet café across from the Green's. It is upstairs on the alley side and in a half lit room. After 30 minutes of attempting to sign on to my AOL account, I was finally about to send e-mails to friends asking them to inform my

parents that I was doing well and another message to the satellite company about my phone problem. To the satellite company “Help! I’m leaving Peshawar in twenty hours and will be in the country side- NEED PHONE TO WORK IMMEDIATELY”

It was now dark and Arif showed up with peanuts and drinks. We sat in my room #101 and talked. At 1 PM there was a surprise knock on the door – It was Haider Ali Shah from Chitral. The three of us sat and talked about old times until well after mid-night.

The next day I met my long time friend Nancy DuPree for lunch. Nancy as always has a good handle on what the current situation is in Afghanistan. Basically, the Afghan government is in a grid-lock. NGO’s are accomplishing only small task and there is little being done to build an economy. The only bright light was that Nancy was able with assistance to open the Kabul museum after all these years.

After lunch Mohammad Ali and I had a long meeting to set him off on his search for my inventory needs and new gem items. Mohammad has been my number one scrounger for years. We agreed to meet and review his findings as soon as I returned from Afghanistan and Tajikistan.

It is now August 2<sup>nd</sup> and time to hit the road! Moin show his face at hotel door at 7AM.

The first thing out of his mouth was that his uncle had been contacted in Namak Mandi by the ISI (Inter Service Intelligence – the US equivalent of the CIA) asking what I was doing in Peshawar. Did they know who I was OR was this some new agent who witnessed a westerner in Namak Mandi - we will never know! Time to get out of town!

On the edge of Peshawar we stopped at the army barracks to pick up our require soldier. He was armed and ordered to travel with us to the border. I’m not sure if he was to guard us or stop us from anything other than go directly to the border.

The traffic was heavy as we reached the outskirts of Peshawar another car plowed into us from behind and smashed our bumper and back end. This was not the first hit on our taxi so the driver was quit calm and settled something with the other driver. “On the road again!

In the Khyber area, we traveled past the drug lord homes and Moin pointed out the mountain where Osama bin Laden is believed to be living. The American press keeps reporting that he is hiding out. How do you hide over a thousand soldiers with guns that have to eat every day???

That is not discussed in the American or Pakistan newspapers.

We drove thru Torkham known as the smugglers town and on to the border of Afghanistan. I had my passport stamped “departure” on the Pakistan side and “enter” on the Afghan side of the border.

After negotiating for a taxi ride to Kabul we were on the road again. It’s hot! This part of Afghanistan is very hot, dry and flat. We had only gone about ten miles when I looked up to see a volkswagon bus roll over and fly directly at us on its side at about 50 miles per hour. Our driver reacted quickly and drove into the roadside ditch and out the other side. When we exited our car people were crawling out of the volkswagon with bloody faces and wounds. There were more than twenty people riding in the bus some being lifted out with major injuries. They were laid in the road shaking badly. Several other vehicles stop and riders gathered and up righted the bus. One man was pinned underneath with blood running out of his mouth and nose. I saw the driver of the bus run past me and into the open field. He probably did not stop until he cross a border into Pakistan or Tajikistan. His life was not worth much at this point in time.

Nothing we could do, so we continued onto Jalalabad and Sorobi. We stopped at the Sorobi police station to locate Moin’s uncle, Raees, whom was my friend. Raees was not present but the police officer on duty served us lunch of rice, lamb, chicken, nan and Pepsi. in the director’s

office where Commander Sher Mohammad and I had been right after the fight with President Najibullah for control of Kabul. The food tasted GREAT!

In years past, this police post was the feared as the KHAD secret police/intelligent Headquarters. The bullet holes were now patched and the rooms painted an off white. A large photo of Commander Ahmed Shah Massoud's photo now hung on the wall .

One of the policemen, Sabir Saba, sat next to me for a photo. His picture taken at the ruby mines were in my second book – “The Gem Hunter – True Adventures of an American in Afghanistan. Sabir Saba offered to go with us part way to Kabul. His presence would get us passed the road blocks where other cars were being turned backed or stopped for long intervals while road construction vehicles moved around the new road.

Most cars and trucks were forced to take a long very dusty, dirt road to Kabul. This would add five hours to our journey.

Fifteen minutes out of Sorobi, we started seeing road construction with police men making cars turn around and return to Sorobi. We are allowed to continue once the policemen could see who was with us. At least that was until an hour down the road we came to an asphalt spreader that took the whole road. We were told it would be one hour before they completed the road around the mountain and could drive their machine off the road so that we could pass. After one half an hour we realized that the one hour estimate was not accurate. Our new estimate was four to five hours! We left our vehicle with the policemen and driver. Carrying our bags up and over the road equipment while the Chinese road workers stared at us with a puzzled look. Once on the other side we located a vehicle coming in our direction. We convinced the passengers in the vehicle to swap cars with us. As they removed their bags from there taxi we replaced them with ours.

Moin and I were complimenting each other and saying how smart we were to hope over the Chinese equipment with our bags to the other side and convince others to take our cab when our new driver stopped dead in his tracks. Then we could see where the Chinese had just taken a large crane and pulled a two foot thick cement beam across the road to block any more cars from approaching the construction area. Once again not to be stopped we decide to build a bridge up and over the beam. It took us and four other people in cars coming from Kabul to build a bridge of rock up and over the cement beam.

