THE RUBIES OF BURMA: A REVIEW OF THE MOGOK STONE TRACT

By Peter C. Keller

For centuries, the Mogok Stone Tract of Burma has provided the world with its finest rubies. The mining district is situated about 700 km north of the capital city of Rangoon, with the rubies found principally in alluvial deposits weathering out of a crystalline limestone or marble. This article reviews the history of this famous locality, the geology of the area, and the mining methods that have predominated. Also covered is the gemology of these stones, including those inclusions that are characteristic of Burmese origin, and a discussion of famous rubies from Mogok.

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It is impossible to consider the "classic" or historically most important gem deposits of the world without including the Mogok Stone Tract in Upper Burma. Mogok has been associated with the world's finest rubies for over four centuries, but not until the British assumed control of Burma in 1886 was Mogok's potential for producing beautiful, deep crimson ("pigeon's blood") rubies truly realized (figure 1). Although Mogok is known particularly for these fine rubies, quantities of fine sapphires, spinels, and peridot are also found in the Mogok Stone Tract. Sapphires are most abundant in the nearby Kathe, Kyatpyin, and Gwebin deposits; peridot is limited to the area of Bernardmyo some 10 km NNW of the village of Mogok. Also found in gem quality in the Mogok area are apatite, scapolite, moonstone, zircon, garnet, iolite, and amethyst.

Historical records indicate that the Mogok Stone Tract has been worked since at least 1597 A.D., when the King of Burma secured the mines from the local Shan (Mongoloid) ruler. After the British annexation of Upper Burma in 1886, the mines were leased to a British firm, which organized Burma Ruby Mines, Ltd. Although the British firm used modern methods to work the mines, it found that their profitability was sporadic at best. Burma Ruby Mines worked the area until the early 1930s, when Mogok reverted back to native mining and the methods used for hundreds of years before the arrival of the British.

Today, little information comes out of Burma regarding the Mogok Stone Tract. Since 1962, when the communist regime took power and subsequently nationalized all industry including gem mining, no foreigner has been allowed to visit Mogok. During this period, supplies of rubies from Burma have diminished drastically. Although some stones are sold at annual auctions in Rangoon, the few quality stones that emerge are smuggled out through Thailand.

The purpose of this article is to describe what is known of this "premier" ruby deposit. Because it is impossible for foreigners to visit Mogok, the research for this article consists of a thorough review of the literature as well as interviews with people who had visited Mogok prior to 1962. The photos, which come from some of these same gem dealers, are particularly rare. The literature is rich in information on Mogok, usually based on a visit to the area by some Western gem dealer. The first such report was that of Pierre d'Amato (1833), who described the local mining methods in the Mogok area. Since then many articles have been written, principally on the mining activities (Wynne, 1897; Morgan, 1904; Gordon, 1888; Scott, 1936). However, since the 1965 article by Gübelin, who also produced a superb two-hour documentary film on the area, nothing of importance has been contributed to the modern literature.

LOCATION AND ACCESS

The Mogok Stone Tract is located in the Kathe district of Upper Burma between latitudes 22° 50′45″ N to 23° 5′15″ N and longitudes 96° 19′ E to 96° 35′ E, or approximately 700 km north of the Burmese capital of Rangoon. Mogok (figure 2) is about 150 km NE of Mandalay, and is located at an elevation of about 1,200 m (4,000 feet). It is the major population center in the area, with 6,000 inhabitants reported in 1960 (Meen, 1962). The tract is about 1,040 square kilometers in extent and includes the townships of Thabeikkyin and Mogok.

The general area of the tract is very mountainous, forming the western borders of the Shan Plateau. Most of the mining takes place in the alluvia of floors and flanks of the Mogok, Kyatpyin, Kathe, and Luda valleys. Mogok Valley is the most important, consisting of a narrow alluvial plain, 5 km long running NE-SW, and about 1 km wide.

All reports of travel to Mogok, when it was permitted, indicate that access to the mining area was very difficult. According to Ehrmann (1957), there were two principal travel alternatives. The first started with three days by train from Rangoon to Mandalay, followed by two days of boat travel up the Irrawaddy River to Thabeikkyin, where one could hire a car for the final 95 tortuous kilometers. The second, and far easier, means was a four- to six-hour flight from Rangoon to Momeik via Union of Burma Airways, and then about 40 km by jeep from Momeik to Mogok.

Because the current Burmese government limits foreign visitors to a 24-hour visa, any travel into the interior is virtually impossible. In addition, the Mogok area is under military control and visits by foreigners are forbidden (Nordland, 1982).

