DISCUSSION

MAGNETIC-POLARITY STRATIGRAPHY OF TORREJONIAN SEDIMENTS, NACIMIENTO FORMATION, SAN JUAN BASIN, NEW MEXICO

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The recent paleomagnetic study by Taylor and Butler (1980) contains much useful information that should aid in our understanding of the nature of the Torrejonian faunal “zones” in the San Juan Basin. There are, however, several points that must bear further discussion.

The conclusion by Taylor and Butler (1980, p. 111) that the Pantolambda and Deltatherium faunal “zones” represent different times and are not facies or accidents of collecting does not follow from the evidence presented. Taylor and Butler found the “Pantolambda zone” on the west flank of “Arroyo Torrecón” (=Torreon Wash on the U.S. Geol. Survey Deer Mesa, N. M. 7.5’ Quad., 1966), loc. 10 of Sinclair and Granger (1914), to be in a normal-polarity magnetozone directly overlying a reversed-polarity magnetozone which contained the “Deltatherium zone”. They also found that the “Pantolambda zone” on the east flank of Torreon Wash, loc. 11 of Sinclair and Granger (1914), is within a normal-polarity magnetozone and assumed that this is the same magnetozone as the one containing the “Pantolambda zone” on the west flank. This is reasonable, judging from the lithologic and faunal correlations between the two flanks (Taylor and Butler, 1980, fig. 7). They further found that the “Deltatherium zone” in the Big Pocket area of Kutz Canyon, like the “Deltatherium zone” on the west flank of Torreon Wash, is in a reversed-polarity magnetozone. Taylor and Butler’s study, then, essentially shows that in one area the “Pantolambda zone” is in a normal-polarity magnetozone, whereas the “Deltatherium zone” in that same area and in one other locality is in a reversed-polarity magnetozone. Taylor and Butler (1980, p. 111) conclude that since the Pantolambda and Deltatherium “zones” are in different magnetozones on the west flank of Torreon Wash they represent different times throughout the San Juan Basin, as a magnetozone boundary is a time line (Taylor and Butler, 1980, p. 108). When they arrived at this conclusion, Taylor and Butler assumed that all occurrences of Pantolambda-producing horizons in the San Juan Basin are in the same magnetozone; it is thus assumed that the “Pantolambda zone” is a single horizon occurring in the same stratigraphic position throughout the Basin. Taylor and Butler thereby assumed as fact the very premise that is in question. Provenience data recorded for most of the fossils recovered in the San Juan Basin over the last 100 yrs have been imprecise, and at present it is not possible to discern whether the supposed zones occur as single horizons at certain stratigraphic levels or as isolated pockets at various stratigraphic levels in different areas of the Basin. There thus is no evidence that the “Panto-
lambda zone" is a single horizon at a single stratigraphic level everywhere in the San Juan Basin. There may well be "Pantolambda zone" occurrences at different stratigraphic levels and thus in different normal or reversed magnetozones; since Taylor and Butler tested only one "Pantolambda zone," it is not possible to characterize the two "zones" as strictly representing different times throughout the Basin.

The evidence presented by Taylor and Butler could be interpreted differently: the "faunal zones" may result from facies changes which occurred intermittently throughout the Torrejonian, with some facies occurring later than others, therefore appearing higher in the section. It must be shown that the "Pantolambda zone" consistently occurs in a magnetozone above the "Deltatherium zone," and the magnetozones must be correlated between localities and shown to be the same reversed and normal magnetozones from locality to locality before the "zones" can be accepted as chronologically separate. The paleomagnetic evidence would be stronger if a greater number of localities were measured, including the Pantolambda-producing localities southeast of Kimbeto (in the area of Escavada Wash) and in the area east of Cedar Hill (Granger, ms and 1917; Lindsay, Jacobs, and Butler, 1978), and if it were thereby repeatedly shown that the "Pantolambda zone" is in a later magnetozone than the "Deltatherium zone." If the two "zones" are to be accepted as representing different times they must be shown to segregate stratigraphically in the same relative position throughout the San Juan Basin.

Taylor and Butler (1980, p. 107) state that the "Deltatherium zone" is not present at Sinclair and Granger (1914) loc. 11 (east flank of Torreon Wash). However, the "Deltatherium zone" is well represented at loc. 11 according to Sinclair and Granger (1914, p. 316); this is verified by Granger's (ms) record of specimens, which lists 22 specimens, including Deltatherium (Am. Mus. Nat. History specimen 16610), from "East fork Torrejon Arroyo Lower Level." It is important to point this out, as this locality is one of only two localities presently known in the San Juan Basin where both the "Pantolambda zone" and "Deltatherium zone" are present.

Finally, it should be noted that new evidence, to be reported elsewhere, indicates that Mixodectes malaris is present in the "Pantolambda zone" (Tsenta, in press) and that Pantolambda is present in the "Deltatherium zone" (Lucas and O'Neill, 1981). Thus these two taxa can no longer be considered as being restricted to a single "zone" in the Basin (Taylor and Butler, 1980, p. 102). I agree with Taylor and Butler (personal commun.) that as time goes on the extension of the ranges of taxa now thought to be restricted to one "zone" into both "zones" is to be expected. This will no doubt be found to be true for other taxa at present restricted to one "zone" or the other as more fossil discoveries are made. Taylor and Butler's (1980, p. 111) suggestion that in the San Juan Basin Torrejonian a "range zone" concept (Woodburne, 1977)
should be utilized instead of a “faunal zone” concept deserves further consideration.

This study by Taylor and Butler without question provides new and useful data on the Torrejonian of the San Juan Basin; hopefully, more paleomagnetic measurements will be made, as suggested above, so that we may have an even better understanding of the chronostratigraphy of the Torrejonian in the Basin.

REFERENCES


REPLY

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Tsentas’ points are well taken, particularly the first one. His comment provides an alternative interpretation for the Pantolambda zone: that the zone may represent a facies and may be distributed throughout the Torrejonian. We made our interpretation on the presence of data, not its absence. We suggested that the Pantolambda zone is younger than the Deltatherium zone as we had no data to show otherwise. Our original data do not support Tsentas’ interpretation; the burden of proof is on him. Since our article, however, we have (as well as has Tsentas) collected additional data from the San Juan Basin. These new data will permit a re-examination of the Pantolambda and Deltatherium zones.

Tsentas’ second comment is correct, but we differ in its seriousness. Although we did not recover fossils from the lower horizon in loc. 11 and neglected to mention Sinclair and Granger’s (1914) collection, their section clearly shows the Deltatherium zone to be in a stratigraphic