THE PENNSYLVANIAN-PERMIAN BOUNDARY IN SOUTH-CENTRAL OKLAHOMA

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Morgan,[1] in 1924, in his commendable report on the Stonewall quadrangle, placed the top of the Pennsylvanian within his Pontotoc "terrane," which he subdivided as follows:

Konawa formation
Stratford formation
Vanoss formation.

He was in considerable doubt as to the relationship of the Konawa and Stratford formations, but concluded that the Konawa overlapped the Stratford. The writer[2] believes the two to be equivalent, as pointed out previously.

Morgan found a species of the plant genus *Walchia* near the top of the Vanoss formation, and it is principally on this basis that he refers the Stratford and Konawa to the Permian. He states that David White said: "although a *Walchia,* it (Morgan's specimen) is not clearly the species *W. pinniformis,*" though comparable to that species.

W. pinniformis has been reported by Sellards[3] and White[4] from the Wreford and Wellington horizons, in Kansas.

Morgan further quotes David White, as follows: "there are a number of cases in which it is clear that *Walchia* is present in the uppermost horizons of the Pennsylvanian. Yet it is in general so characteristic of the Permian that each such case deserves special inquiry."

In Kansas, the upper Pennsylvanian is known as the Wabaunsee formation, and the overlaying lower Permian as Council Grove, Chase and Marion formations. In Oklahoma the latter three formations are grouped into the Stillwater. In Kansas, these late Pennsylvanian and early Permian formations are typically marine, fossilliferous shales and limestones, and this facies continues for a considerable distance into Oklahoma.

The red shales of the Pontotoc suggest continental origin, and the color change in central Oklahoma, which cuts across the Permian into the Pennsylvanian, suggests that land conditions appeared earlier in the southern area than in the northern.

Could not this earlier appearance of land conditions have permitted a slightly earlier appearance of plants with a Permian facies in the Pontotoc, without indicating absolute Permian age?

Since Morgan's *Walchia* is not identical with the typical Permian *W. pinniformis,* is there not some better evidence for drawing the Pennsylvanian-Permian contact at some other horizon?

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[1]Morgan, Geo. D., Bureau of Geology, Bull. 2, 1924.
[2]Dott, Robert H., Okla. Geol. Surv., Bull. 40-k, 1927, pp. 10, 19, 21.
[3]Sellards, E. H., Univ. Geol. Surv., Kans., Vol. IX, 1909.
[4]White, David, U. S. Geol. Surv. Bull. 211, 1913.

Morgan stresses the presence of arkosic material in the Pontotoc as a characteristic of the group. It is not found lower, and none has been found above the base of Morgan's Asher formation, nor of Unit 1 in Garvin County.[5] The sandstones above that point are different in character, and probably in origin. The shales are considerably brighter red.

An unconformity was found by the writer between the Pontotoc and Enid. Successively younger beds of the Enid seem to rest on Pontotoc conglomerates, shales and limestones south of Wildhorse Creek, on the north flank of the Arbuckle anticline. Birk[6] describes a similar unconformity around the west end of the Arbuckle Mountains.

The writer believes that the marked change in lithology, particularly the disappearance of the arkose, and the unconformity, are reasons which outweigh the presence of the genus *Walchia;* and that the base of the Permian in south-central Oklahoma should be drawn at the base of Morgan's Asher in Pottawatomie County, and at the base of Unit 1 in Garvin County, and that no part of the Pontotoc should be included. This opinion was reached previously and independently by Birk.[7]

[5]Dott, Robert H., loc. cit.
[6]Birk, R. A., Bull. Amer. Assoc. Pet. Geol., Vol. IX, 1925, p. 989.
[7]loc. cit.