HISTORY AND PRODUCTION

According to Webster (1975), the earliest historical record of Mogok shows that the mines were taken over by the King of Burma in 1597 from the local ruling Shan, in exchange for the town of Mong Mit (Momeik) some 40 km away. The descendants of the king worked the mines intermittently. In 1780, King Bodawgyi operated the mines using slave labor. Shortly thereafter, the king placed control of the Mogok mines in the hands of governors (So's) who allowed mining on payment of a tax. Valuable stones remained the property of the king, however, with no compensation to the miner. This period was one of great oppression, and many miners left the region. The area never really recovered, and by the 1870s conditions were so intolerable that King Thebaw began negotiating with outside companies to work the deposits. He eventually leased mining rights to the Burmah (sic) And Bombay Trading Company, but arbitrarily canceled their lease on the ruby mines in 1882 (*Mineral Resources*, 1886). This action, along with certain provocations to the British-controlled lumber industry, led the British to invade Upper Burma in 1886 with an army of 30,000 men (*Mineral Resources*, 1886). The British annexed Upper Burma to the colony of India that same year. In October 1887, the Upper Burma Ruby Regulations were promulgated, creating the so-called "stone tracts." In November of that year, the Mogok Stone Tract was established (Chhibber, 1934a and b). In 1889, the British government, through the Secretary of State for India, awarded control of the Mogok mines to Edwin Streeter, the eminent Bond Street (London) jeweler, who organized Burma Ruby Mines, Ltd. The initial 1889 lease of the mining rights to the 10 × 20 mile (15 × 30 km) tract was for a seven-year period at an annual rent of £26,666 plus 16.66% of the net profits (Adams, 1926).

When Burma Ruby Mines, Ltd., moved into Mogok they faced severe difficulties, not the least of which was that they found the richest deposits to be under the village of Mogok itself. Before mining could begin, they had to move the entire village to its present location. In the years that followed, they also had to build roads, bridges, buildings, five

Figure 1. The eight unusually large rubies in this exquisite necklace well illustrate the "pigeon's blood" color so distinctive of fine Burmese stones. The rubies total 66.51 ct, and are surrounded by 96.99 ct of diamonds. Photo by Herbert Giles; courtesy of Harry Winston, Inc. (Editor's note added post-printing: We regret that given the limitations of the four-color process we could not accurately capture the deep color of the original stones.)

washing mills, and a 400-kw hydroelectric plant. In addition, the company was plagued by the age-old problem of miners "highgrading" and smuggling a large percentage of the gem production (Brown, 1933). The Indian government protected the local miners, stating that Burma Ruby Mines could not disturb established native miners in their work, nor remove them except by purchase of their claims. Otherwise, the British company held a monopoly on the mining rights of the Mogok Stone Tract (Adams, 1926; Calhoun, 1929).

In 1896, the original seven-year lease was renewed and extended for 14 years with a fixed rental fee of £13,333 plus 30% of the net profit per year. The mining of rubies in Mogok was at an all-time high. Five large washing mills processed thousands of tons of earth each day. The area eventually became so prosperous that more mills were erected 12 km from Mogok, near Kyatpyin. All mining was open pit, using large hydraulic monitors, or "cannons," under high pressure to wash the gem gravels through a series of sluice-boxes (Webster, 1975).

The area prospered under the control of Burma Ruby Mines until 1908, when large numbers of synthetic rubies entered the world gem market. This caused immediate panic among ruby buyers worldwide, and sales of rubies declined dramatically. Although the Mogok operations continued all through World War I, in 1925 Burma Ruby Mines went into voluntary liquidation (Brown, 1933). The company had six years remaining on its lease, however, and struggled on until 1931, when it surrendered the lease to the government (Halford-Watkins, 1932).

Keely (1982), one of the managers of the mine, gives some additional insight into the decline of modern mining in the Mogok area. He points out that exceptionally heavy rainfall in 1929 caused severe flooding, which destroyed all of the electric pumps as well as the drainage tunnels used to keep the mines from being inundated. The large lake formed by the flooding still remains today (again, see figure 2). Several attempts were made to repair the flood damage, but with no success. Furthermore, as the modern techniques were no longer considered economic, the native miners and their centuries-old mining methods took over Mogok once again. All lease restrictions with respect to applications for licenses were removed, and the government simply collected 10 rupees per month from each miner to cover the cost of a license that the miner "was to wear on the seat of his pants" (Halford-Watkins, 1932). Native mining continued actively except during the period May 1942 to March 1945, when the Japanese occupied Burma and the Mogok tract became part of the battleground of the 14th U.S. Army and the Japanese. After World War II, native mining prospered until the nationalization of the mines by the communist regime in 1963.

