Mountain Basalt–Spilite Group may be comagmatic with the layered complex and could have been deposited on the Tillman Metasedimentary Group (Ham and others, 1964).

Layered-complex rocks were intruded by the Roosevelt Gabbros. However, the recommended age of the gabbros (535 m.y.) and their equivalence to layered-complex rocks are subject to question (Powell and others, 1980) (see Bowring and Hoppe, this guidebook). The Carlton Rhyolite and Wichita Granite Groups were emplaced almost simultaneously at about 525 m.y. Ham and others (1964) suggested that a major period of uplift and faulting occurred between emplacement of the Roosevelt gabbros and the Wichita granites.

Post–Carlton–rhyolite diabase and rhyolite dikes were the last igneous event in southern Oklahoma. Subsequent subsidence led to the deposition of at least 18 km of Paleozoic sedimentary rock during the formation of the Southern Oklahoma Aulacogen. The aulacogen was partially destroyed by Pennsylvanian uplift, which exposed the igneous rocks. This terrane was subsequently buried and is now being exhumed.

In the Fort Sill area, the Mount Scott Granite has intruded as a sill-like mass beneath the Carlton Rhyolite and above the Raggedy Mountain Gabbro, presumably along the old erosion surface. Some of the most compelling evidence that the Carlton Rhyolite was intruded by the Mount Scott Granite is in Fort Sill Military Reservation just west of Lawton, Oklahoma. In this area, the Mount Scott–Carlton intrusive contact is well exposed at a number of places. Along this contact, in the region of Lake Elmer Thomas, there occurs a large outcrop of metamorphic rock. This unit was originally included with the Davidson Granophyre (Hoffman, 1930). Ham and others (1964) reinterpreted the rock as a hornfels, which was produced when Mount Scott granite intruded overlying Carlton rhyolite. These authors presented compelling petrographic evidence that the rhyolite has been metamorphosed or hydrothermally altered. This evidence includes silicification and sericitization of the rock, with flow banding and phenocrysts still preserved. Ham and others suggested that the metamorphism gradually increases downward toward the granite. While these relationships certainly hold for some of the Carlton Rhyolite, we suggest a different interpretation for the rocks exposed on the southern shore of Lake Elmer Thomas, near the base of Pratt Hill (see map for Stops 4 and 8).

FIELD RELATIONSHIPS

The Carlton Rhyolite and metamorphic rocks are well exposed on the north side of Pratt Hill. For the sake of brevity, these metamorphic rocks are called the Pratt Hill quartzite in this paper. This is an informal field term and is not intended for use as formal nomenclature. The rhyolite caps the hill, and the contact between it and the underlying quartzite occurs near the base of the hill, along a steep slope on the north side. From this slope, the contact extends both to the east and west where the hill slopes less steeply, and in these areas the contact is generally not exposed. Our study concentrated on this steep, northern part of the hill where the contact is well exposed in several places. The contact is very sharp, and on the remainder of the hillside, where the contact is not exposed but the two rock types are in close proximity, a sharp contact is also indicated. The contact is generally east-trending across the hillside, and is irregular in elevation. It occurs at water level near the middle of the hill, and climbs to about 20 m above water level (visual estimate) toward the eastern part of the steep northern slope. Measurements taken along the contact indicate that it dips about 10° to the southeast and strikes N. 60° E. on this hillside. Near the western edge of the hill, the quartzite reappears above water level, along a small creek, and extends westward to the "Hideaway" area on the southwestern shore of the lake (see map for Stops 4 and 8). Whether the quartzite reappears along a fault or simply occurs owing to structural irregularity is unknown.

The quartzite is well exposed, and appears generally greenish-gray in outcrop. It is highly jointed, with one especially prominent joint set dipping 20° to the south and striking about N. 70° W. Although not prominently bedded, the unit contains local bands that are mineralogically inhomogeneous, which suggests crude bedding; these bands parallel the prominent joint set so that its attitude is taken to be that of the quartzite unit. The unit preserves no recognizable sedimentary structures, except that some of the jointing occurs as curved fractures that strongly suggest cross-bedding. The upper 25 cm of the unit is noticeably darker, and rocks exposed at the "Hideaway" are more brown than green-gray. These color changes are discussed below.

The Carlton Rhyolite exposed just above the contact is reddish brown and is clearly an ash-flow tuff, as indicated by the prominent occurrence of fiamme. The unit strikes N. 80° W. and dips 35° to the south, as indicated by the attitude of fiamme. The unit is porphyritic, with well-displayed phenocrysts of quartz and alkali feldspar.

PETROGRAPHY

Two thin sections of Carlton rhyolite were taken immediately above the contact with the underlying quartzite. The modes of these samples are summarized in table 12. The rock is hiatal porphyritic with phenocrysts of quartz (5 percent) and orthoclase (10 percent) in a matrix of quartz and feldspar intergrowths (fig. 30).

Quartz occurs as euhedral to subhedral phenocrysts (1 to 3 mm in diameter), rarely as oval polycrystalline aggregates (about 0.2 mm in diameter), and as microlites in the matrix. Orthoclase occurs as rectangular euhedral phenocrysts (3 to 4 mm long), as crystal fragments, and as microlites in the matrix. Phenocrysts are partially altered to white micas, clay minerals, and rarely epidote. Feldspar crystals con-