

UPDATE ON GEMSTONE MINING IN LUC YEN, VIETNAM

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In 1987, gems were discovered in the Luc Yen area of Vietnam's Yen Bai province. Ruby, sapphire, and spinel from primary and secondary deposits are the most valuable of these; tourmaline, gem-quality feldspar, pargasite, and humite are also mined there. As a result of this discovery, the Luc Yen district has become Vietnam's most important gemstone-trading center over the past 30 years. The markets of Yen The, the capital of Luc Yen, offer an additional assortment of natural gems from Vietnam and elsewhere (including peridot, beryl, aquamarine, topaz, and quartz); synthetic gems are also found in these markets.

Marble-hosted ruby and spinel deposits represent the foremost source of colored gems in Central and Southeast Asia (Garnier et al., 2008). They are contained in a series of platform carbonates that underwent amphibolite facies metamorphism to form crystalline marbles during the Cenozoic continental collision between the Indian and Eurasian plates about 21–23 million years ago (Garnier et al., 2006). These deposits occur in Afghanistan, Pakistan, Azad Kashmir, Tajikistan, Nepal, Burma (Myanmar), China, and central and northern Vietnam (Hughes, 1997). In northern Vietnam, the deposits are located in the Yen Bai province (figure 1). The city of Yen Bai, the regional administrative capital, is located some 200 km northwest of Hanoi, about halfway to the Chinese border. It was an important local gem trading center during the 1990s (Kane et al., 1991; Kammerling et al., 1994), though most of the dealers have since relocated to Hanoi. Luc Yen, on the other hand, is a mountainous district located in the north of Yen Bai province. Its main city, Yen The, is also known as Luc Yen, the name given to the ruby and spinel mining district described in the gemological literature (e.g., Kane et al., 1991; Pham et al., 2004a).



Figure 1. This map of northern Vietnam shows the location of the gem-rich Luc Yen district.

The aim of this paper is to present the state of gem mining activities in the Luc Yen district within their geological framework, and to provide insight into the local gem trade. The paper will show the evolution of Luc Yen's gem industry since 1987, with an eye toward the future.

HISTORY OF THE LUC YEN MINING DISTRICT

The Luc Yen district mainly consists of jungle-covered karsts separated by several narrow valleys where paddy fields and traditional villages are located, as shown in figure 2. It is bordered on the west, south, and east by Thac Ba Lake (figure 3). The lake was cre-

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Figure 2. A view over Yen The, the quiet capital of Luc Yen district. The town is surrounded by paddy fields and jungle-covered, karst-type mountains. Photo by Vincent Pardieu, © GIA.

ated in 1970 by the construction of a dam for Vietnam's first hydroelectric power plant. Thac Ba Lake is 80 km long, with a maximum width of 10 km, and contains more than a thousand islands. Covering the expanse between Tan Huong and the Luc Yen peninsula, it has submerged a potentially gem-rich area.

The initial discovery of high-quality Vietnamese rubies occurred in the Luc Yen district in late 1987, after farmers recovered the stones from placers. The ruby was found in colluvial and alluvial sediments, and the primary source was believed to be marble. Gem exploitation began in earnest in June 1988, with

the establishment of VINAGEMCO (Vietnam Gemstones Company), a state-owned company for exploration, mining, processing, and trading. Mining activity began that September, with a joint venture between VINAGEMCO and B.H. Mining Company of Thailand to work the Khoan Thong Valley placer. From November 1989 to March 1990, 244 kg of gem-quality rubies and sapphires were mined from Khoan Thong, most of them sold and cut in Bangkok (Kane et al., 1991; Garnier et al., 2004; Pham et al., 2004a,b,c; Nguyen et al., 2011; Le et al., 2012).

From 1990 to 1994, thousands of independent miners moved to the Luc Yen district. Many new discoveries were made in both primary deposits and placers. These gems were sold in the Luc Yen mar-

In Brief

- Since the discovery of corundum and spinel deposits in 1987, Luc Yen has become Vietnam's most important gemstone-trading center.
- After a brief period of state-controlled operation, mining is again being done by local farmers working primary and secondary deposits.
- Activities related to the Luc Yen market include sales of gem-quality stones and gem-related artwork.

ket. In 1995, the mines went under the management of the Vietnam National Gems and Gold Corporation (VIGEGO). A 2003 merger formed the Vietnam Minerals Corporation (VIMICO), and the Luc Yen mines are no longer controlled by the state. Local

Figure 3. Local miners take advantage of the low water level at Thac Ba Lake to dig for rubies during the spring of 2005. Photo by Vincent Pardieu, courtesy of AIGS/Gübelin Gem Lab.



