placed on the accepted surface relations in the Wichitas. A variation on the theme advanced above is the alternative that the Meers is part of the Tillman, but making all the Tillman younger than the gabbro. In any case, a large sedimentary section, pre-Reagan in age, is thought to exist in southern Oklahoma and northern Texas, from the COCORP study (Brewer and others, 1981; Brewer, this guidebook). The precise dating of these rocks becomes increasingly important in unraveling the regional tectonic history.

POST OAK CONGLOMERATE AND WICHITA MOUNTAINS GEOMORPHOLOGY

Numerous outcrops of the Post Oak Conglomerate of Permian age (Hennessey Group) are evident in the eastern Wichitas. Figure 3 shows the general relations of the Permian units on the substrate lower Paleozoic sequences. A close correlation exists between the Post Oak and the topographic forms of the mountains. Even though Taff (1904) had thought that the conglomeratic sedimentary facies surrounding the Wichitas was Permian, Hoffman (1930) considered the facies as Pleistocene gravels. Chase (1954) first treated these rocks as a separate, mappable Permian unit with the name "Post Oak." He thought that the unit represented the last tectonic movement of the Wichita Uplift. Interpretation of the origin of the rounded granite and rhyolite boulders and cobbles, so common in the facies, was largely lacking until recently. Gilbert (1979) and Al-Shaieb and others (1980) pointed out that the rounding is due to spheroidal weathering, and not transport. Gilbert (1979) was the first to recognize the topography underlain by granite as the tor type (Twidale, 1976). The following discussion is aimed at Post Oak–granite relations, whereas Donovan (this guidebook) should be consulted for aspects of Post Oak–limestone relations.

Tor topography is generated on a generally homogeneous substrate that has been fractured, horizontally and vertically, in a regular way. The shapes of the boulders that ultimately result are a function of fracture spacing; the sizes are limited by the fracture spacing and by the degree of weathering. A distinct period of tectonic quiescence is necessary, allowing weathering to predominate over erosion. Low-relief landscapes presumably form during the time interval. An important point is that the rounding process is entirely subsurface, in an essentially H_2O-saturated environment. Hydrolysis proceeds along the fracture surfaces and out into the blocks from all sides, with minimum energy configurations yielding subspherical reaction surfaces. Near the land surface, the blocks may be entirely disaggregated and disintegrated (fig. 19); at depth, the rock is nearly pristine. Between the surface and depth, an inverse gradation occurs in volume of weathered material and unweathered core–stone-sized blocks.

Eventually, the regime changes and erosion predominates over weathering. This could be due to renewed uplift and (or) to a climate change such as increased rainfall. The weathered rind of the fractured blocks is stripped off differentially to become arkosic sand, silt, and clay, with the core-stones lagging somewhat behind as (1) tors (columns of rounded boulders), (2) boulder streams, so well developed on Mount Scott, and (3) conglomeratic sheets in low-relief areas. That the conglomerates fill in valleys can be seen in the Central Lowland (Quanah Parker Lake to French Lake, secs. 16–17, 21–23, T. 3 N., R. 14 W.). This requires an original topography that was developed in several distinct stages. The valleys had to form before substantial stripping of the surrounding knobs, because debris from the knobs fills the valleys.

Finally, the Post Oak facies as well as the igneous knobs were buried in shaly material derived externally, presumably from the east. Thus, the Permian topography was buried and only now is being exhumed. Most of the present mountain forms, down to outcrop scale, are Permian. This picture helps to

TABLE 10.—PROPOSED REVISION IN PROTEROZOIC(?) TO MID-CAMBRIAN LITHOSTRATIGRAPHY

Cambrian	Wichita Granite Group	
	Carlton Rhyolite Group	
		Meers Quartzite
Proterozoic ?	Raggedy Mountain Gabbro Group	
	Tillman Metasedimentary Group	

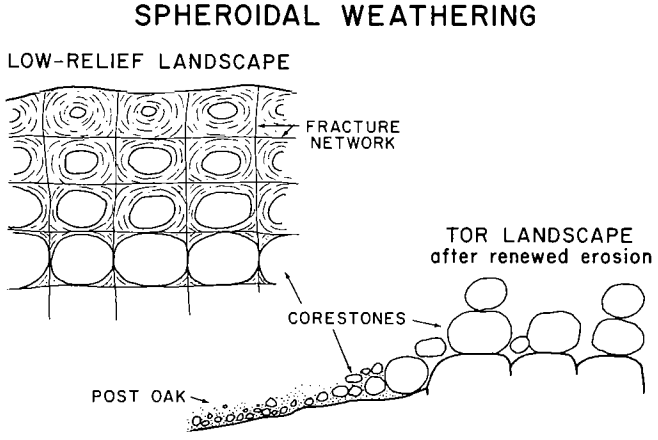

Figure 19. Drawing showing how development of spheroidal weathering can eventually lead to a tor landscape on granitoid rocks. This is origin of topography in much of Wichita Mountains and Post Oak Conglomerate. Boulders and cobbles of Post Oak are mostly corestones with shapes derived through Permian weathering before erosion rates increased. Subsequently, limited transport redeposited them as conglomerate. See Twidale (1976) for general discussion of such processes.