It was now dark and our car lights were very dim as we continued the journey to Kabul. At an intersection outside of Kabul we were stopped by a policeman because of our poorly lite car and coming from an area where the road had been closed. When the policeman asked our new driver for his license, the policeman, Moin and I all learned that our new drive did not possess a driver's license and his vehicle was without registration. The policeman refused to let us continue. We asked to see his supervisor as we pressed upon him that we need to continue on to Kabul. To our surprise the supervisor was behind the tree at the side of the road.

I handed my passport to the supervisor and told him that it was important that I continue on to Kabul as I had official meetings the next day with ministers. He offered Moin and I dinner and cots to sleep on but we pressed him that it was important that we continue. We continued to press that Commander Sher Mohammad was expecting us to be at his home three hours ago. Then I asked him to call Dr. Abdullah the Foreign Minister if he wanted to confirm our story. This shook him loose and he decide that we could continue with our driver and the car.

When we finally reach Sher Mohammad's, he and his family greeted us and said, “We have prepared some food for you two.” Moin replied that he was too tired to eat. To be polite I said “Just a little food would satisfy me” Moin disappeared with his cousin as I sat on the afghan

carpeted floor against the wall. A water jug was carried by Sher Mohammad's son into the room for me to wash my hands. Then another son arrived with chicken, rice and green tea. I eat and climbed the rickety wood ladder made of logs and rope to the upper loft where they had place an old army cot for me.

I was more tired than dirty AND I was REALLY DIRTY from all the dust on the dirt road. However, after taking off my shoes and falling back on the cot, I fell sound asleep until 5:30 AM.

Most of the guys in the house would have said their 4AM prayers and gone back to bed by now. Thus, it was a perfect time to take a shower by pouring water from a pitcher over my head and change clothes before breakfast was to be served. The bathroom was very smelly and the water very cold but it did refresh me and wake me up. I used up the whole bucket of water that had been left in the bathroom to get the dirt off my body.

An hour later, as I was seated in the guest room with Moin, a breakfast of eggs, nan and tea was set before us. Using the nan as a spoon for the liquid yoke I eat my eggs and drank the tea. Moin let me know that he was not feeling very well and Sher Mohommad had told his son, Ashoor, to escort me to Kabul.

My first stop was Ariana Airways to purchase my airline ticket to Dushanbe. There were no other passengers buying tickets so I was in and out of the office in fifteen minutes. The next stop was the Tajikistan Embassy where I had pre arranged via Ilhom in Dushanbe to pick up my visa. The next stop was a visit to Zebullah Hashimi's shop on Chick Street. Upon arrival his son informed us the Zebi was in the hospital. I agreed to return at ten in the morning and go to the hospital with his son to visit with Zebi.

Next was a call to Richard Scarth who was working with USAID. I had attempted for years to start a new program to train Afghan miners. Richard and I had been E-mailing and he thought he may have some funds available for a program. We agreed to meet at the Gandamak Hotel at 3 PM. Then I called Eng. Es'Haq and agreed with him to meet at the Gandamak as well. This appointment was for 4:30PM.

---

### Miner's Training Program

1. Will create employment for ex-military and other tribal people
2. Will provide government taxes on export
3. Will provide government with foreign currency.
4. Will build a relationship between Kabul government employees and tribal peoples.

---

The meeting with Richard left me with hopes of a real program. He was to set up some future meetings with USAID people and I was to sell the Minister of Mines on the project.

It sounded too simple! At least we were off on a plan!

I felt good as Richard departed. Ten minutes later Eng. Es'Haq appeared. After shaking hands and asking about one another's families. Eng. Es'Haq said that General Bismullah was waiting for us at the Afghanistan Army Headquarters. When we arrived at the main gate the guard called Gen. Bismullah who send a drive down to the gate to clear us a lead us to the meeting.

General Bismullah had prepared a table full of Afghan fruits and nuts along with coffee and tea. We sat, drank, ate and talked for one and one half hours about the Afghan situation. The main

complaint was that the US Government and Military were just running things without informing or working with the Afghan commanders. General Bismullah made the following comments:

1. Warlords are being retired and/or their powers are being taken away.
  2. The US Army totally controlled the Afghan Army to the point they cannot make decisions. Like 'Leashed dogs'
  3. Pakistan is an enemy of Afghanistan
  4. Afghanistan is receiving little or no assistance from China, Russia and Iran.
  5. President Karzi and the Americans undermined Commander Ismail Khan the Herat Commander.
  6. The elections will be good for Afghanistan.
  7. New people from outside Afghanistan are arriving and corruption is ramped.
  8. Alcohol is available to military troops including Afghan troops. This is not good!
  9. The Afghan government is attempting to make changes to the life style of the common Afghan too fast. Religious and village people are both complaining.
  10. Village people are complaining that they are not receiving any assistance. It all stays in Kabul.
- 

That night I had an interview dinner with Celina Aizenman, reporter on the staff of the Washington Post. Neither she nor I could understand why the news papers are not printing articles on Pakistan's true anti Afghan position. Pakistan is harboring and supporting al Qaeda and the Taliban. Pakistan wants to keep Afghanistan unstable.

