Emeralds from Asia

Pakistan, Afghanistan and India – Historically Significant Deposits?

Dietmar Schwarz and Gaston Giuliani on countries with a green future

Though contributing only a few percent of today's world emerald output, Asia once played a role as a major producer of emeralds, and the continent's future is promising as deposits from localities such as Afghanistan are rediscovered and developed. Asia's green potential never fades far into the recesses of the collector's mind, as fine and interesting specimens are repeatedly brought to the market.

PAKISTAN – Known in Antiquity?

Pakistan has several emerald districts: the Swat Valley in the Northwestern Frontier Province; the Malakand and Mohmand areas (Pranghar, Gandao, Tsapari, Zankhae, Tora Tigga, Bucha, Khanori); Bajaur Agency (Amankot, Barang-Turghao, Maimola) and the Khaltaro area in the Gilgit district.

Pakistan's most important emerald region is by far the Swat Valley. Situated 200 kilometers northeast of Peshawar, Swat is home to a number of localities: Mingora, Charbagh, Alpurai, Makhad, Malam, Gujarkili, Bazarkot and Bar Kotkai. The largest mines are scattered around the northeastern edge of the town of Mingora (Islamia, Farooq, Correls Trench, Mine 2 and Mine 3). Gujarkili is the second most important mining district in the Swat Valley.

Swat emerald deposits are generally cited as having been discovered in 1958; however, scientists in Nancy (France), researching the source of antique jewelry, have found that an emerald set in a Gallic-Roman earring exhibits an oxygen isotopic composition known only for emeralds from Swat Valley. To many, this discovery proves that Swat Valley emeralds have been mined since antiquity (Giuliani et al, 2000).

Though ancient area mining activities are undocumented, we can assume that these emerald deposits have been known and exploited for generations. At time of Alexander the Great (about 300 BC), Pakistan and Afghanistan, including the Kabul, Swat and Peshawar Valleys, were part of the wealthy kingdom of Gandhara. Extensive trade routes such as the Silk Road traversed these valleys. With the road from Pakistan to Afghanistan running alongside the Swat River and the Mingora outcropping in plain view from the road, it is likely that these deposits had been exploited for years.

The Mingora District

The Islamia Mine in Mingora was the first mining area to be developed after the modern discovery of the deposits of the Swat Valley. Little is known about the early mining phases, though government documents indicate that claims were granted to individuals in Karachi and Peshawar and were renewed in three-year terms until 1969. Though no official production figures were released for that time period, emerald mining was obviously promising, and the mines were put under control of the government run *Pakistan Industrial Development Corporation.* This corporation was responsible for mining activity until 1972, when the *Sarhad Development Authority* took over, passing control in 1979 to the new government agency, *Gemstone Corporation of Pakistan* (GCP). The GCP developed several regions, discovering new emerald deposits in Malakand and Mohmand as well as the Gujarkili deposit in Swat Valley. In the 1980's, the largest share of Pakistani emerald production came from the Mingora Mine.

The GCP was responsible for emerald exploration, mining, processing and sales, and quickly learned that managing an emerald mine is not an easy task, and the corporation folded in 1994. A new mining license has since been granted to a private company, but at the moment, the Mingora Mine is officially closed as legal issues are resolved.

In the beginning of the 1990's, the Khazana deposit in the Shamozai district was discovered, but it has not been mined on a large scale.

The Gujarkili Deposit

Discovered in 1981 by GCP geologists, the Gujarkili deposit is 24 kilometers east-northeast

of Mingora in the valley of a tributary of the Swat River. According to official estimates, 12,000 carats, a sizable quantity, of gem-quality emeralds were produced between 1982 and 1987.

In the beginning of October 1997, mining rights were granted by the *Directorate of Industries, Commerce and Mineral Development of Frontier Province* to the privately run *Balous Gem Mining, Inc.* The company immediately began mining, and when the authors visited the site in the middle of 2000, a staff of fifty people, including geologists and mining engineers were working a 20-hectare area. Today, shafts and tunnels are bored into the mountainside with a systematic underground operation replacing the strip mining. Though the company does not release production figures, the deposit is obviously economically interesting. The mine's entire production is sold on the American market. Gujarkili emeralds are generally dark green and are between 1 and 10 carats, though good quality crystals up to 200 carats have been reported.