When the Burmese government nationalized all industries in 1963, it forbade all private businesses, including gem mining and selling. Today, the diminished gem mining is monitored by the army, and gems can be sold legally only at the annual auction held in Rangoon by the Petrol and Mineral Development Corporation (PMDC). These auctions have not been highly successful because of the generally poor quality of the stones offered. The total sales figures from the annual gem emporium, as published by the *Minerals Yearbook*, gives some idea of modern production. In 1969, the Fifth Annual Gem Emporium yielded $2,400,000. This figure rose dramatically in 1973 to $5,800,000, the last year for which statistics are available, but it is important to note that this sum represents mostly income from sales of jade and pearls, with very few rubies having been offered.

Early production records are difficult to find and are generally incomplete. According to Iyer (1953), in a table of production statistics for the Burma Ruby Mines, Ltd., 1,300,000 ct of ruby were recovered during the period 1924–1939. As usual with gem production statistics, it is impossible to know how much additional material was recovered by highgraders and operators of private claims.

According to Nordland (1982), the Mogok area is off-limits to foreigners, and closed even to Burmese without special permission. A division of Burmese troops now oversees the government-owned mines.

GEOLOGY

Several detailed accounts of the geology of the Mogok Stone Tract have been published. The earliest is the large and comprehensive work of Brown and Judd (1896), who conducted their study on behalf of the Burma Ruby Mines, Ltd., and the Secretary of State for India. La Touche, perhaps best known for his work on the Kashmir sapphire mines, included the Mogok area in his *Memoir of the Northern Shan States* (La Touche, 1913). Other

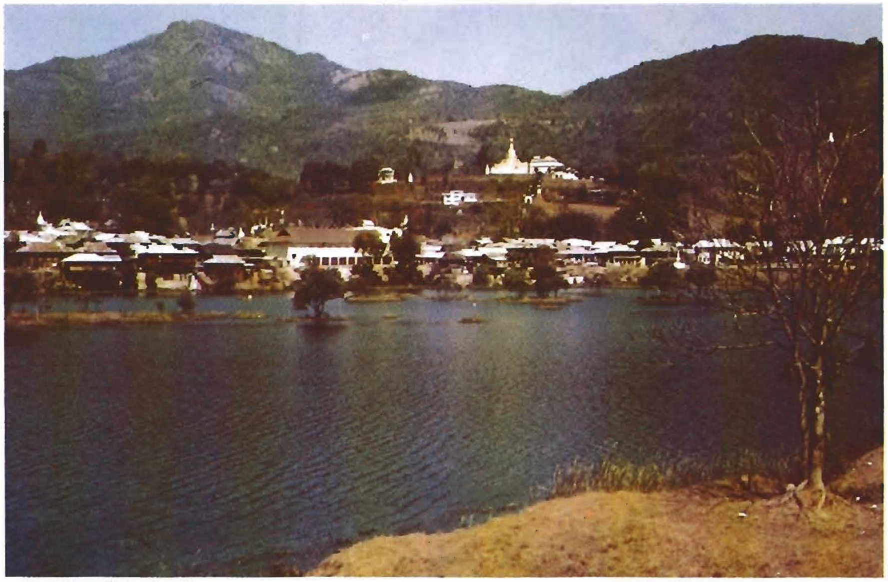


Figure 2. A view of the town of Mogok from across the artificial lake that resulted from the flooding of the extensive works of the Burma Ruby Mines, Ltd.

early geologic studies include Bleeck (1908), Fermor (1930, 1931, 1932, 1934, and 1935), and Heron (1936 and 1937). Chhibber (1934a) includes a description of the gem gravels in his work on the geology of Burma.

Systematic mapping of the Mogok Stone Tract on a scale of 4 inches = 1 mile was started in 1929 and published by Brown (1933). Much more extensive mapping, however, was continued by Iyer (1953). This work is by far the most complete on the Mogok area, and resulted in a superb map of the deposit (as adopted for figure 3).

As is the case with all tropical areas, the geologic mapping of Mogok was particularly difficult. Not only must the geologist contend with dense vegetation and numerous wild animals, but he must also study rocks that are covered with a thick mantle of soil and products of deep chemical weathering. In the Mogok area, annual rainfall is more than 360 cm (140 in.).