The next morning I visited with Zebi in the hospital and heard all about his hernia operation. He was doing well and we agreed to have dinner when I returned from Tajikistan.

I caught up on E-mail at an Internet Café on Chicken Street before meeting Khalid Sekander for lunch. Khalid is the son of Hamed and Sema Sekander of Dallas. He is an Afghan by decent as well as an American schooled attorney who is in Kabul to assist with writing new laws for Afghanistan.

That night I enjoyed dinner with Lt. Col. David Milo, head of the British Forces in Afghanistan. He stated that in the long run the American and British forces would lose this war as Pakistan, Russia, China and Iran were all against America being in Afghanistan. Later that night Sher Mohammed said he was totally in agreement with this thought.

To make the night worse there was no water in the house. After running around all day I was grubby and would have like to have showered.

The next person I wanted to locate and chat with was Abdul Kafi Rasuli, ex-Deputy director of Mines and Industry. I was still on an old track to locate Dehzad Hashim. The track had gone cold and Abdul was not of much assistance but served a great lunch. Every time I come to Kabul I think of Dehzad. Someday, I will find out what happened to him!

Still without bathing at 4:30 AM the next morning I was on my way to the Kabul airport.

As it turned out it bathing would have been a waste of time as all passengers had to stand in an open dirt field for over an hour before being allowed into the airport. If I had arrived as instructed I would have had to stand one and one half hours in the field.

The airport was under construction and on the front hung a 20' photo of Commander Ahmed Shah Massoud and a written dedication to him posted next to the photo.

Looking around it appears that I'm the only caucasian on the flight to Dushanbe. I guess that rumors on Ariana's maintenance problems are spreading. True to form from as far back to my memories in the 1970's Arianna is late to take off. This time only 1 ½ hours!

I can remember them being one to three days late and if you were not available when they were ready to go – tough luck! They would leave without you!

After fifty-five minutes in the air during which I was served a wonderful breakfast of eggs and mushroom covered chicken, nan and tea we arrived in Dushanbe without any problems.

Compared with American airlines that serve very little food this was a good surprise.

Upon clearing customs I walked outside to look for Ilhom Narziev. I had met Ilhom flying in one of Commander Massoud's helicopters in 1999 when he was on his way to Afghanistan as a Tajik reporter to write articles about Massoud. Ilhom had been a Russian army officer like his father.

However, he preferred newspaper work over military. He now has four sons and works as a free lance journalist. Recently he had guided a group of Chinese businessmen and politicians into Afghanistan. During the trip they were telling the Afghans that China and Chinese people were their friends. China was supporting road building, supplying cheap goods including prayer beads while Americas were in their country to control the country and shoot the local people.

Being born in Turkmenistan of Tajikistan parents and moving with his family during his father's military career, Ilhom had continued to travel, write and serve as a guide. He was now to serve as my guide as we planned to visit to Khorog and the ancient spinel mines at Kuh-i-Lal in Badakhshan. After which we planned to cross the Pamirs to visit ruby mines near the Chinese border in Western Tajikistan.

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## TAJIKISTAN

A Landlocked 143,100 sq.km exotic country with 3,387,000 people situated halfway around the world from the United States

Tajikistan had a known population since the 6<sup>th</sup> century. Archeologists have reported evidence of prehistoric people living in what is now Tajikistan over 200,000 years ago.

Elamites built settlements in 2,000 BC. There existed the Persian Achaimenio Dynasty in 6<sup>th</sup> to the 4<sup>th</sup> century BC and Alexander the Great in 330 BC. In 329 BC Seleucus, Alexander's general ruled after Alexander's departure. In the first century the Kushan Buddhist ruled and were later replaced by the Arab Moslems in the 8<sup>th</sup> Century. The Arabs were replaced by the gold mining Turkic people in the 11<sup>th</sup>-13<sup>th</sup> century. This was followed by Genghis Khan in the 13<sup>th</sup> century. He had invaded in 1220 AD and was followed by Timor in the 14<sup>th</sup> century. He died in 1405.

The Russians took over control in 1866 and just recently give up control.

Tajikistan is composed of 55,250 square miles of which 90% lies 10,000 feet above sea level. Lake Karakul is 141 square meters and two miles about sea level and 780 feet deep. Glaciers in Gordo Badakhshan reach heights of more than 23,000 feet with more than 5.5 million people living in river valleys of which the three major valleys are Fergana, Hisser and Vakhsh.

Dushanbe is the capital and largest city with 604,000 residence. The population is composed of 62% Tajik, 24% Uzbek, 8% Russian, 1.3% Kyrgyz and 1.5% Tartar.

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After clearing immigration and customs I step outside to look for Ilhom. There were only a ten or twelve people beside our passengers and half of them were cab drivers standing around. No Ilhom!

It hit me that I had E-mailed him two days ago and he had not replied. For two hour the night before I had attempted to call him on my satellite phone. Was I in trouble?

Not speaking Tajik and having no back up for Ilhom may have been a mistake. Was this whole trip in jeopardy?

After 30 minutes in the hot sun – Still no Ilhom!

Using sign language and motions I ask a cab drive to call Ilhom. The cab driver dialed the number I pointed out to him on my paper but no one answered. There was a message after three minutes but I could not understand it. I had the cab driver dial again and listen to the message.

