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 end-member in which Al^{3+} 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 $MgO-Al_2O_3-B_2O_3-SiO_2-H_2O$," *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.% TiO_2) were higher in the alkali-deficient dravite
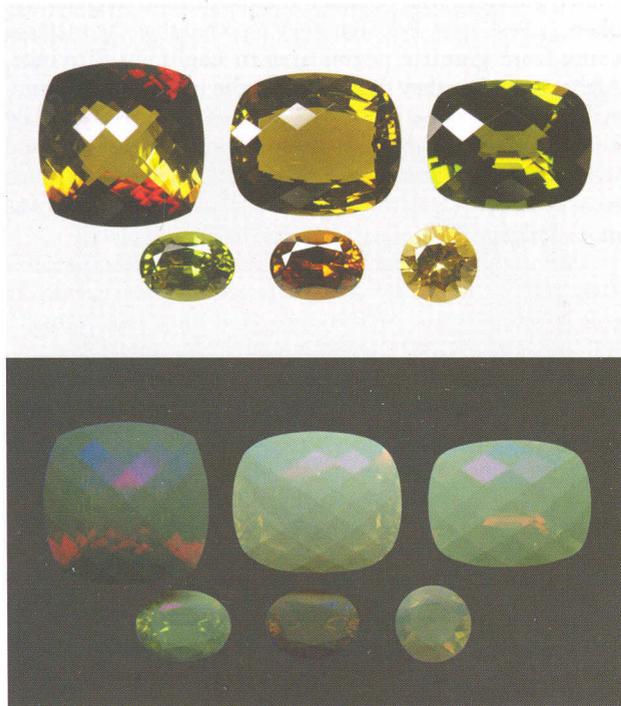

Figure 33. This faceted stone (3.70 ct) and cabochon (14.97 ct) of triploidite were cut from a portion of the rough sample, which was obtained at a local mineral market in Guilin, China. Courtesy of John Lucking; photo © Jeff Scovil.

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

Triploidite 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 rhodochrosite, 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 triploidite, which has an idealized formula of $Mn_2(PO_4)(OH)$ and a Mohs hardness of 4½–5. Powder XRD data and Raman spectra for the sample are available on the Internet at http://rruff.geo.arizona.edu/rruff (search for R050186, and click the icon under "Options"). The results for both electron-microprobe analysis and a crystal structure refinement yielded an empirical formula of $(Mn_{1.70}Mg_{0.15}Fe^{3+}_{0.06}Fe^{2+}_{0.05}Ca_{0.04})(P_{0.97}Fe^{3+}_{0.03})O_4(OH_{0.67}F_{0.33})$. The triploidite 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.

Figure 32. Tourmaline has recently been recovered from the Morogoro region of Tanzania in a range of "earth tone" colors (top, 0.93–9.05 ct). Chemical analysis of these samples revealed that they are uvite-dravite tourmalines. The stones display weak-to-strong chalky greenish yellow fluorescence when exposed to short-wave UV radiation (bottom). Courtesy of Advanced Quality A.C.C. Ltd.; photos by Candice Grobon (top) and Franck Notari (bottom).