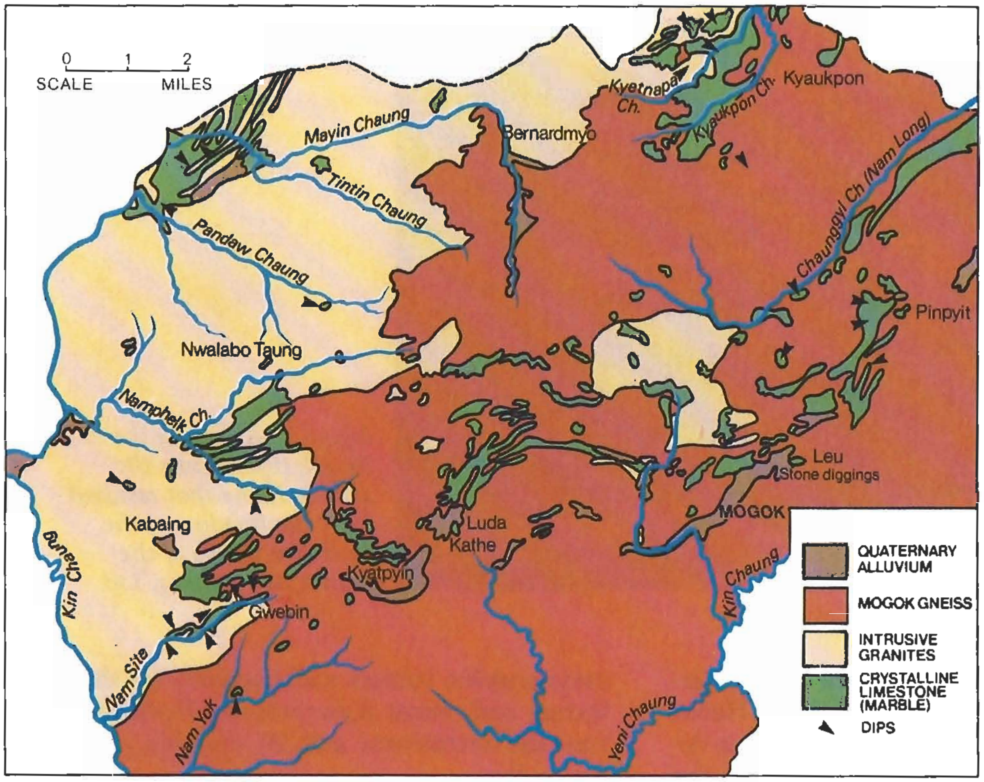
We do know that the geology of the Mogok area is very complex, consisting primarily of high-grade metamorphic schists and gneisses; granite intrusives, including gem-bearing pegmatites; peridot-bearing ultramafic rocks; and, most importantly, ruby- and spinel-bearing metamorphic marble.

The rubies of Mogok are weathered from the marble of the area, which is in contact or interbedded with a complex series of highly folded gneissic rocks. Iyer (1953) identified 13 mappable rock units in the Mogok area. These, however, can be, and often are, grouped into (1) intrusive granitic rocks; (2) the Mogok gneiss, which consists of metamorphic schists and gneisses; (3) the Pleistocene and recent (Quaternary) alluvium; (4) ultramafic intrusives; and (5) marbles (again, see figure 3).

The Mogok gneiss is the prevalent rock unit in the region. It consists of many types of metamorphic rocks, including scapolite- and garnet-rich biotite gneisses, calc-granulites, quartzites, garnet-sillimanite–rich gneisses, and hornblende schists and gneisses. The Mogok gneiss makes up the eastern two-thirds of the area mapped by Clegg and Iyer (Iyer, 1953). The marbles, which are the host rocks of the rubies and spinels, are intimately interbedded with the Mogok gneiss. Rounded fragments of the Mogok gneiss are a major constituent of the gem gravels. Because of the heavy rainfall and tropical climate of the region, the Mogok gneiss weathers very quickly to a reddish lateritic soil, leaving only rounded boulder remnants.

The granitic intrusives in the Mogok area form most of the western third of the Stone Tract. On the detailed geologic map of Clegg and Iyer (Iyer, 1953), they consist of the Kabaing granite, an augite and hornblende granite, a syenite, and a tourmaline granite. Pegmatites containing topaz, tourmaline, and aquamarine are also included in this map unit. Many small exposures of granitic rock have been included in the unclassified crystallines of the Mogok gneiss.

