

## INTRODUCTION

Spherulites are usually rounded or spherical objects found in rhyolitic obsidian. They usually comprise acicular crystals of alkali feldspar that radiate from a single point. The radiating array of crystalline fibers typically have a similar crystallographic orientation such that a branch fiber departs slightly but appreciably from that of its parent fiber (Keith and Padden 1963). Individual fibers range from 1 to several micrometers in diameter. The spherulites most likely form by heterogeneous nucleation on microscopic seed crystals, bubbles, or some other surface at high degrees of supercooling. They grow very rapidly stabilizing their fibrous habit and typically range in size from microscopic to a few cm in diameter.

Examples of spherulites larger than a few centimeters are rare, but large megaspherulites have been reported at Silver Cliff, Colorado (Cross 1891, 1896; Iddings 1909; Siems 1965, 1967, 1968; and Smith et al. 1994); Steens Mountain, Oregon (Fuller 1931); and Klondyke, Arizona (Simons 1962). Megaspherulites with diameters up to 0.91 m have been noted by Fuller (1931) in the "upper laminated rhyolite" from Steens Mountain, Oregon and up to 1.83 m by Simons (1962) in a vitrophyric welded tuff from Klondyke, Arizona. Megaspheres occurring in the state of Jalisco, Mexico, developed in a matrix of a hot ash-flow tuff and have diameters ranging between 0.61 and 3.35 m (Stirling 1969). Stirling suggests that crystallization began when nuclei of glass particles released hot gases which moved outward in all directions, promoting the crystallization of adjacent glass particles, and thereby forming the megaspheres (Stirling 1969). Because Stirling did not observe radiating crystalline fibers, they did not consider them to be megaspherulites.

The Silver Cliff volcanic district is in south central Colorado, approximately 40 km southwest of Cañon City (Fig. 1). Volcanism occurred over a five million-year period beginning in late Eocene