Stockton and Giddens, and chemical studies of the Sandy Creek Gabbro by Powell, all bear out this relation. Some of the data are presented in the field-stop descriptions. This unconformity becomes the surface upon which the 525–500–m.y. Carlton Rhyolite Group extrudes and along which some units of the chemically equivalent Wichita Granite Group intrude. Gilbert (1978d) noted the large preponderance (10:1) of rhyolite to granite, which is also a peculiar feature of the region. Because rhyolites are extremely susceptible to post-emplacement alteration, chemical studies of the granites are expected to provide a better measure of the pristine igneous liquids. Myers and others (1981) used the A-type designation for those liquids. Gilbert (1978d, 1982) pointed out the large amount of Cambrian basaltic liquid necessary somewhere in the crustal column to go with the rhyolite liquid, either as a chemical source or a heat source. This is indicated in figure 5 by basaltic unit 4. Our only measure of this material is probably the late diabasic dikes and plugs which cut all other igneous units. Tensional strains are shown by normal faulting during and preceding volcanism, as argued first by Ham and others (1964) and also by Brewer and others (1982). Whether the aulacogen should be dated as beginning from this mid-Cambrian faulting, or the earlier Burch Fault, is not resolved. A net uplift results, owing to the build-up of the extrusive pile to a thickness of perhaps several kilometers in places.

Stage 4 represents the slow, overall subsidence of the Anadarko Basin region to receive 4 to 6 km of carbonate muds and shelf-type carbonates on the igneous substrate of the Wichita province. This subsidence carried forward from the Late Cambrian to the Mississippian, with the deposition center being within the present Anadarko Basin by Silurian–Devonian Hunton time (Amsden, 1975). Cambrian depocenters are unclear because key strata are eroded from the uplift and the deep Anadarko Basin has not yet been adequately sampled.

Stage 5 represents the uplift and formation of structural features as seen today. The uplift began in latest Mississippian to earliest Pennsylvanian time, with a number of pulses each shedding a new flood of debris out into the adjoining Hollis Basin on the south and Anadarko Basin on the north. A major compressional phase seems to be documented by the COCORP results, with large overthrusting of the core area out over the Anadarko. The Pennsylvanian fill of the Anadarko is partly derived from the Wichita Mountains area, particularly the "granite wash." About 3–6 km of section was added to the basin. Subsequently, tectonism waned in the Wichitas while additional sediments were being added to the Anadarko, seemingly from continued activity in the Ouachita tectonic belt to the southeast. Permian sediments accumulated to 2–4 km in thickness, finally burying the Wichita Mountains area, whose igneous core had been exposed. The record is skimpy for deposition during subsequent periods, although it is assumed by some that Cretaceous units eventually covered this area as well. Recent exhumation has exposed the Permian and two Cambrian unconformities, plus all major igneous units, with the exception of the Navajoe basalts.

Additional discussion of some of the stratigraphic units follows, as well as an outline of problems awaiting resolution.

IGNEOUS RELATIONS

General Statement

Table 2 presents the most recent rationalization of basement lithostratigraphy after Powell and others (1980), with proposed modifications of (1) granite terminology from Myers and others (1981) and (2) gabbro nomenclature from Stockton and Giddens (this guidebook; and 1982). A diagrammatic cross section of the igneous relations, as they existed at the close of Carlton Rhyolite volcanism and late diabase emplacement, and before the start of mid-Cambrian sedimentation (Reagan Sandstone), is shown in figure 6. While this diagram is not drawn to scale, it illustrates many key relations well-displayed in the eastern Wichitas; it is also meant to be representative of the whole province, from the way the *exposed* units are distributed.

From the recent dating of the Mount Sheridan Gabbro (Roosevelt Gabbros) at 550 m.y. by Bowring and Hoppe (this guidebook), the erosional interval during which the gabbroic substrate was planed off can now be estimated at less than 50 m.y., and probably less than 25 m.y. This unconformity appears to have been regionally low and planar, but with local relief of at least 100 m, and perhaps as much as 200 m. A saprolitic zone should have developed. Layering in the individual plutons of the Roosevelt Gabbros is both subparallel and at high angles to layering in the host Glen Mountains Layered Complex. Whereas some of the discordance is presumably due to intrusive flow relations, the suggestion is still clear that some tilting of the earlier layered complex may have preceded emplacement of the later gabbros. No systematic studies have been directed to this question.

Onto this mid-Cambrian surface poured out the Carlton rhyolites. As the volcanic stack accumulated, some of the rhyolitic liquid began to intrude the earlier volcanics and along the unconformity, the latter now also becoming an intrusive contact. The resulting Wichita granites are mainly sill-like sheets. Bulbous, pendant-shaped plutons, the common forms of many epizonal and mesozonal bodies, such as those in the Sierra Nevada Batholith, are not known in the Wichitas. A number of unusual, hybrid "igneous" rocks have been recognized in the Wichitas for some time (Huang, 1955). As these are always found along the gabbro-granite contact, it would appear that the origin of these rocks is tied to interaction between the gabbroic saprolite and rhyolitic liquid. Gilbert (1982) also argued that the dominance of rhyolites over granites (Gilbert, 1978d) is due to the