Of the granitic intrusives mapped by Clegg and Iyer, the Kabaing granite is by far the most important and one of the largest rock units in the area. It is found in workings throughout the Mogok area, and much of the gravel encountered in the allu-



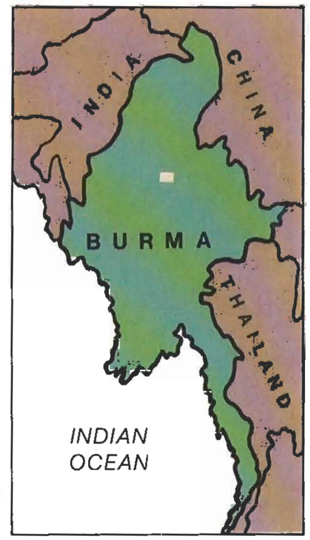


Figure 3. Detailed geologic map of the Mogok Stone Tract of Burma, adapted from the original drawn by Clegg and Iyer (Iyer, 1953). Artwork by Lisa Joko.

vium is undoubtedly derived from this granite. The Kabaing granite contains bands of marble and appears to be responsible for the contact metamorphism that formed the gem rubies and spinels of the Mogok Stone Tract.

The Kabaing granite contains numerous quartz and topaz-bearing pegmatites, with cassiterite noted in abundance in certain of these bodies. Iyer (1953) states that two topaz crystals weighing about 5 kg each were kept in the office of the Burma Geologic Survey. Such gem minerals, along with large quartz crystals, were generally sold to Chinese traders for carving.

Basic intrusives are very rare in the Mogok area, and are limited to gabbros and hornblende-pyroxene rocks, as well as to peridotites found as minor intrusive dikes and sills principally in the Bernardmyo area about 10 km north of Mogok. These rocks are of minor importance, except when they are the source of the spectacular Burmese gem peridot, which rivals that from Zabargad (St. John's Island), Egypt. The peridotite in the Bernardmyo area is a light-colored, granular rock composed almost entirely of olivine with minor pyroxene and magnetite (Iyer, 1953). In the peridot diggings, the rock is generally seen only as a series of loose, weathered boulders with serpentinization taking place along fracture surfaces. Also included as a minor map unit along with the ultramafic intrusives is a small outcrop of nepheline syenite about 12 km west of Mogok.

The marble is generally very coarsely crystallized and typically is pure white in color, although locally it may be tinged with yellow or pink. In addition to ruby and spinel, the marble contains diopside, phlogopite, forsterite, chondrodite, scapolite, sphene, garnet, and graphite. The marbles have been intruded by granitic rocks, and the effects of contact metamorphism are evidenced by the presence of feldspar and diopside in very coarse-grained portions where in contact with the granitic rocks.

La Touche (1913) included the marbles as part of the Mogok gneiss; Iyer (1953) chose to place the marbles in the "Mogok Series," restricting the Mogok gneiss to gneisses and unclassified crystalline rocks. These unclassified crystalline rocks consist of gneisses, granites, and quartz veins that, because of the thick soil horizon and dense jungle, could not be mapped as separate units.

In the valleys and on the sides of the hills, the gem-bearing gravel layer rests on a soft, decomposed rock of characteristic appearance. This gem-bearing bed consists for the most part of brown or yellow, more or less firm, clayey, and at times sandy material, known locally as *byon*

(Cecil, 1928). This layer, the residuum left by solution of the marble during weathering, contains ruby, sapphire, and other varieties of colored corundum, as well as spinel, quartz, tourmaline, feldspar grains, nodules of weathered pyrite, and other minerals of lesser importance. Rarely, a pure gem sand occurs, which consists almost entirely of minute, sparkling grains of ruby. The byon lies, as a rule, from 5 to 6 m below the surface of the valley floor, and is from 1 to 2 m in thickness, pinching off to nil. On the sides of the valley the beds of byon are as thick as 15 to 22 m. These are, of course, purely residual weathering deposits (Chhibber, 1934a).

MINING METHODS

After the departure of the British and their modern mining techniques, native mining was very active, with operations varying in size from single operators to mines employing two to three dozen workers.

The indigenous mining methods used at Mogok have been described in great detail (Simpson, 1922; Adams, 1926; Halford-Watkins, 1932; Iyer, 1953; Spaulding, 1956; Ehrmann, 1957; Meen, 1965; Gübelin, 1965). The three most common mining methods described by these authors include the *twinlon* (twin), the *hmyadwin* (hmyaw), and the *loodwin* (loo).

A twinlon, usually constructed in the dry season, consists of a small circular pit that in general is less than one meter in diameter. These pits are commonly 6 to 12 m deep, although some as deep as 30 m have been reported (Halford-Watkins, 1932). The pits are dug vertically until the gem gravel or *byon* is reached. The miners then dig laterally for about a 10- to 12-meter radius to remove the gem-bearing gravel. The pits are illuminated by means of a mirror from above. Commonly, three men are employed in a single twinlon: two men dig while the third hauls up the earth using a long bamboo crane with a basket attached (figure 4). This method is not unlike that employed at the Ban Kha Cha sapphire deposit near Chanthaburi, Thailand (Keller, 1983). Occasionally, when water is a problem, a *lebin* is constructed. A lebin consists of a square pit that is 1 to 2 m wide and reinforced with timber. Water is removed via a native-constructed bamboo pump. The recovered gem gravels are then carefully washed and sorted on the surface.

