COLOMBAGE-ARA SCHELITE
By Mahinda Gunawardene

A new deposit of scheelite was discovered in 1983 near Ratnapura, Sri Lanka. This article analyzes the gemological properties of this rare gem mineral, and compares them with those recorded for scheelites from Mexico and the United States.

In 1983, a new occurrence of gem scheelite was discovered near the village of Colombage-Ara, not far from the city of Ratnapura, Sri Lanka. The author obtained a parcel of faceted stones from a Ratnapura dealer who had represented them as rock crystal quartz.

The scheelites examined by the author were reportedly found in a small pegmatite vein near Colombage-Ara, approximately 80 km south-southeast of the city of Ratnapura. Preliminary examination with a 10x lens and a diffraction grating hand spectroscope helped to identify the stones. Since the refractometer failed to provide a shadow-edge on the scale, the stones were first thought to be zircon, especially as a 10x lens exhibited double images of the rear facet edges. However, the spectroscope revealed a rare-earth spectrum, with lines centered around 584 nm, instead of the absorptions typical for zircon. This confirmed the colorless samples to be the first gem scheelites discovered in Sri Lanka.

Scheelite is colorless in its purest state, but the allochromatic gem can occur in a wide variety of colors, including orange, yellow, green, purple, brown, red, and many shades of gray. Few references to this CaWO₄ mineral are found in the gemological literature (see, for example, Webster, 1976, and Arem, 1977), although it is a very attractive collector’s stone (figure 1). The physical properties of scheelite, such as refractive index and specific gravity, are comparatively high, but the mineral is soft (4.5-5 on the Mohs scale). Cuttable gem material has been found in the United States in California, Arizona, Utah, and Nevada, as well as in Mexico, Czechoslovakia, Italy, Switzerland, Finland, France, England, Korea, and Australia.

LOCATION AND OCCURRENCE
The village of Colombage-Ara lies on the southwestern edge of the Udawalawe reservoir, approximately 5 km northeast of the main road between Ratnapura and Embilipitiya, in southern Sri Lanka.

Scheelite in rocks of Precambrian age has been reported in Colorado and Wyoming by Tweto (1960) and Angell (1943), and is disseminated in regionally metamorphosed rocks, mainly in cal...
cosilicate gneiss. Similar geologic conditions exist in Sri Lanka in Precambrian rocks of the Highland series (Munasinghe and Dissanayake, 1981). The district surrounding the towns of Colombage-Ara and Ratnapura is located in the southern part of the metamorphic rock assemblage.

Approximately 20 kg (44 lbs.) of scheelite have been found at this locality to date. Although most of the crystals range from 0.30 to 5.00 ct, stones as large as 25 ct have been recovered.

**GEMOLOGICAL PROPERTIES**

Table 1 gives the gemological properties of 10 scheelites from Sri Lanka, one from California, and one from Mexico that were examined for this study.

**TABLE 1.** The physical properties and reactions to ultraviolet radiation of natural scheelites from Sri Lanka, the United States, and Mexico.

<table>
<thead>
<tr>
<th>Gem locality (no. of stones)</th>
<th>Color</th>
<th>Refractive index</th>
<th>Specific gravity</th>
<th>Short-wave ultraviolet</th>
<th>Long-wave ultraviolet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Lanka (8)</td>
<td>Colorless</td>
<td>1.920–1.922 and 1.930–1.935</td>
<td>5.94–6.30</td>
<td>Distinct whitish blue</td>
<td>Distinct whitish blue</td>
</tr>
<tr>
<td>Sri Lanka (1)</td>
<td>Very yellow</td>
<td>1.921 and 1.933</td>
<td>6.21</td>
<td>Distinct whitish blue</td>
<td>Dull yellow</td>
</tr>
<tr>
<td>Sri Lanka (1)</td>
<td>Grayish white</td>
<td>1.900 and 1.905</td>
<td>6.16</td>
<td>Distinct chalky blue</td>
<td>Dull yellow</td>
</tr>
<tr>
<td>United States (1)</td>
<td>Colorless</td>
<td>1.918 and 1.926</td>
<td>6.15</td>
<td>Very strong blue</td>
<td>Dull yellow</td>
</tr>
<tr>
<td>(Kern County, California)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico (1)</td>
<td>Canary yellow</td>
<td>1.930</td>
<td>6.11</td>
<td>Distinct yellowish blue with yellow rims</td>
<td>Indistinct</td>
</tr>
</tbody>
</table>

Notes and New Techniques
and the United States vary considerably. The absorption spectra of some of the stones tested, as seen through a prism-type spectroscope, are shown in figure 2. The spectrum of a Sri Lankan scheelite as recorded on a Pye-Unicam SP8-100 UV-VIS spectrophotometer is shown in figure 3.

**Microscopy.** The photomicrograph shown in figure 4, taken while the stone was immersed in methylene iodide, clearly reveals the angular zoning frequently seen in Sri Lankan scheelites. Wavy kaleidoscopic colors were evident when the stone was observed with polarized light (figure 5). This phenomenon may have been due to internal strain in the structure of the Sri Lankan material. During this study, 55 scheelites were examined with the microscope, no characteristic mineral inclusions were discovered, although many forms of fingerprint-like liquid inclusions were often visible (figure 6).

**CHEMICAL ANALYSIS**

Chemical data for the 10 Sri Lankan scheelites were obtained through energy-dispersive X-ray fluorescence (EDXRF), which revealed the presence of tungsten and calcium (see figure 7). Silica

![Figure 2. The absorption spectra as seen with a prism-type hand-held spectroscope in scheelites from (a) Sri Lanka, (b) California, and (c) Mexico.](image)

![Figure 3. The spectrum of a Sri Lankan scheelite as recorded on a Pye-Unicam SP8-100 UV-VIS spectrophotometer.](image)

![Figure 4. The angular zoning seen here in a stone immersed in methylene iodide is frequently observed in scheelites from Sri Lanka. Transmitted light, magnified 40×.](image)

![Figure 5. This colorless scheelite from Sri Lanka, observed with crossed polarizers, displays the wavy kaleidoscopic effect often seen in this material. Magnified 50×.](image)
Figure 6. Fingerprint-like liquid feathers are often seen in Colombage-Ara scheelite from Sri Lanka. Dark-field illumination, magnified 32×.

Figure 7. Energy-dispersive X-ray fluorescence spectrum of a Sri Lankan scheelite. The major elemental peaks, calcium (Ca) and tungsten (W), have been labeled.

was detected in most of the samples studied. A few of the Sri Lankan scheelites also contained iron, copper, and sulfur. Notably, the light yellow scheelites contained iron, which probably contributes to their coloration. Under normal operating conditions, Sri Lankan scheelite tends to split under the electron beam of the microprobe. However, patient and careful use of the microprobe provided major element percentages of CaO (20.22 wt.%) and WO₃ (77.78 wt.%), but minor elements (the remaining 2 wt.%) were not recorded.

SUMMARY AND CONCLUSION

The first scheelites reported from Sri Lanka have been found in a small pegmatite vein near the town of Colombage-Ara. Although relatively few stones have been found to date, the material is attractive and some fairly large pieces (up to 25 ct) have been mined.

The Colombage-Ara scheelites differ from stones from California and Mexico in specific gravity, spectrum, and inclusions. Although this find is geologically interesting, the Precambrian Sri Lankan scheelite deposits have not proved to be economically important. The small-scale mining that produced the stones found to date has now come to a virtual halt.

REFERENCES


