INTRODUCTION

Spherulites are typically rounded or spherical objects found in rhyolitic obsidian. They are usually composed of acicular crystals of alkali feldspar that radiate from a single point. The radiating arrays of crystalline fibers typically have a similar crystallographic orientation such that a branching fiber departs slightly but appreciably (i.e., a few degrees) from the orientation of its parent fiber (Keith and Padden 1963, 1964a, 1964b). The fibers are also characterized by a time-independent growth rate and non-crystallographic branching, which allows the crystalline fibers to maintain the same diameter as the spherulite grows (Kirkpatrick 1974). Individual fibers range from 1 to several µm in diameter. The spherulites most likely form by heterogeneous nucleation on submicroscopic seed crystals, bubbles, or some other surface at high degrees of supercooling. The fibers grow very rapidly (>10^4 cm/s), stabilizing their fibrous habit, and become spherulites that typically range in size from microscopic to a few centimeters in diameter (e.g., Keith and Padden 1963; Kesler and Weiblen 1968; Lofgren 1971a, 1971b; and Penn 1977).

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; Smith et al. 1994; and Tremallo et al. 1998), 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 suggested 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, he did not consider them to be megaspherulites.

The Silver Cliff volcanic district is located in the Wet Moun-