The second most common method of recovering gems at Mogok is by means of a quarry-like hmyadwin, or hmyaw. These open-pit mines are usually worked during the rainy season, since they employ hydraulic mining and require a great deal of water. A hmyadwin is dug into a hillside to a depth from 6 to 15 m. Hmyadwins are usually used continuously for 50 or 60 years because of their very complicated construction. They vary greatly in size, but the most complex is the kind that uses a series of channels to bring in water from great distances to wash the soil and gem gravels removed from open-pit mining on the hillside. The

Figure 4. A twinlon, or circular pit, from which gem-bearing gravel is removed via the basket attached to the long bamboo crane shown here.

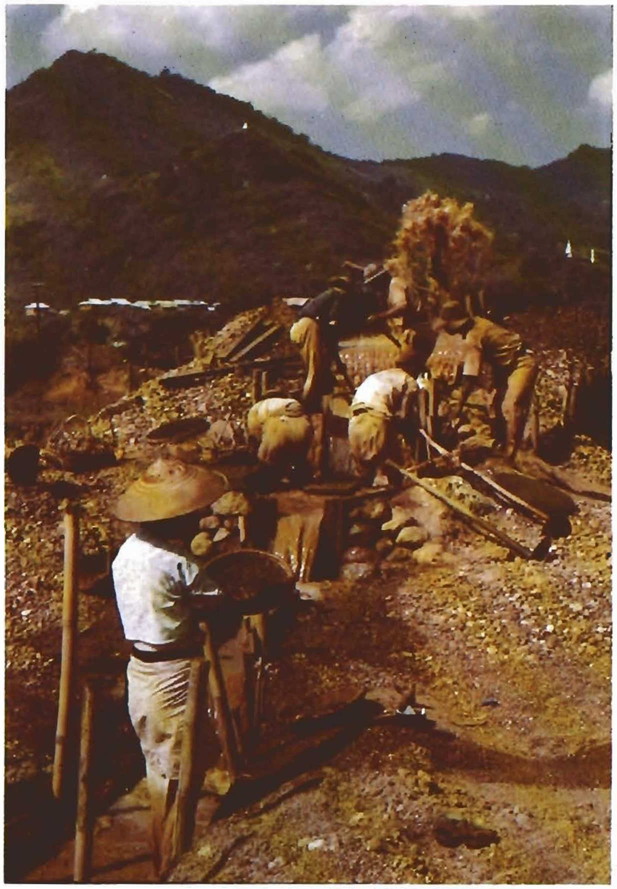


Figure 5. A recovery and washing plant for gem gravels near Mogok.

gravels and much lighter wastes are washed into flat circular stone pits, where the "heavies" are trapped in a series of sluices. The lighter wastes are washed into the valley below. During operation, large pebbles are picked out and discarded, and the sluices are periodically inspected for gems (figure 5).

Deep chemical weathering in the limestone areas of Mogok produces typical karst topography, resulting in numerous underground caverns which may go for hundreds of meters and contain huge chambers lined with spectacular stalactites and stalagmites. Such caverns, called loodwins or loos, may also contain some of the richest gem gravels in the Mogok Stone Tract. Unfortunately, mining in these caverns is the most dangerous of the three methods. A miner must find his way through very narrow channels in the limestone, digging in every crevice for gem gravel which he puts in a basket dragged on his foot. When the basket is full, it is brought to the surface and the gravel is washed. Because of natural concentration in the loos, such gravel may contain up to 25% ruby (Chhibber, 1934b). However, it is not uncommon for a miner to get stuck in the rocks, or lost underground. Because of this danger, as well as the depletion of accessible loos, this method has been used only rarely in recent years.

As is the practice in most of the gem-producing areas of the world, once the miner finishes processing his gravel and abandons it, it is freely available to the small independent miner (figure 6), who may reprocess it in the hope of finding overlooked

Figure 6. As is the case in most gem-mining operations, the waste from the major mining operations is freely available to independent miners for sorting. In Burma, however, this sorting is limited to females, known locally as kanase.