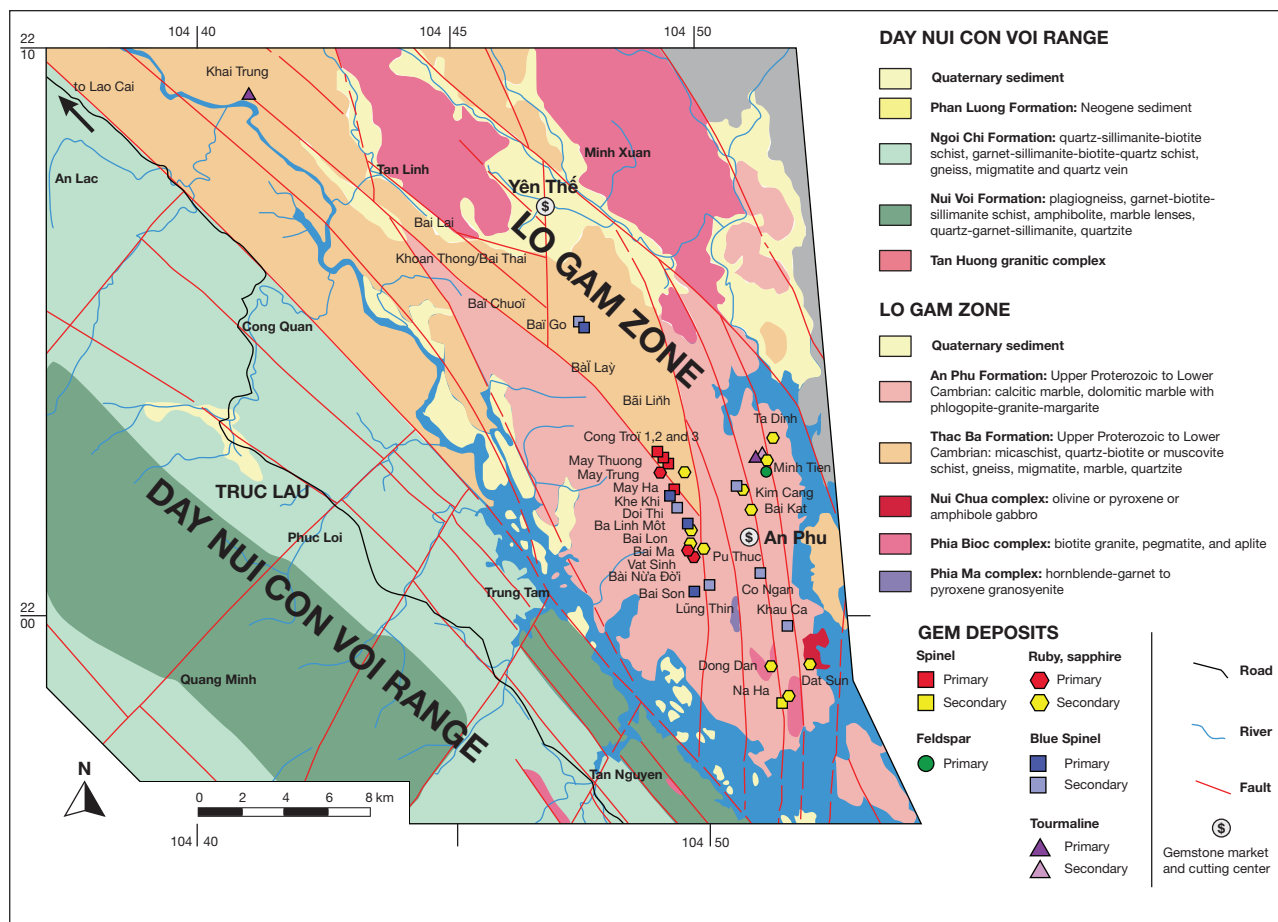


Figure 4. This geological map of the Yen The, modified from Pham and Al (2004), shows the primary and secondary deposits of ruby, sapphire, spinel, tourmaline, and feldspar visited by one of the authors during seven field expeditions between 2005 and 2012. Modified by Vincent Pardieu.

farmers, working in small-scale operations, do much of the mining throughout the region.