Than with motions I got the message – Phone no work!

Now What To Do! Ilhom and I had no backup plan. If I leave the front of the airport how will he ever find me? I had the card from the Tajikistan Hotel in my pocket as I had removed it from my files. However, I had never mentioned to Ilhom that I would stay there.

After another thirty minutes in the hot sun, I looked up and spotted Ilhom across the park walking towards the airport entrance and me. What a relief!

We gave each other a hug as he explained that he called Ariana and they told him the plane would be 2 ½ hours late. Any way we were together now and excited about are forthcoming trip to western Tajikistan. Ilhom had received the blessings of the Foreign ministry and the Ministry of Mines for our trip. The only requirement left was for them to meet me personally to obtain final written permission. This was another delay as it was now Saturday and the government offices were closed until Monday. Of course the Ministry of Mines had requested a formal letter of interdiction be sent to them from the Foreign Ministry requesting a meeting. After that a meeting would be scheduled. Only the Gem Committee could provide us with written permission to visit the mines and the chance to complete my 15 year quest to enter the famous spinel mines at Kuh-i-Lal.

I had wanted to accomplish this since reading about these mines in a 1903 edition of a Sir Marco Polo – The Venetian Concerning The Kingdoms and Marvels of the East book translated by Colonel Sir Henry Yule at the home of Giraud and Carolyn Foster in 1989. The map which I copied was dated 1271. I must do this in my life time.

In 1993, I made my first attempt to reach the spinel mines via Pakistan and Afghanistan.

However, after being turned back at the Chitral Border and then discovering bandits on the road out of Escarza we had to abort our trip detailed in Chapter 13. I spent a year researching and planning the next trip as detailed in Chapter 15 but once again was forced to return because of fighting near the border and the destruction of the bridges between Afghanistan and Tajikistan. However, on my 1994 trip with my new GPS (ground positioning system) and old maps, I was able to spot and photograph the mine from the edge of the Panda River (previously the named the Oxus by the Greeks) from the Afghan side of the border. The mine was situated just as it was placed on the Marco Polo map and fully described by Ole Olufsen (1898-99 expedition) and Capt. John Woods (1841 and 1872 expeditions) who had made expedition to the mine in the 1800's. There was no other information to be found per my search in the western world. The mine had originally been within the borders of Afghanistan but when the British and Russians

agreed on drawing a new border called the Durand Line, Kul-i-Lal was now in Tajikistan. This was because they moved the Afghan/Tajik border from the mountain top to the river. The mine was on the side of the mountain.

It was six years later (2000) before I would have another chance to enter the mines at Kuh-i-Lal. I had been corresponding with some Tajik and Russian geologist who claimed they could get me to the mine. On this trip I was delayed ten days in Tashkent, Uzbekistan obtaining a Tajikistan visa. After another three day delay in Dushanbe obtaining permission for myself and my Tajik sponsors to visit the mines we were on our way to Kuh-i-Lal. However, I only had four days now before I was to meet with Commander Massoud and fly to emerald mines of Afghanistan.

We drove south from Dushanbe along the Afghan border in an old Russian Jeep which broke down several times due mainly to unfiltered gasoline. The shorter direction (375 miles) thru Tajikistan rebels had been attacking government troops and buildings along the route the week of my arrival. With so many guards at posts along our route going over our permission letters and questioning my companions for several minutes each time we only made it half way the first day.

We stayed with a family in the mountains who served us a nice meal with lots of fresh fruit.

Late on the second day, after a roll-e-coaster drive over what Olefsen had referred to as the "Devel's Passes, "we reach Khorog where my escorts had relatives. Olefsen had to hoist horse over the passes with ropes in his time. It was slightly better now. After a morning of meetings and negotiations we were given permission to visit Kuh-i-Lal. It appeared my dream trip would finally come true. I just wanted to enter the mine tunnels and take photos. It was that simple.

Our plan was to leave at 5AM visit the mine and start back to Dushanbe. However, when we reached the base of the mountain and started to climb to the mine we were stopped by the mine manager. He would not let us into the mine without permission from his supervisor and the KGB. We showed him our permission papers and practically pleaded with him to no avail. He was to frighten by his superiors to let us in.

It was 10 PM before we arrived back in Khorog. We were dirty and tired but drove directly to the KGB headquarters. It was closed but a guard told us where the KGB director lived. Thirty minutes later we found his home but the lights were out. We discussed what to do. What do we have to lose – Let's wake him up! He was a bit grumping but friendly. After ten minutes of discussions and showing our papers from Dushanbe he handed my friends a permission paper BUT wrote on the paper that his permission was only good if we obtained the permission of the Badakhshan Interior Minister. He told us where he lived and we were back on the road. At midnight we woke up the Minister only to be shot down. He would not give us permission saying that he would have to go with us and that was not possible as the President of Tajikistan was visiting Khorog the next day and he had to be present. That's it! My time was up! The next morning very disappointed we began our journey back to Dushanbe.

In 2004, I attempted to obtain permission thru another Tajik/Russian geologist but the permission to visit the mines was not granted and Khudai my friend and Afghan guide was not available to travel to Tajikistan via Afghanistan.