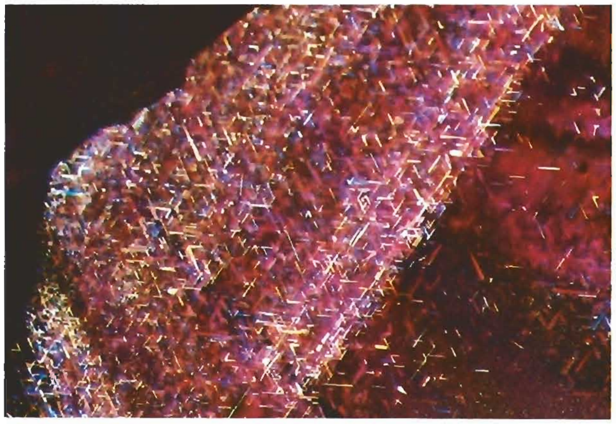


Figure 7. Exsolution crystals of rutile in a Burmese ruby. Such dense clouds of short, flattened rutile needles are commonly observed in rubies from Burma. Oblique illumination, magnified 60×. Photomicrograph by John Koivula.

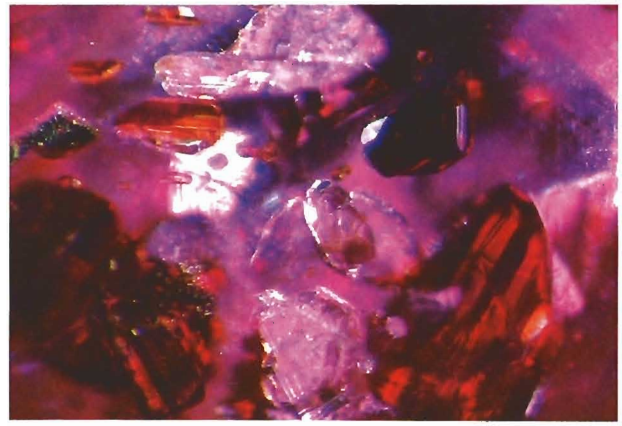


Figure 8. This characteristic inclusion scene in a Burmese ruby shows "bloody" deep red and fine, short, acicular, dust-like crystals of rutile, as well as whitish and colorless calcites, all against a color-zoned field of variable intensity. Dark-field and oblique illumination. Magnified 50×. Photomicrograph by John Koivula.

gem material. In the case of Mogok, however, only women are allowed to search for gems in such refuse. These women, called *kanase*, usually recover only enough from the debris to live on, but they have been known to recover large gems.

GEMOLOGY OF THE BURMESE RUBY

The physical and optical properties of the rubies from Mogok do not differ significantly from those listed for corundum from other sources. Anderson (1980) lists refractive indices for Burmese rubies of 1.765 and 1.773, with a birefringence of 0.008 and a specific gravity range of 3.99 to 4.00. These rubies have particularly strong dichroism, with the two colors being pale yellowish red and deep red. The Burmese material is chrome-rich, which gives rise to strong fluorescence to ultraviolet radiation and a characteristic absorption spectrum, as well as to the "pigeon's blood" color associated with Burmese stones. The absorption spectrum characteristically consists of a bright doublet in the red at 6942 Å and 6928 Å, and weaker lines in the orange at 6680 Å and 6592 Å.

Inclusions do tend to be of some use in distinguishing Burmese rubies from those of other localities. According to Webster (1980), Burmese rubies exhibit short rutile needles, parallel to each of the three parallel faces of the hexagonal prism. These needles intersect at 60° and 120°, and lie in a plane 90° from the c-axis of the crystal (figure 7). In addition, Burmese rubies may contain included crystals of rutile, spinel, or biotite. Most characteristic of rubies found in Burma are inclusions of calcite rhombs, an artifact of the marble host rock (figure 8). Both Koivula (personal communication) and Eppler (1976) have found negative crystals to be very common in Burma rubies (figure 9), and Koivula has also noted sphalerite crystals.

FAMOUS RUBIES FROM MOGOK

Unlike diamond, emerald, and sapphire, fine, well-publicized faceted Burmese rubies are almost unknown. There are, in fact, few if any named rubies in the museums or royal treasuries of the world today. The gemological literature of the

Figure 9. A primary negative crystal in a Burmese ruby. Such negative crystals, although somewhat common, are often mistaken for solid inclusions and therefore go unrecognized and overlooked. Shadowing, magnified 65×. Photomicrograph by John Koivula.

20th century does note a handful of stones exceeding five carats, but with the exception of two—the 43-ct Peace ruby and the approximately 40-ct Chhatrapati Manick (Clarke, 1933)—no others were significant enough to bear names, and even the whereabouts of the two named stones is unknown today.