Mining activity in Khoan Thong and the surrounding mountains continues, though it is only a shadow of its past. Today, two large memorial stones located at the entrance of the valley serve as reminders of bygone ruby mining.

THE LUC YEN MINING DISTRICT

The deposits of Yen Bai and Luc Yen are hosted by metamorphic belts associated with large-scale shear zones. The Red River shear zone (figure 4) comprises the Day Nui Con Voi metamorphic belt and, on its eastern flank, the Lo Gam tectonic zone (Garnier, 2003; Pham et al., 2004a,c). The Luc Yen ruby and spinel deposits occur in the Lo Gam zone, in a thick metasedimentary sequence of Cambrian age, composed of marble and overlying sillimanite-biotite-garnet schist. This zone is also known for fine tourmaline. These units, bounded by left-lateral faults,

are intruded by granitic rocks and related pegmatites of Triassic age. The primary and secondary (placer) deposits of ruby and spinel, as well as sapphire, tourmaline, amazonite, pargasite, and humite, are presented within a geological framework.

Ruby and Sapphire Deposits. Luc Yen's corundum deposits are set in moderate- to high-temperature recrystallized marble units of Upper Proterozoic to Lower Cambrian age, in the eastern side of the Red River shear zone, specifically the Lo Gam tectonic zone (Hoang et al., 1999; Garnier et al., 2002, 2008; Pham et al., 2004a; Nguyen et al., 2011). Two types of deposits are mined there (Giuliani et al., 2003):

- Primary ruby occurs as: (a) disseminated crystals within marble associated with phlogopite, dravite, margarite, pyrite, rutile, spinel, edenite, and graphite (An Phu, Minh Tien, Luc Yen, and Khoan Thong areas); (b) veinlets associated with calcite, dravite, pyrite, margarite, and



Figure 5. Rough ruby and sapphire crystals from An Phu (left) and small rounded rubies hosted in placers (right) are sold in the Luc Yen gem market. Photos by Vincent Pardieu, © GIA.

phlogopite (An Phu); and (c) fissures with graphite, pyrite, phlogopite, and margarite (Bai Da Lan mine and Minh Tien).

- Secondary deposits (i.e., placers) consist of gravel concentration in karst pockets and alluvial fans found all over the Luc Yen region (Kane et al., 1991; Garnier et al., 2004). The gem-bearing valleys are often narrow and correspond to small depressions typically ranging from 2 to 3 km². Corundum crystals are pink, purple to red, and blue; colorless sapphire coexists with ruby, as well as gray to brown and bipyramidal sapphire and trapiche ruby. Gem corundum is associated with spinel (red, pink, and pale blue), multicolored tourmaline, and garnet. These placers furnish a variety of gem-quality material for the market, which has been open daily since 1987 (figure 5).

Spinel Deposits. Gem spinel, hosted in either marble or placers, was discovered in Luc Yen in 1987, together with ruby and sapphire. Local farmers mine gem-quality spinel from placers along the streams and from alluvial deposits. The specimens exhibit red, brownish red, pink, purple, sea-blue, and sky-blue colors (figure 6). Faceted spinels of up to several hundred carats are known, but most of the faceted gems weigh less than 10 carats. The red, brownish red, and pink spinels are found in An Phu, Minh Tien, Bai Gau, and Khoan Thong. Cong Troi is the source of pink and purple spinels, while dark sea-blue specimens are mined mostly in Co Ngan and Bai Gau. Fine “electric” blue spinel crystals (usually small and/or included and under three grams) come from Khe Khi, Ba Linh Mot, and Khau Ca. Sky-blue material is produced in the Bai Son and Lung Thin areas, as well as near Bai Gau (Senoble, 2010).

Figure 6. The rough sky-blue spinel on the left is from the Bai Son mine. The cut spinels from Luc Yen (right) weigh 2.3 to 11.9 ct. Photos by Vincent Pardieu, © GIA (left) and Pham Van Long (right).





