Module B. Colour from the Cosmos

Lesson 15: Beryl Geology and Geography

The Geology of Gem Beryl: Four Genetic Models

An attempt to classify beryl deposits based solely on economics might result in two categories, those related to pegmatite and and those *not* related to pegmatite. (Recall your reading on pegmatites, assigned for Lesson 5, on page 36 of the textbook.) This scheme, however, neglects to consider the great diversity of environments in which gem beryl deposits can form. Nevertheless, for the sole purpose of finding gem beryl, this type of approach would likely yield the largest number of positive results since pegmatites are relatively easy to identify in the field and can host many other gemstones, too. A search for pegmatite-hosted gem beryl may not result in the best value of gem beryl, however, because the most valuable and rarer gem beryls are often found in unusual environments. The red beryls from Utah, emeralds from Colombia, and dark blue beryls from Yukon Territory are very good examples of these unusual environments.

An efficient way of finding and studying beryl deposits (and all other gem deposits for that matter) is by identifying the source of the necessary components, understanding subsequent transport mechanisms, and by defining the events that cause deposition (or crystallization). Because gem beryl requires the element beryllium in its crystal structure, a search for beryllium is a good way to find gem beryl. In the next sections, we will learn more about the geological models of beryllium enrichment, namely pegmatitic, magmatic,metamorphic, and secondary, which can lead to the crystallization of gem beryl.

In searching for gem minerals, we must recognize the requirement of a favorable growth environment to produce stones that are sufficiently large and transparent to semi-transparent to be considered for faceting into cut gems. These two variables further restrict the environments in which gem quality beryl is found. For larger crystals, one must typically have open space cavities or robust growth within a solid rock. For clarity of a stone, a stable and nurturing growth environment is also important. Although important considerations, these aspects of gem deposits are obviously less critical than finding an occurrence in the first place!