mentary and not all hornfelsed rhyolite. This was particularly true at Pratt Hill on the south side of Lake Elmer Thomas, where both hornfelsed rhyolite and Meers Quartzite occur intimately together (see Stops 4 and 8; and Sides and Miller, this guidebook). In correction of Hoffman, the Davidson Granophyre in the Easter Pageant (Holy City) area, NE¼ sec. 17, T. 3 N., R. 13 W., is hornfelsed rhyolite, whereas the Davidson south of Mount Scott, sec. 14, T. 3 N., R. 13 W., is metasedimentary.

Problem and Proposal

From Taylor (1915) on through Ham and others (1964) to Powell and others (1980) and Sides and Miller (this guidebook), all workers have treated the Meers Quartzite as inclusions in the igneous rocks of the Wichita province. However, since the Glen Mountains Layered Complex and Roosevelt Gabbros were recognized as separate and distinct intrusive events by Powell and others (1980), and each was thought to have quartzite inclusions, a profound problem with the Meers has emerged. What stratigraphic and structural position could the Meers have that would enable three different magmas—two gabbroic and one granitic—to acquire pieces of it, particularly with an erosional interval separating the gabbros from the granite? The only possible answer seems to be that the Meers is in the crustal column below the gabbro, at least 4 km below the present surface. This answer generates another problem: How could a low-density quartzite be found in the middle of a gabbroic lopolith, where the original tholeiitic liquid should have floated it? While this question might be answered, more complexities and improbabilities immediately arise, so that a rethinking of the basic relations is necessary.

A review yields the following situations:

1. As presently understood, Meers inclusions occur in (a) the Glen Mountains Layered Complex at only two localities, one of which is SW NE SW NW sec. 32, T. 4 N., R. 13 W.; (b) the Roosevelt Gabbros, in the Mount Sheridan member south of Meers, as the type example at NE NE SE sec. 32, T. 4 N., R. 13 W., and in nearby areas; and in the Sandy Creek member as a new report from Stockton and Giddens, Stop 3, NE NE SW sec. 4, T. 3 N., R. 15 W.; and (c) the Wichita Granite Group, in the Mount Scott Granite at several places, for example, NE SW SW SE sec. 34, T. 4 N., R. 14 W., and as a new report from Stockton and Giddens, Stop 3, SW NE NE SE sec. 8, T. 3 N., R. 15 W.; and in the Quanah Granite as a new report from Gilbert, Stop 5, SE SW SE sec. 23, T. 3 N., R. 14 W. Many of the occurrences of metasedimentary rocks in the granites of the western Wichitas (Merritt, 1958) might now have to be included within the Meers unit. The Meers is part of the Tillman Metasedimentary Group and older than the Glen Mountains Layered Complex.

2. The Meers Quartzite consists of two distinct facies, a quartzite and a "graywacke" or feldspathic sandstone. The relationship between these facies is unknown although in places they do occur together. Two different sedimentary units of different ages may have been inadvertently grouped together, and Sides and Miller (this guidebook) argue for such an interpretation. The pure quartzite facies is not known from the subsurface Tillman. Sides and Miller suggest that the dirty quartzite (graywacke facies) of Pratt Hill (Stop 8) is not Meers but a post-gabbro quartzite developed on the erosional surface, predating the rhyolite. In fact, a similar interpretation in mapping in the eastern Wichitas had been used by considering some of these quartzite–sandstone outcrops to be a volcaniclastic basal portion of the Carlton Group. However, Sides and Miller do not see much evidence for volcanic materials in the dirty quartzite.

3. Review of available information suggests a revised interpretation for the Meers. Consider the following points. From the beginning, a range of sandstone types, from pure to dirty quartzite, have been included in the Meers, although the pure type has been emphasized by most workers. Our own work shows a range in metamorphic grade for the quartzite, from chlorite-bearing through andalusite-bearing, to sillimanite-bearing. This suggests recrystallization of the same rock types along a steep temperature gradient. The only quartzite outcrops that can be seen unequivocally immersed in igneous rock are in granite and rhyolite. All of these appear to be near or along the base of the granite and rhyolite sections. The only outcrops of quartzite that had been thought to be in gabbro also occur near or *at* the granite–gabbro contact, a surface of unconformity. The high-grade metamorphism of the quartzite (sillimanite-bearing) was always thought to be due to the gabbro (Hoffman, 1930; and Merritt, 1948), but this was not the only heat source available. The granites are high-temperature types at 950°–1,000°C, as discussed earlier, and well above the low-pressure, minimum temperature of stability of sillimanite at 800°–850°C (Richardson and others, 1969). Therefore, the proposal here is that the Meers is not correlative with the Tillman but is younger than the Raggedy Mountain Gabbro Group and predates, or is basal to, the Carlton Rhyolite Group, as shown in table 10. This means that (1) the metamorphism of the quartzite is due to the granite (and rhyolite, to a lesser extent); (2) the variation in degree of metamorphism is a function of envelopment in the granite, and the lower grade samples must lie below the base of the granite; (3) the outcrops listed as in the gabbros are actually just at the unconformity, lying on the gabbro, and are not inclusions in it, contrary to all earlier discussions; and (4) the metasedimentary xenoliths common in parts of the western Wichitas (Merritt, 1958) are probably fragments of the Meers Quartzite as well.

The unusual aspect of these interpretations is the removal of the quartzite from stratigraphic position beneath the gabbros. This may have additional implications with respect to the age of the Tillman, for it is unclear how much weight Ham and others (1964)