Figure 7. The rubellite crystals are from Tan Lap (left) and Khai Trung (bottom right); the green tourmalines are from An Phu (top right). Photos by Pham Van Long.

In Luc Yen, rough spinel crystals occur in dolomitic marble with calcite, phlogopite, humite, and pargasite. Formation takes place in metasomatic zones resulting from the percolation of fluids in the marble. The crystals, which range in size from a few millimeters to five centimeters, are of octahedral habit and have a red to brownish red color. Spinel crystals in placers are more transparent and are used for gem cutting. Larger crystals in host rock are usually translucent to opaque, and suitable only as collection samples.

Tourmaline Deposits. Tourmaline-bearing pegmatites have been reported in Luc Yen (Nguyen, 1995), but gem tourmalines have not been found in these rocks thus far. They have been recovered instead from alluvial gravels associated with gem corundum; these gravels may be found in weathered crust. The crystals are striated prisms with rounded triangular cross-sections and various terminations. The color of Luc Yen tourmaline ranges from green to brown, black, yellow, and red (figure 7). Multicolored zoned crystals usually contain alternately pink, purple, and yellowish green colors. Color zoning is often observed from the center of the crystals to their periphery, with a combination of pink, purple, and dark green.

Feldspar Deposits. Gem-quality feldspar, found with tourmaline in weathered pegmatites in the Minh Tien area, was first discovered in 1999. Production has fallen in recent years, because the deposit's location

in paddy fields has restricted mining. This feldspar ranges from light to dark green, and from opaque to transparent. Most of the production has only been suitable for cabochon cutting. The stones are typically traded as amazonite, a variety of microcline feldspar, which is found in rare-element pegmatites (Nguyen, 2010). It is associated with smoky quartz, albite

Figure 8. These faceted gem-quality green feldspars, weighing between one and three carats, are from Luc Yen. Photo by Vincent Pardieu, © GIA.





Figure 9. Pargasite (left) and humite crystals (right) occur in marble at Luc Yen. Photos by Vincent Pardieu, © GIA.

(cleavelandite), tourmaline (elbaite), and Li-mica (lepidolite). Facet-grade transparent green feldspar (figure 8), which is very rare here, has been identified as green orthoclase (Laurs et al., 2005).

Pargasite and Humite Occurrences. Pargasite and humite are often associated with spinel in the marbles around An Phu, Phan Thanh, and Khoan Thong. They tend to be interspersed alongside spinel in alternating bands within the marbles. The pargasite appears as dense clusters or wide bands formed of long prismatic crystals, sometimes with a hexagonal cross-section. They can form as groups of crystals from 0.5 to 2 cm and sometimes up to 1.5 × 7 cm. The pargasite is usually dark to light green (Cong Troi) but can be yellowish green when associated with ruby (Khoan Thong). Its transparency is often very poor, and the material is sold in Yen The for “gem paintings” (described in the “Gemstone Trading Activities” section below).

Humite (clinohumite), distributed with spinel in white marble, forms in groups of crystals and usually has a honey to dark yellow color (figure 9). Their size

varies from 1 × 1.5 cm to 3 × 5 cm. Like the Luc Yen pargasite, the humite has poor transparency and is typically used for gem paintings¹. Attractive samples of spinel, pargasite, and humite in white marble, ranging in height from 6 to 10 cm, are typically sold to collectors; sometimes they are carved into ornamental artworks.

MINING ACTIVITIES IN LUC YEN

Primary Deposits. Ruby. At present, ruby is mined in white marble at the May Ha and May Thuong (translated as the Lower and Upper Cloud) mines. In May 2011, May Thuong was mined by a handful of men working every day, living in a canvas-covered shack halfway up the mountain. The mining tools consisted of a power generator, drilling machines, and crowbars to open the quarry.

In May Thuong, ruby crystals form bands in the marble along a single direction corresponding to the foliation plane of the metamorphic rocks. Upon detecting signs of ruby or phlogopite (a mineral commonly considered an indicator for rubies), the miners drill a hole to conduct blasting and then remove the white marble block (figure 10).