It is now August 2005 and I have not given up. Sometimes the impossible just takes a little longer to accomplish.

Ilhom recommended that I stay at the Dushanbe Hotel. The rate is \$25.00 per day and the rooms were as nice as the \$125.00/day Tajikistan Hotel. Sounds Good To Me!

After checking in Ilhom and I walked to an ice cream/coffee shop to talk about our plans. This time I had two four weeks in Tajikistan before my flight back to Afghanistan.

We had just sat down when a man approached me and said, "Are you Mr. Gary?"



“Yes,” I replied.

“I thought so”, he said. “I’m with the Afghan Embassy here in Dushanbe and I recognized you. Daud Panjshiri is now our Ambassador, please come visit us at the Embassy.”

“Thank you for the invitation. I will be happy to visit you” I replied as he departed.

I turned to Ilhom and said, “Daud Panjshiri was the man who had given me a letter of safe passage and asking Commander Malik at Escarza to assist me with a horse to ride over the mountains and into Pakistan when the Taliban were attacking in the year 2000. Massoud and Dr. Abdullah were pinned down on a mountain top for days and could not get to me by helicopter so I took it upon myself to cross over the mountains and into Pakistan.”

Our conversation than turned to “The Great Game”

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### “ The Great Game - Continues”

In my last book “The Gem Hunter – True Adventures of an American in Afghanistan” Russia and Pakistan were the aggressors in Afghanistan with Pakistan being back by the USA. Today, Ilhom and I see the number of countries involved in Afghanistan’s future on the increase. The USA and China are now involved with Iran, Pakistan and Russia playing games. Pakistan has continued to back the Taliban and refusing to disturb the al Qaeda forces in and around the border areas of Afghanistan being financed by Saudi, Egyptian and other Moslem interest.

Ilhom recently escort a group of Chinese politicians and business men into Afghanistan.

China was preparing to support the Afghans with cheap goods including religious items as well as have Chinese laborers build roads. Of course the Chinese propaganda was the same as being spoken by Russia, Iran and Pakistan – The USA is the aggressor and killing Afghans.

After 9/11 USA troops were permitted to have troops and military bases in Uzbekistan, Kirgizstan and Tajikistan. This cost an unknown amount of money. Recently, however, US government employees were caught assisting Uzbek rebels escape capture by Uzbek government forces. More salt was rubbed into the open wound when the US press and State Department condemned the Uzbek government for opening fire on the escaping rebels. Uzbekistan gave the USA 180 days to close down and leave their country. Russia attempted to persuade Kirgizstan and Tajikistan to follow the same policy but they refused as they needed the money and they believed that the US would assist them in preventing al Qaeda personnel from working in their countries.

China was upset at Kirgizstan for allowing the USA to build a base near the Chinese border.

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Sunday was a day of exercise, E-mail and a long walk around Dushanbe with Ilhom.

At 10AM on Monday, Ilhom and I entered the Foreign Ministry building as it opened.

The Foreign Minister was busy but assigned Mr. Suleiman to assist us with approval for our expedition. Mr. Suleiman was the man who helped me in 2000 and again in 2001 when I was in Tajikistan.

Our first problem arose when both Suleiman and Ilhom failed to locate the Gem Committee by calling their telephone numbers.

Ilhom said; “Let’s go to the Journalist Club where we can use the phone books, directories and free E-mail. Ilhom true to his efficient self shortly located the new phone number for the Gem

Committee. They said to see us they must have a letter from the Foreign minister requesting the meeting. Ilhom called Suleiman who said it would be the next day before he could arrange for the signed letter as the foreign minister was out for the day.

Ilhom may be the guide for the trip but he had never been in the mining areas that I wanted to travel or Kuh-i-Lal. Ilhom said that he would visit some bus stations on his way home to determine the best and most economical route and means of transportation for our trip.

By 11 AM the next morning we had our letter from the Foreign Minister and a meeting set with the Minister of Industry for 1:15PM and the Agha Khan Chief of Mission, Hadi Husani for 3PM.

The Agha Khan people operated programs through our Tajikistan and we wanted to question them about travel arrangements and transportation. Hadi was a pleasant young man from Canada whose family was now in Philadelphia. Hadi said that he fully supported our expedition. He phoned and arranged for us to go directly to meet the Minister of Geology.

The minister did not speak or read English but was totally fascinated with my book "Gemstones of Afghanistan" which I had given him as a gift. He signed his name, Akhmedove Aleksander Rahmatullaevich, on a geological magazine and handed it to me. After a half hour discussion about gems of Tajikistan and the route to Kul-i-Lal, he showed me samples of Tajikistan lapis which was spotted with white calcite and very different in appearance from Afghan lapis. After museum with three different padlocks on the door in true soviet fashion. Akhmedove spoke roughly with the guard and supervisor whom the guard had located in the adjoining offices. We were told if we would return at 9AM the next morning all the locks would be removed and the Museum director would be present to give us a tour and answer our questions.

The supervisor spoke some English and told me he had been in Nuristan. When I asked him about being bitten by poison flies in Nuristan, he rolled up his sleeve and we compared scars. I asked him what he did to prevent them from biting. He said "I just drank more vodka." We all laughed!

Departing Ilhom and I visited the market to purchase tea, a garam melon and some cooked chicken. Our plans were finally coming together. At the hotel I sat and reviewed my past attempts to visit the mines.

