in linear stringers oriented near-parallel to the c-axis and also in three directions at ±28° from the c-axis (perpendicular to the three pyramid faces), and a small semitransparent crystal in one stone.

The six samples were chemically analyzed by electron microprobe at the University of Oklahoma, Norman. Energy-dispersive X-ray analysis showed that the tourmalines are Ti-bearing solid solutions between the end members uvite and alkali-deficient dravite. Alkali-deficient (or alkali-free) dravite is an aluminum-rich theoretical endmember in which Al³⁺ is accommodated in the normally divalent Y site by removal of cations from the X (alkali) site (G. Werding and W. Schreyer, “Alkali-free tourmaline in the system MgO-Al₂O₃·B₂O₃·SiO₂·H₂O,” Geochimica et Cosmochimica Acta, Vol. 48, 1984, pp. 1331–1344). Two of the samples were dominated by the alkali-deficient dravite component, three were dominated by uvite, and one of them was transitional between the end members (slightly uvite-dominant). The Ti concentrations (-0.5–1.1 wt.% TiO₂) were higher in the alkali-deficient dravite samples. No Fe or other cations were found at the detectable concentration of -0.3–0.5 wt.% on an oxide basis. The chemical analyses of these samples indicate that gemologists would best refer to them as tourmalines in the uvite-dravite series.

Elizabeth P. Quinn and BML

**Tripolidite from China.** In August 2004, mineral collector John Lucking (Phoenix, Arizona) purchased a reddish orange mineral while visiting a local stone market in Guilin, China. The dealer represented the material as rutilochrosite, but the color, luster, cleavage, and hardness suggested a different mineral. Mr. Lucking was unable to obtain reliable information on the source of the mineral, but based on the associated minerals and other material that he saw for sale, he believes that it came from the tin-polymetallic sulfide deposits near Dachang, Guangxi, China. After returning to the U.S., he asked Mark Kaufman (Kaufman Enterprises, San Diego, California) to cut a cabochon and a faceted stone from this material (figure 33).

In March 2005, Mr. Lucking submitted samples to researchers at the Department of Geosciences of the University of Arizona, Tucson. Single-crystal X-ray diffraction (XRD) and chemical analysis obtained by two of these contributors (MJO and RTD) identified the mineral as tripolidite, which has an idealized formula of \( \text{Mn}_1.70\text{Mg}_{0.15}\text{Fe}^{2+}_{0.06}\text{Fe}^{3+}_{0.09}\text{Ca}_{0.04}\text{P}_{0.97}\text{Fe}^{3+}_{0.08}\text{Ti}_{0.67}\text{F}_{0.33} \). The tripolidite occurred with quartz (identified by Raman spectroscopy), pyrite (identified by XRD), and sphalerite (identified by XRD), which is consistent with an origin from a hydrothermal mineral deposit.
In March 2006, Mr. Lucking loaned the faceted stone and the cabochon (3.70 and 14.97 ct, respectively) to GIA, and donated some fragments of the triploidite. The following gemological properties were collected by one of us (EAF) on the polished samples: color — reddish orange, with very weak pleochroism in reddish orange and yellowish orange; diaphaneity — transparent (faceted stone) and translucent (cabochon); R.I. — 1.660–1.679 (faceted stone) and a spot reading of 1.66 (cabochon); birefringence 0.019; hydrostatic S.G. — 3.83 and 3.80; and fluorescence — inert to long- and short-wave UV radiation. A cutoff at 420 nm and an absorption band at 530–550 nm were seen in both samples with the desk-model spectroscope. Microscopic examination revealed numerous two-phase (liquid-gas) inclusions and fractures.

The R.I. values are lower than those reported for triploidite in mineralogy textbooks [e.g., 1.723–1.730 for a sample with a Mn/Fe ratio of 3.31; C. Palache et al., The System of Mineralogy, Volume 2, John Wiley & Sons, New York, 1966, pp. 853–855]. However, lower R.I. values are expected for triploidite Mn end-member compositions [Palache et al., 1966], and this is consistent with the much higher Mn/Fe ratio of the gem-quality triploidite reported here. The S.G. of triploidite is typically reported as 3.70, which is considerably lower than the values recorded in the present study. Nevertheless, the density calculated from the crystal structure refinement was 3.82 g/cm³, which is quite similar to the S.G. values that were measured hydrostatically.

UV-Vis-NIR spectra of the two samples showed features similar to those noted in the desk-model spectroscope [e.g., figure 34]: A strong absorption at 400–420 nm (actually a doublet) and a broad peak at approximately 520–560 nm. A series of absorption features were also recorded in the UV region below 370 nm.

To our knowledge, this is the first report of gem-quality triploidite.

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Väyrynenite from Afghanistan. The Spring 2006 Gem News International section (p. 75) documented a faceted väyrynenite from Pakistan, which had properties comparable to a väyrynenite from an unspecified locality that was described in the Summer 1994 Lab Notes section (p. 121). Since it is such a rare mineral, we were quite surprised when we received three more faceted väyrynenites in May 2006, this time from a different locality. The stones were supplied by Farooq Hashmi, who obtained the rough from Afghan suppliers in Peshawar, Pakistan; they reported that the material came from granitic pegmatites in Laghman Province, Afghanistan, but they did not know the identity of the mineral. Over the course of the past two years, Mr. Hashmi saw a few parcels of this material in Peshawar, with a total weight of up to 20 grams, but only small pieces of gem rough were available. He noticed that the Afghan väyrynenite was more pink and less orange than the Pakistani material.

Gemological properties of the three faceted stones (0.09–0.17 ct; figure 35) were collected by one of us (EAF): color — orangy pink, with orange and pink pleochroism; R.I. — n₁ = 1.640–1.642 and n₂ = 1.668–1.770; birefringence — 0.028; hydrostatic S.G. — 3.20–3.25; Chelsea filter reaction — none; and fluorescence — inert to both long- and short-wave UV radiation. An absorption line at 413 nm, and weak bands at 435, 465, 505, and 565 nm, were visible with the desk-model spectrocope in the two larger stones. With magnification, all three stones had numerous fractures and chips, and the largest väyrynenite also contained a “fingerprint.” EDXRF spectroscopy recorded the expected Mn and P, as well as minor amounts of Fe.

The n₁ and birefringence values of the Afghan väyrynenite were somewhat higher than those reported in the two Gems & Gemology entries referenced above, but they are

Figure 34. This UV-Vis-NIR spectrum of the faceted triploidite shows a strong absorption at 400–420 nm and a broad peak at approximately 520–560 nm, as well as a series of absorption features in the UV region below 370 nm.

Figure 35. Laghman, Afghanistan is reportedly the source of these väyrynenites (0.09–0.17 ct). Courtesy of Farooq Hashmi; photo by C. D. Mengason.