The ruby crystals often present a bipyramid hexagonal shape, with a dark red or dark purple-red color. They are generally opaque, but sometimes translucent and suitable for cabochon cuts. Their size usually ranges from 3 mm to 1.5 cm in diameter and from 2 to 10 cm in length. The ruby-bearing blocks range from 0.5 to 700 kg, with dimensions between 5 cm and 1.2 m. Each block may contain hundreds of different-sized crystals (figure 11).

¹ One of the authors has observed humite in other spinel deposits around the world, but with several differences. Pargasite crystals similar to those from Luc Yen are associated with spinel and corundum in marbles of the Hunza Valley in Pakistan. At Kul I Lal, Tajikistan, pink to purple and red spinel is hosted in marbles with gem-quality clinohumite. In Mahenge, Tanzania, spinel is also formed in marble with clinohumite and blue apatite. Near Kasigau Mountain in Kenya, red spinels are hosted in marbles with blue apatite, green amphibole, and graphite. Burmese spinels from Mogok are sometimes found with blue apatite and chondrodite, a member of the humite group. Besides Hunza, the author has never witnessed gem-quality spinel and corundum within 20 cm of one another.



Figure 10. A young miner stands with his jackhammer in front of a ruby mine at May Thuong. Photo by Vincent Pardieu © GIA.

In 2010, ruby was discovered in the marble at Bai Gau (Bear Site), near the Bai Chuoi (Banana Site) area. These ruby crystals, associated with pargasite, have a fine color.

To carry ruby-bearing blocks to the bottom of the hill, the miners employ locals (usually Man or Tay ethnic minorities), who carry the material on their shoulders for a fee of 2,000 to 3,000 Vietnamese dong (US\$0.10–\$0.15) per kilogram. Despite the incredibly difficult terrain, one man or woman can usually carry 50–80 kg. Until the middle of the last decade, An Phu and Luc Yen were home to several family-sized cutting factories. Most of the cutters were also traders, working at home with simple machines; only large or high-value stones were taken to professional cutters. Some of these cutting factories have begun specializ-

ing in carving and trimming ruby on marble specimens, as shown in figure 12. They may be carved into decorative shapes, such as trees or animals. Such carved gemstones in matrix are highly valued in Vietnam, where there is a market for items related to traditional beliefs associated with *phong thuy* (the Vietnamese version of Chinese feng shui).

Spinel and Pargasite in White Marble. Since the turn of the 21st century, spinel and pargasite mining activities have been focused in the Cong Troi (Sky Gate) area (Pardieu, 2010). In 2009–2010, mining li-

Figure 11. Crystals of ruby in marble matrix. Photo by Vincent Pardieu, © GIA.



Figure 12. In Luc Yen, spinel specimens are carved and trimmed for decorative and feng shui purposes. Photo by Vincent Pardieu, © GIA.





Figure 13. A view of the Cong Troi marble cliff, the largest pink spinel mining area in the Luc Yen region, with the mining camp in the foreground. Photo by Vincent Pardieu © GIA.

censes were allocated to some Indian companies for extracting white marble intended for export. When geological drilling operations began in the area, local miners had to stop mining. Once drilling was completed in late 2010, work resumed. In 2012, approximately 20 miners were at Cong Troi (figure 13), most of them between 17 and 35 years old.

Since spinel and pargasite are distributed in bands

parallel to the foliation of the marble, spinel mining often occurs over a large area, covering the entire mountain from the base to the top. Spinel from Cong Troi exhibits a variety of colors, typically brownish red, reddish brown, brown, purple, black, pink, and purplish pink. The size varies from 1 × 1 mm to 5 × 5 cm (figure 14). The crystals are usually octahedral, though many also exhibit spinel-law twinning.

Blue spinel is found in the white marble at Bai Son, but the crystals usually have a dull color and low transparency. Blue spinel is associated with phlogopite, humite, and sometimes pyrite. Other occurrences are at May Trung, Ba Linh Mot, and Khe Khi.