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### **Sixteen Year Quest**

1989 – Located the ruby mines of Tajikistan on a Marco Polo Map

1993 – Failed to reach Tajikistan as Russian and Afghan thieves control the Afghan border area.

1994 – Reach Shignon, Afghanistan to find the bridge to Tajikistan was destroyed and there was fighting with the Tajikistan rebels against the Russian army and the Tajikistan government.

1999 – Reached Dushanbe, Tajikistan but could not arrange permission to visit the mines

2000- Tajikistan government was fighting rebels making it too dangerous to travel.

2001 – Received permission to visit the mines in Dushanbe but was not able to get permission in Khorog.

2005 – Success, I reached and toured the mines and returned with samples and photos.

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In 1993 I was in a bureaucratic quagmire between Pakistan and Afghanistan officials. Now it's 2005 and I'm again up against the Tajik bureaucracy to obtain visas and permission to visit the lal mines at Kuh-i-Lal. I had made a major effort in 1993 and failed. In 1994 I was able to locate and photograph the mines from the Afghanistan side of the border but found no way to cross the Panda River as there was a war and the bridge at Shignon was destroyed.

In 2001, I made another grand effort to visit the mines at Kuh-i-Lal. This time the Tajik bureaucracy kept me in Tashkent, Uzbekistan extra days waiting for my visa approval for Tajikistan. When I reached Dushanbe, I was delayed again in obtaining a Gorno Badakhshan visa and permission to visit the Lal mines. When I finally reached the mining property at Kuh-i-Lal the guards turned us away by saying we needed approval from the local interior minister and the KGB. We drove back to Khorog and located the KGB chief at 11 AM. He said that he had no problem with our visit but his approval would only come after we obtained permission from the interior minister. We failed to locate the interior minister that night and the next morning. My time was now up as I had to meet the film crew in Peshawar, Pakistan in three days. Disappointed once again I returned to Dushanbe.

In 2004 I made plans to travel with Khudai Akbari to Tajikistan via Ishkashim, Afghanistan. After arriving in Afghanistan Khudai canceled on us so we were without guide and translator.

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Ilhom and I arrived at the museum promptly at 10AM and were met by Anna Gorbatiuk, the head of the Museum. She handed me a book published by the museum which I asked her to sign. She did so with pride and then walked us around the museum answering all our questions. I was particularly interested in the ruby, spinel, clinohumite, lapis and tourmaline specimens. If our trip was successful we would witness these gems being mined. All the gems in the museum were fully documented but of poor quality-nothing worth cutting into gems. This was nothing to write home about but at least we now know where the gems mines of Tajikistan are located.

Ilhom's phone rang while we were in the museum. It was Mr. Makhnadali Z. Gulov, the Deputy Minister of Industry, asking us to return to their office for a discussion at 3PM. During the meeting we were given the Ministry permission but this was watered down by their telling us that we needed approval from the manager of the Kuh-i-Lal mine. The good news was that they would support us and the manager was in Dushanbe but they had yet to locate him. Here we go again! We stressed that our clock was ticking!

On the way back to the hotel Ilhom said that he would bet that we also needed permission once we reached Badakhshan. I had told him about my previous trips and the permissions required. Well two steps forward and one step back!

Low and behold, Ilhom called at 11AM the next morning – full permissions had been granted by all! The Deputy Minister of Industry had even set up a meeting for us in Khorog the next day.

As soon as Ilhom arrive at my hotel we walked to the Foreign Ministry where our passports were handed us with visas for Badakhshan stamped inside. The Deputy Minister of Industry informed us that he had set up a meeting for us in Khorog the next day.

Hurray!

Ilhom and I took a cab from the ministry to the flying coach station to check on a ride to Khorog. Luck was with us as they had Russian version of a VW bus scheduled to leave for Khorog at 2PM. That was enough time for Ilhom to go home, pack and return.

Promptly at 2PM we arrived at that bus station and found them ready to depart. The vehicle had to be push to start the engine and a policeman wanted bakshish from the driver to leave the bus area. Five more times we were stopped by police along the road for bakshish. Each time the driver would stop and get out of the vehicle to negotiate and pay the police. After the third time all twelve passengers would shake their heads and say out loud "More Bakshish!" This broke the ice and all the passenger started talking with each other. The driver was from Khorog, his assistant driver was an ex-Russian Army Officer who was assigned to the Tajikistan/Afghanistan border patrol. The lady next to me was a nurse in her 40's who had worked in Afghanistan with

the Russian army. She was traveling with a lady friend from Murgab. Behind me sat a medical student who had attended medical school at Michigan State for six years. He spoke good English and had visited my home town of Kalamazoo, Michigan. The student and Ilhom were the only two that spoke English.

Another passenger was the son of the Tajik Defense minister. He sat across from me at an angle with his body guard assigned by his father. Directly in front and facing me was a Tajik in his early 20's who was studying aviation engineering in Moscow. Three others were young men from southwestern Tajikistan. Last was a young girl in her late teens who became sick with the first winding mountain passes. The driver had to stop several times to allow her to jump out and throw up.

