

6. AGE OF THE CLOVERLY FORMATION

The discontinuous fossil record of terrestrial vertebrates and the rarity of Early Cretaceous vertebrate remains in particular preclude precise dating of the Cloverly Formation on the basis of its vertebrate fauna alone. Other evidence must be considered. Peck and Craig (1962) reported that the "Lower Cretaceous" nonmarine sediments of Wyoming and adjacent states (Kootenai, Cloverly, Burro Canyon, Peterson, and Lakota Formations) contain ostracods and charophytes (Cyprideinae and Clavatoraceae) that elsewhere (western interior, Gulf Coast region, Europe, Asia and Africa) are of Aptian age. Unfortunately, no samples were available to them from the Cloverly Formation within the Bighorn Basin. Cloverly samples that were analyzed by them were collected from the Wind River Basin, the northwest flank of the Wind River Mountains, the Jackson Hole area, the Rawlins uplift and the north flank of the Uinta Mountains. Kootenai samples were obtained from southwest and western Montana (Beaverhead and Powell Counties). Thus their samples that are most relevant to this study were collected well outside of our study area. Consequently, until similar analyses are made of the microfauna of the Cloverly Formation within the Bighorn Basin area, we must consider Aptian as only a probable maximum age for these strata. Whether the entire Cloverly sequence, from Unit IV to Unit VII, is of Aptian age is not known. It is of particular interest, however, that Peck and Craig note that collections from the Cloverly "are mostly from calcareous clays associated with the limestones of the middle variegated clay unit". This description seems to correspond to our Unit V, rather than VII, so it is conceivable that the upper part of the Cloverly Formation is Lower Albian. The occurrence within our study area of *Inoceramus comancheanus* and *Haplophragmoides gigas* (Eicher, 1962) in the upper 25 feet (7.6 m) of the Thermopolis Shale (as that unit was redefined by Eicher in 1960) establishes a minimum age limit of Middle Albian for the underlying Sykes Mountain and Cloverly Formations.

As I noted above, two undescribed specimens from the Glen Rose Formation of the Trinity Group of northern Texas appear to be conspecific with specimens from the Cloverly Formation. One is a skull (OU 8-0-S2) that seems referable to *Tenontosaurus tilletti*. The other is a complete turtle skeleton (FMNH PR-273) referable to *Naomichelys speciosa*. Unfortunately, precise stratigraphic data are not available for these specimens, but both are recorded as from the Glen Rose Formation. Stanton (1947), on the basis of numerous collections of pelecypods and gastropods from the Trinity Group, has judged the Glen Rose Formation to be basal Middle Albian in age. Thus the Glen Rose appears to be slightly older than the Thermopolis Shale and younger than the ostracod-charophyte faunas of middle or lower(?) Cloverly. Both of the above specimens require careful study to ascertain whether in fact they are conspecific with Cloverly specimens.