Secondary Deposits (Placers). *Ruby, Sapphire, and Spinel.* Corundum and spinel are mingled in alluvial placers. Mining is conducted on a small scale, from Bai Lai in the northeast of Luc Yen to the Na Ha area in the south, near the banks of Thac Ba Lake. The most active sites are along the streams of Cong Troi, in Nuoc Ngap (An Phu area). Material is also removed from old mines in areas such as Minh Tien, Khoan Thong, and Bai Chuoi (figure 15), where big companies mined the most accessible and profitable material, often missing areas between marble pinnacles that excavators could not easily reach. As a result, some gem-rich ground was left behind; this is now collected by locals with shovels and buckets. In



Figure 14. Left: A miner shows the association of spinel and pargasite in marble. Right: Red (top) and blue (bottom) spinel in marble. Photos by Vincent Pardieu, © GIA.

some places, locals mine in karsts or caves of white marble (see Cong Troi 2, Cong Troi 3, May Thuong, May Ha, and Dong Dan in the figure 4 map).

Most of the mining in each area is done by small groups of local farmers using mini-generators and water hoses. Activity fluctuates according to agricultural cycles. Excavators and high-pressure water hoses are used in some places, but most of the miners use basic tools, washing with rattan buckets and picking the gemstones by hand.

In the Bai Chuoi area, near the Khoan Thong mine, miners work within pits. They have a small water reservoir and a pump with a sluice for washing and sorting gems. The mine has produced ruby (including many trapiche rubies), tourmaline, rutile, and quartz, as well as some blue sapphire and light blue spinel. It has also yielded large, opaque, purplish red ruby crystals that are suitable for cabochons or carvings. After three or four workdays, the stones are gathered, classified, and brought to the Luc Yen market; some are sold directly to the dealers.

Spinel from An Phu and the surrounding area have typical features. Their color can be red, brownish red, reddish brown, purple, pink, purplish pink, blue, or sky blue. The pink to red spinel can be found throughout the area, but blue specimens are recovered mainly from Co Ngan, Khau Ca, and Kim Cang. The sky-blue spinels are mostly found in colluvial material from crevasses in the Bai Son and Lung Thin areas, where miners follow the caves underground to a 5–8 m depth (figure 16).

Figure 15. Farmers dig for gems in the paddy fields near Minh Tien. Photo by Vincent Pardieu, © GIA.



Figure 16. A team of miners works a deep and wide crevasse in the karsts at Bai Son in search of beautiful light blue spinel. Photo by Vincent Pardieu, © GIA.

Tourmaline. Compared to corundum and spinel, mining activities for tourmaline in Luc Yen are less intensive. Tourmaline is often extracted by locals along the streams in Minh Tien and Nuoc Ngap (An Phu municipality).

Tourmaline is mined in weathered pegmatites (Nguy, 1996). Peak mining activity occurred at An Phu between 1989 and 2000. The size of the crystals is highly variable, but some can reach 20 cm long and 10 cm across (3–4 kg). The colored tourmaline belongs to the elbaite and dravite series, at 57.6–97.4 mol.% and 56.9–87.7 mol.%, respectively (Nguy, 1996).

In 2008 and 2009, new tourmaline occurrences were found in Khai Trung (Yen The ward) and Tan Lap (Phan Thanh ward). In Khai Trung, heavy mining activity occurred between 2008 and 2010. Several blocks of rubellite weighing hundreds of kilograms were sold to collectors. Some of the blocks are also displayed as