By 6 PM we all knew each others background and were telling stories and laughing. I teased the ex-Russian soldier about shooting at me while I was in Shignon, Afghanistan across the river from him at Khorog. The lady next to me kept bumping me when the vehicle would hit a new bump or hole in the road. At first she would show an expression with her hands and eyes of being sorry to bump me. Then I said: "You OK!" this she did not understand. Ilhom then translated. Then she said "OK" after each bump.

At 6:30PM we stopped for dinner at a roadside restaurant. Ilhom and I sat at a table by ourselves while a lady from Kirgizstan with a friendly smile served us rice, chicken and orange soda.

After dinner the dirt road became so rough that the driver rarely was driving at speeds over 15 to twenty miles per hour. As we hit more bad bumps the lady next to me switch from saying "OK" to "No OK" It became a joke.

After nine hours the road became very steep with narrow cliffs showing as the headlights hit them. At one point on a very steep grade I recalled again Captain Ole Olefsen writing about the "devils passes" in his 1904 journal – *"the devil's passes one, two and three the passage along steep paths scarcely half a foot broad, along the border of precipices that go sheer down into the foaming river that roars several hundred yards below. Often there is no other path than the foothold that one may get in the small roughness of the steep precipices of gneiss. Here horses, donkeys, and baggage had to be hoisted with ropes from one terrace to another."* (Ref. *Gemstones of Afghanistan p. 79*)

At approximately 1:30 AM two young men in the back of our vehicle were hounding the driver to stop so they could buy some cigarettes. The other passengers were supporting them to stop as we wanted to straighten our cramped legs and go to the bathroom. Finally the driver gave in and stopped in front of some homes in a small village. There was a chaikhana with lights on next to the road.

We all got out of the vehicle. I had a bad urge to water the field several yards back along the road. I walked back down the road in the pitch black night and stepped off the road into the field. It was difficult to see as the quarter moon was slipping behind the mountains. I relieved my kidneys and walked back towards the light of the chaikhana.

When I was ten yards from our vehicle I started seeing shadows of people moving rapidly and making loud noises. Five yards closer I could not believe my eyes. A man with his back to me had one of our young men pinned against our vehicle with his hands around his throat and his fingers digging into his Adam's apple. Just as I looked closer the ex-Russian Officer grabbed the man's arm and pulled hard. As the man let go of his pray another man grabbed the Russian's arm and pulled him backwards and away. The Russian push the second man hard enough that he flew to the ground. He jumped up and with his fist slugged the Russian in the eye. This obviously was no game!

In the dark I could not tell who was who or friend from foe. I glanced around for Ilhom but did not see him.

When the man with the throat hold was forced to let go of the Youngman he had jumped into our vehicle. Now the strangler was loose from the Russian. He leaped into the vehicle after the young man. As he leaped he hit the young girl who squealed loudly.

He proceeded to grab the Youngman's foot and started backing out of the vehicle. At this point two other passengers started kicking the intruder. I was only five feet away from the intruder when a rock crash landed six inches from my right foot. As a result of the force from the large rock, small rocks and sand from the roadway splashed my leg. A second later a second large rock hit our vehicles rear window near me and broke the window. Time for action!

I quickly stepped backward several steps and off the road just as our vehicle leaped forward and took off down the road. Many people chased after the vehicle and I saw the Russian Officer jump into the vehicle as it passed him. Now what do I do!

Only a few seconds had passed when I spotted Ilhom hanging on to one man's wrist and he was talking under the light of the Chaikhana. Friend or Foe? Ilhom spotted me at the same time and yelled "Gary follow the vehicle down the road, I'll be with you in a few minutes." I had only taken twenty steps up the road when I felt a soft hand gently reach for my arm. A soft trembling voice said, "No OK" I recognized the voice as the lady who had been setting next to me in the vehicle. We continued down the road with our arms interlocked like we were about to enter a formal dinner party. The moon had completely moved behind the mountain and we could not even see our hands. My feet and the road were pitch black. My lady friend slipped several times on the rocky road way. Several times I stepped off the road into high grass as the road twisted and turned.

After what seemed like a quarter of a mile I heard Ilhom's voice somewhere back in the dark. We stopped walking and waited for Ilhom. As he approached us I heard "Gary?" I replied "Over Here" in a low voice above a whisper. Now we were three walking in the dark.

After another quarter mile we could see lighted buildings in the distance. As we approached we spotted our vehicle. Next to the vehicle was the bad, mad man with two other men running towards the Russian officer. Six other people came out of the building with lights and ran to the Russian's side. We heard a loud shooting match.

The three of us to walk a half circle around the whole group when we spotted a man in uniform surrounded by eight other men running towards us. As they neared our position they turned and ran towards the arguing group. The whole conflict group then moved thirty yards back down the road from whence we had just walked.

Ilhom said to the lady and me "You two stay here" He walked off to meet with the group.

I said to the lady on my arm "Chai" as I could now see that the Chaikhana was open.

She replied, "OK"

Tea and cookies were served and eaten by the time Ilhom reached our table at the chaikhana.

"What happened," I said

"The man ran away," Ilhom replied.

"What is the whole story," I asked.

Ilhom replied, "I do not know exactly what happened but it seems as though one of our young men passengers said something to the bad man when he was buying cigarettes that really ticked him off. He then took off after the young man calling for his sons to attack us as he ran after the young man and our vehicle. When the police living near this chaikhana arrived he ran off. The

police asked the Russian if he wanted to stay and press charges but he told the police that he preferred to just continue our journey.”