Occasionally, transparent and well-developed emerald crystals occur in cavities. The talc-rich, sheared, crumbly host rock is relatively soft, and undamaged crystals can be mined easily.

Gandao: "Vanadium Beryl"

The Gandao deposit, 40 kilometers northwest of Peshawar, is notable for emeralds that occur in the quartz veins of their dolomite host rock. Gandao emeralds are colored far more by vanadium than chromium: roughly 0.5 wt. percent V_2O_3 as compared to 0.1 wt. percent Cr_2O_3. They are also known as *green vanadium beryl*. Specimens of these aesthetically challenging beryl crystals are rarities on the collector's market.

Khaltaro: *Emerald Pegmatites*

The Khaltaro district in the Haramosh area of Northern Pakistan is 300 kilometers from the Swat deposits. The emeralds were discovered during the GCP's 1985 exploration of the region. The deposit is located 70 kilometers east-northeast of Gilgit, near the town of Sassi (about 16 kilometers north of Sassi), at 4,200 meters above sea level. Khaltaro is the only documented Pakistani emerald deposit in which emeralds formed in hydrothermal veins and hydrothermally altered pegmatites contained in amphibolites.

Mingora, Pakistan

A view of the open pit at the Mingora Mine, one of the many localities in Pakistan. 1992 photo taken by Dietmar Schwarz.

Pakistani pegmatites have gained worldwide recognition for their well-crystallized aquamarine, tourmaline, topaz and garnet. Khaltaro emeralds, which can be up to 3 cm in diameter, are described as well-developed, pale to medium-green crystals.

Afghanistan: Panjshir Valley

The Panjshir Valley is at the foothills of the high mountain system Hindu Kush, 130 kilometers north of Kabul. Russian geologists reportedly found the emerald deposit during a systematic mapping campaign in the early 1970's; however, analyses done on historic emeralds indicate that some of the *old mine emeralds* in Indian jewelry (page 62) are in fact Afghan. It is not known when the Panjshir deposits were first mined, but there are indications that mining began no later then the 18th century (Giuliani et al, 2000).

In 2000, there are several mining areas spread over a 400 km^2 area on the eastern bank of the Panjshir River. The most important of these areas are Khenj, Buzmal (Dasht-e-Rewat) and Mikeni. In this region, a *mine* is generally dozens of shafts and tunnels dispersed throughout mountainous terrain. Notable quantities of cuttable emeralds were mined during the last three decades of the 21st century.

Panjshir, Afghanistan

A 4.3 cm emerald crystal in a calcite-lined cavity fractured by tectonic movement and partly rehealed. Collection Wolfram Schäfer, photo Maximiliam Glas

The emerald occurrences are located along the Herat-Panjshir fault in shear zones cutting Paleozoic metasediments, mainly muscovite schists, and a series of diorite-gabbros, quartz porphyry intrusions. Emeralds are found in quartz-ankerite-pyrite veins. Hydrothermal alteration induced albitization and pyritization of the surrounding country rock. Halite-bearing fluid inclusions in emeralds indicate the high salinity and evaporative origin of the parent fluids. The source of the beryllium is unknown. The chromium and vanadium likely came from the metasediments.

The mining history of the Afghan emerald deposits is as dynamic as their geologic evolution, with production determined, not by geology, but by politics. The 1989 withdrawal of the Russian forces was followed by a twenty-year civil war as the Northern Alliance, under Ahmed Shah Massoud (the *Lion of Panjshir*), defied the Taliban's *holy warriors*. At the end of the 1990's, the Panjshir Valley was the retreat of Massoud and his mujaheddin. It is well known that after 1984 the emerald trade helped to finance the Northern Alliance's fight for freedom. California gem dealer Wali Beekzad (*Five Lions Gems*), whose family resides in the Khenj area, reports that mining activities slowed somewhat during the 2001/02 allied bombing, but have normalized in recent months. It is amazing that, in a place as volatile as Panjshir, emerald mining has never completely stopped.

In 1990 the region's production climaxed as 2,000 emerald miners worked at altitudes of up to 4,500 meters generating 10 million US dollars in emerald rough. During the ensuing years, the number of miners declined to a 1995/96 low of 500 to 800 men. In 1997, mining activities were again on the rise.

Emeralds from Panjshir vary in color and quality, the best being comparable with Colombia's highest-quality emeralds. The largest reported cut stone weighs about 15 carats. One remarkable 8.79 carat stone, reportedly cut from a 36 carat, rough emerald, sold in 1987 for $165,000. The Panjshir rough generally weighs between 4 and 5 carats, but crystals weighing more than 50 carats are not uncommon.