TABLE 1. Summary of gem mining sites in the Luc Yen district.^a

Name	Location	Main Production	Deposit Type	Mining Activity Witnessed
Yen The	22°06'46"N 104°46'17"E	Mix (ruby)	Secondary	None
Bai Lai	22°06'27"N 104°44'41"E	Mix (ruby)	Secondary	None
Khoan Thong/Bai Thai	22°05'37"N 104°45'23"E	Mix (ruby)	Mostly secondary	Three groups (20 people max.)
Bai Chuoi	22°05'26"N 104°46'05"E	Mix (ruby)	Mostly secondary	Two groups (10 people max.)
Bai Go	22°04'45"N 104°47'04"E	Ruby, spinel (blue, pink)	Mostly secondary	Several groups (100 people max.)
Bai Lay	22°04'05"N 104°47'50"E	Mix (ruby)	Mostly secondary	Two groups (10 people max.)
Bai Linh	22°03'44"N 104°48'02"E	Mix (ruby)	Mostly secondary	One group (5 people max.)
Cong Troi 1	22°02'02"N 104°48'46"E	Spinel (pink, red)	Mostly primary	Several groups (30 people max.)
Cong Troi 2	22°02'12"N 104°48'43"E	Spinel (pink, red)	Mostly primary	Several groups (15 people max.)
Cong Troi 3	22°02'21"N 104°48'34"E	Spinel (pink, red)	Mostly primary	Several groups (10 people max.)
May Thuong	22°02'04"N 104°48'31"E	Ruby	Primary	Two groups (10 people max.)
May Trung	22°01'48"N 104°48'43"E	Spinel (pink, blue)	Primary	One group (5 people max.)
May Ha	22°01'49"N 104°48'36"E	Ruby	Mostly secondary	One group (5 people max.)
Khe Khi	22°01'35"N 104°48'39"E	Spinel (blue)	Mostly secondary	None, or one group (2 people max.)
Doi Thi	22°01'32"N 104°48'46"E	Mix	Mostly secondary	None
Ba Linh Mot	22°01'18"N 104°48'49"E	Mix	Mostly secondary	One or two groups (4 people max.)
Bai Lon	22°01'12"N 104°48'59"E	Mix	Mostly secondary	None
Pu Thuc	22°01'42"N 104°49'18"E	Ruby	Mostly secondary	None
Bai Ma	22°00'43"N 104°49'03"E	Mix	Mostly secondary	One group (5 people max.)
Vat Sinh	22°00'39"N 104°49'00"E	Ruby	Mostly secondary	Two groups (10 people max.)
Bai Nua Doi	22°00'31"N 104°49'04"E	Ruby	Mostly primary	One group (5 people max.)
Bai Son	21°59'57"N 104°49'09"E	Spinel (blue)	Primary and secondary	Two groups (10 people max.)
Lung Thin	22°00'01"N 104°49'26"E	Spinel (blue, pink)	Mostly secondary	Three groups (12 people max.)
Ta Dinh	22°02'42"N 104°50'45"E	Mix	Mostly secondary	Three groups (12 people max.)
Minh Tien	22°02'14"N 104°50'23"E	Mix	Mostly secondary	Four groups (20 people max.)
Kim Cang	22°01'45"N 104°50'09"E	Mix (ruby, spinel)	Mostly secondary	Three groups (10 people max.)
Bai Kat	22°01'26"N 104°50'16"E	Mix (ruby, spinel)	Mostly secondary	One group (7 people max.)
Co Ngan	22°00'10"N 104°50'24"E	Mix (ruby, spinel)	Mostly secondary	Three groups (12 people max.)
Khau Ca	21°59'22"N 104°50'54"E	Mix (ruby, spinel)	Mostly secondary	Three groups (12 people max.)
Dong Dan	21°58'29"N 104°50'37"E	Mix	Mostly secondary	One group (7 people max.)
Dat Sun	21°58'30"N 104°51'24"E	Mix	Secondary	None
Na Ha	21°57'57"N 104°50'59"E	Mix	Secondary	Two groups (10 people max.)

^aBased on GIA field expeditions in 2009, 2010, 2012, and 2013.

feng shui stones. The tourmaline often has light red to pink colors, but the crystals are broken. The transparency is poor, and the percentage of facet-grade gems is very low (usually less than 5%). These resemble the tourmalines found in Bac Kan province. The Khai Trung tourmalines are zoned, and their light green and yellowish green colors are mixed with pink, light red, and dark purple zones. The crystals have a needle-like habit and range from 0.4 to 0.6 mm in diameter and

from 2 to 6 cm in length. Associated minerals included quartz, feldspar, and mica.

The occurrence in Tan Lap, discovered at the end of 2010, covers approximately 300 km². The tourmaline is hosted by weathered pegmatites formed by kaolinized feldspar, quartz, and black tourmaline (schorl). Reddish purple rubellite is often found in the middle of the weathered pegmatite bodies. As in the Khai Trung area, many crystals are broken and have



Figure 17. Though only a fraction of its size during the 1990s, the Luc Yen gemstone market is still held daily. Photos by Pham Van Long (left) and Vincent Pardieu, © GIA (right).

low transparency, making them suitable only for cabochon cutting or as collection samples. Local farmers are officially forbidden to mine there, but some still occasionally find pockets of rubellite weighing tens of kilograms.

