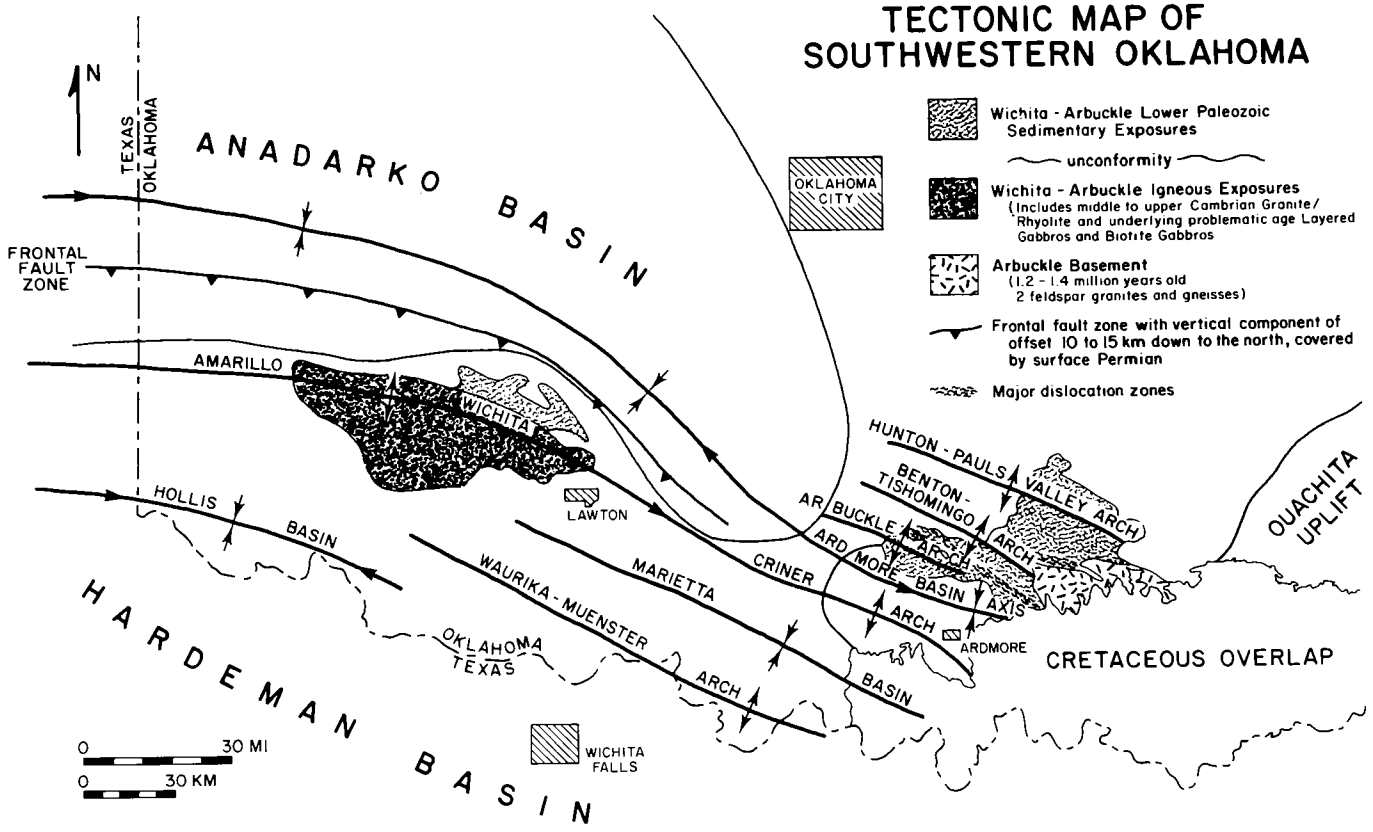

Figure 1. Tectonic map of southwestern Oklahoma. From Powell and others (1980, Part II, fig. 1).

Interestingly, the surface topography of the Wichita Mountains also is unusual because it is a fossil Permian surface just now being uncovered (fig. 3). No really substantial modifications by recent weathering or erosion have altered the fundamental forms developed 200 m.y. ago. Whereas this fact has been known, in part, for some time (for example, Evans, 1929), the extent of the preservation has only now begun to be appreciated. Gilbert (1979) recognized the topography as a classic example of the tor type. Implications for the tectonic history and surrounding Permian sediments are now being explored.

Figure 4 is a simplified version of the basement of Oklahoma and nearby Texas. The oldest basement in the immediate region appears to be in the Eastern Arbuckle province (Bickford and Lewis, 1979; Denison, 1978), where ages as old as about 1.4 b.y. are now accepted. A number of apparently younger provinces were delineated by Denison (1966) in Oklahoma and by Muehlberger and others (1967) in Texas. The relations between and among these younger terranes are unknown. Commonly, however, rhyolites and shallow-seated granites dominate, implying only modest amounts of erosion before Cambrian time. Of special note are two provinces, the Tillman Metasedimentary Group and the Wichita Mountains igneous assemblage. The Tillman is the only terrane where low-rank metasediments are important. The work of Brewer and others (1981, 1982), as described later in this guidebook (Brewer), now indicates that these rocks may only be the top portion of a huge Proterozoic basin whose size (depth) may rival that of the Paleozoic Anadarko. Ham and others (1964) first erected the Tillman Group and assigned to it the limited outcrop of Meers Quartzite in the Wichita Mountains. This assignment is discussed by me later in this article, and by Sides and Miller in a following article.

The igneous rocks of the Wichita Uplift are a bimodal suite of (1) substrate exposed gabbros (Raggedy Mountain Gabbro Group) and buried basalts (Navajoe Mountain Basalt–Spilite Group), and (2) overlying rhyolites (Carlton Rhyolite Group) and granites (Wichita Granite Group). No other exposed province in the Midcontinent, nor other identified nearby basement, has layered gabbros similar to those in the Wichitas (Glen Mountains Layered Complex). Furthermore, the younger units of the group (Roosevelt Gabbros) intrusive into the complex, are of a distinctive, biotite-bearing, hydrous tholeiitic character (Powell, this guidebook), not found in other nearby parts of the basin. Bowring and Hoppe (this guidebook) are able to show convincingly that at least some of these younger gabbros are 550 m.y. in age, limiting the erosional interval that preceded the major rhyolite–granitic period. The felsic rocks are similar in petrographic character to many others of the Midcontinent basement, for example the Saint Francois Mountains of southeastern Missouri, but are only ~525 m.y. in age in comparison with ~1,500 m.y. in Missouri.

Figure 5 (Gilbert, 1981b) is a summary description