“Sit down and have some tea” I told Ilhom

I asked the Chaikhana owner to take our photo with my digital camera but the screen read “no battery” Darn! It would be a night to remember. My extra batteries were all packed deep in my bag which was now underneath a pile of luggage in the vehicle.

By the time Ilhom finished his tea the driver was calling for us all to return to the vehicle, On the road again! It was now 3AM. Most everyone was trying to sleep as they wobbled in their seats. I stayed awake and watched out the front window from the second row of seats. I was ready to yell at the driver if he started to fall asleep. He had to be tired but seemed to know every turn in the road.

At 5AM looking to the right the driver and I spotted a light in the river below the road. It was a jeep off the road and in the river. The jeep driver probably had fallen asleep and was now stuck in the sandy river bottom and up to the top of his tires in water. We all climbed out of the vehicle and assisted the driver of the jeep to push his vehicle back on the road.

The driver did not stop again until 7:30AM. The sun was rising. This time the driver parked our vehicle and reached for a towel which he put over his head as he slumped over the steering wheel to sleep.

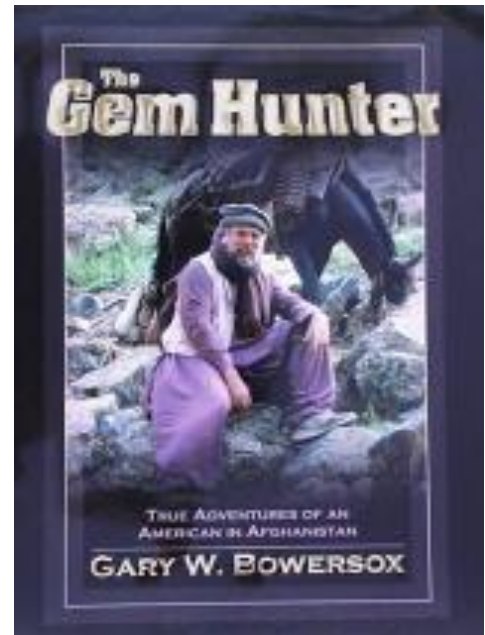
By this time the road was a mixture of dirt and old asphalt with lots of pot holes. At least it was a sign that we were back in a civilized area. I exited the vehicle with the other passengers and walked straight for the chaikhana with its open air lanai. I laid down on the woven grass mat. It felt so good to stretch out on my back. Even though my knees ached from the cramped distance between the seats I fell asleep for some twenty minutes before I heard Ilhom saying “Chai with bread and honey!” I took my camera out of my pack and videoed our tired group of passengers. After breakfast we were on the road again to complete our 375 mile journey from Dushanbe to Khorog. It was 2:30 PM when we finally arrived and everyone one shook hands good bye. It was sad knowing that we would most likely never see these new friends again in this life time. That was a long 24 ½ journey! Now let’s hope we get into the mine at Kuh-i-Lal!

## Book –The Gem Hunter

Hardcover

"**Gem Hunter - True Adventures in Afghanistan**" book is a hardcover book with 504 pages with 253 photos, maps and figures to help illustrate his tale. It also includes map coordinates of all known gems and minerals in Afghanistan plus an extensive glossary of terms and people ... all carefully indexed!

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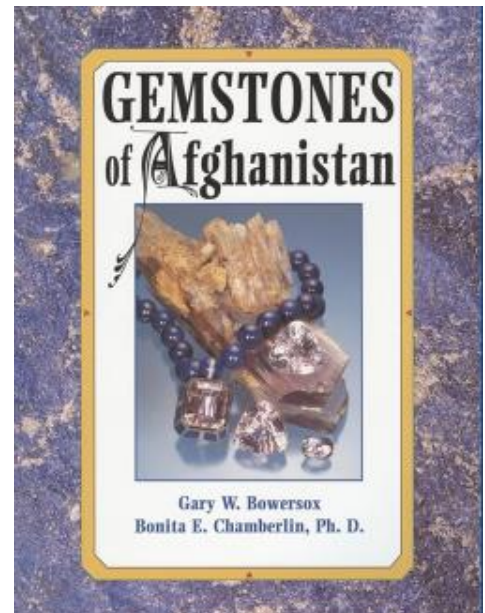
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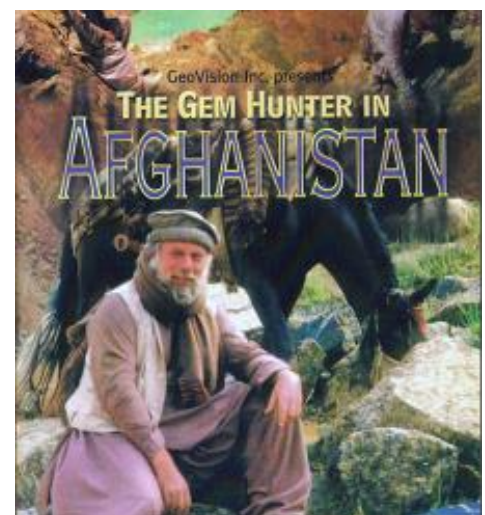
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