GEMSTONE TRADING ACTIVITIES

Before the 1990s, Luc Yen was a small, impoverished town that derived most of its income from agriculture and timber. But after the gem discoveries, the town grew rapidly. The first market opened in 1987, and today Luc Yen is the busiest gem-trading center in northern Vietnam.

During the 1990s, the exhibition area of the market extended over 1,000 square meters, with hundreds of local farmers selling gems from 5:30 to 7:30 every morning. When the market was closed, the farmers would return to the mountains to mine. The buyers at the market were Vietnamese tradespeople, mainly from Hanoi and Ho Chi Minh City (formerly Saigon), with some foreign traders from Thailand and other countries.

Today the market is only about a tenth of its former size. Although business is still conducted every morning, the miners and traders have mobile phones and no longer need to meet there. The traders often try to buy directly from local farmers at the foothills when they return from mining. The sellers at the market are mainly women who display parcels of both rough and faceted gemstones on small tables (figure 17).

Currently, about 30 stores are concentrated in the streets around the central lake and the surrounding area of the old market. Traders often pool their money to-

gether to purchase particularly high-value gemstones. Only professionals and well-known buyers have the opportunity to see the exceptional stones. Some of the gemstones sold in the market are not from the Luc Yen mines, including beryl, peridot, quartz, chalcedony, jade, and fluorite (figure 18).

In Luc Yen, most of the dealers are also skilled cutters, with one or two cutting machines at home. Nevertheless, some local family businesses have evolved into small factories equipped with a few machines, cutting gems directly for customers. A number of old cutting factories have switched to carving

Figure 18. Common misspellings in the Luc Yen gem market include “rubi,” “sapier” for sapphire, “sitilen” for spinel, “phelydot” for peridot, and “siclin” for citrine. Photo by Vincent Pardieu, © GIA.





Figure 19. Left: A man trimming a block of red spinel in marble at his home. Right: A small cutting factory in Luc Yen. Photos by Vincent Pardieu, © GIA (left) and Pham Van Long (right).

feng shui stones. The original gem-bearing marble blocks are carved to reveal the gems and to produce artworks and artifacts (figure 19).

At present, one of the most exciting activities in Luc Yen is gemstone painting. The small stones used to create these paintings come in a variety of colors: red ruby, garnet, and spinel; blue sapphire; green peridot, pargasite, or chalcedony; purple fluorite or amethyst; and pink rose quartz. The gems may be left intact or crushed into powder to produce the paintings, which are modeled after Vietnamese art-

Figure 20. Gemstone paintings are produced and sold in Luc Yen. Photo by Vincent Pardieu, © GIA.



works (figure 20). Gem grains may be polished for higher-quality paintings.

Using a sheet of white acrylic as a base, the artist paints a pattern for the picture. The sheet is covered with white powder made from calcite, and suitably colored stones are applied to the pattern. The stones and powder are held together by special glue. One worker can complete a 40 × 60 cm painting in a single day. There are about 10 manufacturers who distribute these products, which are sold in stores from Hanoi to Ho Chi Minh City.

Gem painting and carving are of particular interest to the Luc Yen miners, providing a steady local market for their daily production. These activities cover the miners' costs most of the time, even if they are not making profitable discoveries in the field. Having a steady market for their production enables them to occasionally find some exceptional gemstones.

CONCLUSION

Since the discovery of gems in Luc Yen in 1987, the local industry has undergone many changes. The early finds were made by local farmers. Later discoveries occurred along Highway 70, between Yen Bai and Luc Yen, which became Vietnam's most important ruby, sapphire, and spinel producer, as well as its busiest processing and trading center. Unorganized mining operations by locals, along with illegal exportation, led the Vietnamese government to form a national corporation to manage the country's gemstone production. Yet industrial-scale mining in the Luc Yen area has not been effective, because the placer gemstones are

often distributed in karsts, caves in mountains, or narrow valleys, none of which permit large-scale operations. These difficulties caused VIGEGO to relinquish control of gemstone mining in Luc Yen in 2000. Since

then, the area has returned to small-scale artisanal mining. In the near future, officials from Yen Bai province plan to turn Luc Yen into a gemstone trade center and a geological reserve (Pham et al., 2011).

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