Afghanistan's official contribution to the world emerald market is modest. Many of the better quality crystals, sometimes up to 200 carats, find their way into the hands of dealers and collectors through unofficial, underground channels. These specimens are most frequently traded on the Asian market, especially in Hong Kong.

Locals control the emerald trade in Afghanistan. Stones are valued at weekly meetings and are then taxed and sold at auction. Buyers take them to Kabul, to Peshawar or directly to the cutting centers of southeastern Asia and Europe. During the civil war, new trade routes developed, such as the one via Tadjikistan.

The Russian geologists' detailed investigations indicate high potential for emerald production in the Panjshir Valley, though specific data is unavailable. The uncovering of Afghanistan's emerald treasure seems to depend most of all on the course of contemporary history.

India: the "Old Mine" Riddle

In India, as well as in many other ancient civilizations, emerald was a highly regarded gemstone. Though emeralds are mentioned in ancient texts, there are no known references to emerald localities in India. The first Indian find was recorded in 1943 in Rajasthan. The historic

aspects of importing emeralds from different regions are, however, quite interesting.

Old writings refer to a country "at the edge of the desert, close to the coast" pointing, possibly, to the old Egyptian mines. It is a reasonable assumption that while rubies and sapphires from Ceylon and India were finding their way to Egypt along ancient trade routes, emeralds traveled in the opposite direction. The term *old mine* is still used today in the gemstone trade and refers to emeralds of exceptional color, size and purity.

Though Indian dealers had distributed emeralds throughout the world since the 16th century, most of the stones were not cut until the 17th and 18th centuries. The origin of these gemstones was not known for generations, though it was said that the stones came from long-forgotten mines "somewhere in southeast Asia."

The Egyptian mines are the only specifically known early emerald producers. Stones mined 3,000 years ago were traded in Asia for lapis. Until the 16th century, Egypt and Austria were the only certain sources of emeralds, though recent investigations point to the Pakistani deposits as potential ancient emerald producers.

The emerald-age began in Europe with the exploitation of the Colombian deposits. The primary consumer of the Colombian production, which outshined all previous finds, is thought to be India. This assertion is strengthened by examples such as the treasure of the Nizam of Hyderabad. The Nancy scientists examined four old mine emeralds in his treasure and discovered that three were from Colombian mines! From this and similar studies, one can assume that, because of their quality, most old mine emeralds are from Colombia. At first, they made their way to India via Europe, and later along newly developed trade routes through Asia. Reaching India via Spain's colony in the Philippines, these emeralds indeed came from "somewhere in southeast Asia," but not from a mine, from a Philippine harbor.

The fourth of the Nizam of Hyderabad's emeralds shares characteristics with Panjshir emeralds suggesting that small quantities of the emeralds in the Indian emperors' treasures came from present day Pakistan and Afghanistan and further supporting the theory that the *Bactrian* emeralds from the time of Alexander the Great (330 B.C.) could have come from Pakistan and Afghanistan.

Rajhastan and Tamil Nadu

The 1940's and 50's brought a series of finds following the discovery of deposits in the Arawalli Mountains. These deposits are aligned in a 200 kilometer belt, trending north-northeast to south-southwest in the states of Rajhastan (Mewar) and Ajmer-Merwara. In the mid-1990's, emeralds were also found in southern India near the villages of Idappadi and Konganapuram in the district of Salem, 340 kilometers southeast of Madras in the state of Tamil Nadu.

Emerald is mainly found in two districts: Ajmer-Merwara, encompassing Bubani-Muhami and Rajgarh-Chat-Bihur and Mawar, including Kaliguman, Tekhi and Gum Gurha. Indian emeralds tend to be low quality, though some small stones that exhibit excellent color and purity. The best emeralds are from Rajgarh.

Today Indian production is sporadic. Gems are cut only in India, mainly in the area of Jaipur, along with large quantities of imported emeralds from other countries.

Emeralds for Freedom

In early 2001, Dudley Blauwet of Mountain Minerals brought home this 1.1 cm high emerald specimen from Korgun in the Laghman Province of Afghanistan. The emerald districts of Afghanistan had been under the control of the Northern Alliance for more than 20 years. Photo Jeff Scovil

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