In 1875, owing to the impoverished condition of the ruling house of Burma, two spectacular rubies were placed on the market. After cutting, these stones weighed 32.35 and 38.55 ct. Seldom have two such remarkable and perfect rubies appeared on the European market simultaneously. These two stones brought £10,000 and £20,000, respectively. At the time, many regarded this incident as only an indicator of the quality and size of the gems that the ruling houses of these Eastern empires must possess. Yet, when the British conquered and annexed Burma, they found little or no evidence of vast stores of corundum gems, although the possibility exists that all the royal gems were stolen during the conquest of the country, by both the Burmese and the English (Brown, 1934).

Years later, in 1899, a 77-ct rough ruby was discovered by Burma Ruby Mines, Ltd. The most famous Burma ruby was found on Armistice Day, November 11, 1918. Two English mine supervisors spotted the stone on the washing pan and called for the mine's general manager, who subsequently named it the Peace ruby (Keely, 1982). The 43-ct crystal reportedly was purchased by a wealthy Mogok stone merchant who cut it into a 22-ct flawless stone. Unfortunately, its color tone was slightly dark and the cut gem sold for less than the dealer had paid for the crystal. Since the discovery of the Peace ruby, several stones of nearly 30 ct have been found, although none has received a special name that has been carried into the literature.

Today, fine Burmese rubies are almost nonexistent in museum collections. The British Museum of Natural History at South Kensington displays the 167-ct Edwardes ruby crystal, which was given to that museum by John Ruskin in 1887 (Spencer, 1934). The crystal is not of faceting quality, but must be considered one of the more important Burmese rubies surviving today. The Los Angeles County Museum of Natural History displays

Figure 10. One of the finest Burmese ruby crystals ever placed on public display is this 196.1-ct etched crystal, which is now part of the permanent collection of the Los Angeles County Musum of Natural History. Photo ©1983 Harold and Erica Van Pelt.

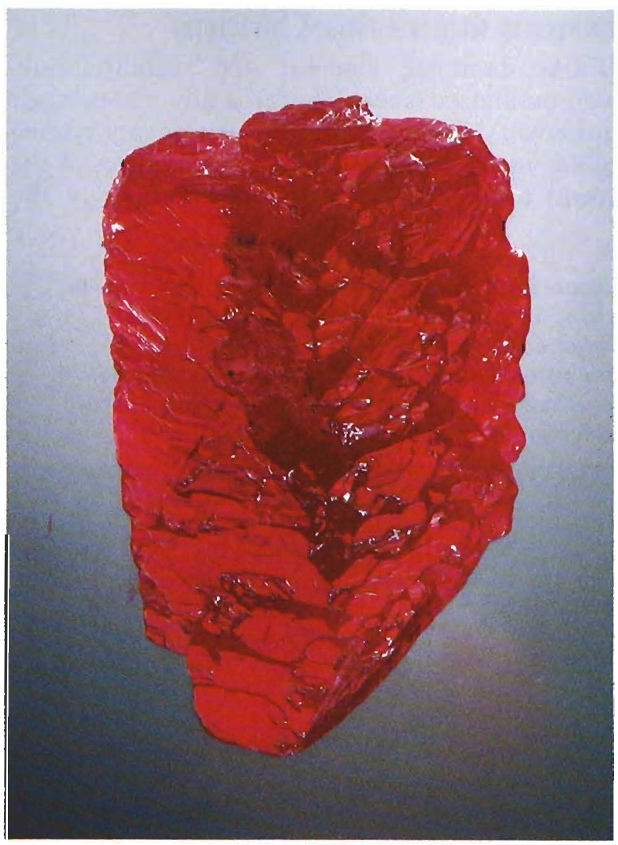


Figure 11. This 15.97-ct cushion-cut ruby from the Mogok Stone Tract is considered to be one of the finest Burmese rubies known today. Property of Alan Caplan, New York City. Photo by Morris Lane.

the 196.1-ct Hixon ruby. This highly etched crystal is of superb color and possesses unusually complete crystal form (figure 10). Alan Caplan, a New York gem dealer, has a magnificent 15.97-ct faceted Burma ruby that many believe is one of the finest rubies of its kind. It is exceptionally free of flaws and has the classic "pigeon's blood" color (figure 11). It was displayed recently at the American Museum of Natural History in New York.

CONCLUSION

The Mogok Stone Tract is a classic example of the uncertainties inherent in the mining of colored gems. This deposit has been known to produce relatively large amounts of rubies of the finest quality. In addition, the geology of the area and the slowness of the relatively primitive mining methods suggest that the supply of Mogok rubies should be far from depleted. Yet fine Burma rubies are rarely encountered in today's gem markets and the number of rubies offered at the annual gem emporium in Rangoon appear to have dwindled to insignificance because of the political uncertainty of that area of the world. It remains to be seen whether the true potential of the Mogok area will ever be realized.

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