

AMPHIBIANS AND REPTILES OF THE LATE HEMPHILLIAN WHITE CONE LOCAL FAUNA,
NAVAJO COUNTY, ARIZONA

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Hemphillian Land Mammal Age (late Miocene) paleoherpetofaunas are fairly well represented from the midcontinental region of North America (Parmley and Holman, 1995), but amphibians and reptiles of this time period are poorly known from the western United States (Holman, 2000). Here we present the findings of a study of a small, but diverse late Hemphillian paleoherpetofauna (White Cone local fauna) from Arizona. A brief discussion of the paleoherpetofauna was provided by Peck and Parmley (2000), but this report is the first detailed account of the paleoherpetofauna. It represents the first paleoherpetofauna of this age from what is now the southwest desert region of North America (Holman, 2000). These findings are important in that they significantly add to our knowledge and understanding of amphibian and reptile biodiversity of the southwestern United States approximately 6.5 Ma.

The White Cone herpetofauna comes from the upper member of the Bidahochi Formation located on joint use land of the Navajo and Hopi Indian Nations in Navajo County, northeastern Arizona (Repenning et al., 1958; Baskin, 1978, 1979). The age of these sediments is considered to be early late Hemphillian (ca. 6.5 Ma) based on its mammalian fauna (Baskin 1978, 1979) and a radiometric date of 6.69 ± 0.20 Ma derived from basalts near the White Cone sediments by Scarborough et al. (1974).

SYSTEMATIC PALEONTOLOGY

The White Cone fossils reported here are deposited in the vertebrate paleontological collections of the University of Arizona Laboratory of Paleontology (UALP). Recent comparative skeletons in the herpetological collections of Georgia College and State University were used to aid in fossil identifications. The classification system here follows Banks et al. (1987) and Holman (1995).

Class AMPHIBIA Linnaeus, 1758
Order ANURA Rafinesque, 1815
Family BUFONIDAE Gray, 1825
BUFO PLIOCOMPACTILIS Wilson, 1968
(Fig. 1A)

Material—Two left ilia: UALP 23405, 23417.

Remarks—Ilia of this extinct toad are distinct and distinguished mainly by their small size and high, relatively narrow dorsal prominences (Wilson, 1968; Holman, 1975). Sanchiz (1998) suggested that there was insufficient evidence (nomen dubium) to support this taxon, and that it actually may represent the Recent species *B. compactilis*. While the White Cone fossils clearly resemble *B. compactilis* in ilial characters, they also differ from the Recent species enough to retain *B. pliocompactilis* as a distinct taxon. The fossils have higher, more robust dorsal prominence-protuberance complexes, longer subacetabular expansions, and slightly larger acetabular fossae than Recent *B. compactilis*. Based on Recent toads of known size, the White Cone ilia represent toads in the 30–35 mm snout-to-vent range. *Bufo pliocompactilis* previously was reported from older Miocene deposits (Clarendonian, Kansas: Wilson, 1968; Holman, 1975; mid-Hemphillian, Nebraska: Parmley, 1992). The presence of this small toad in the White Cone l.f. extends the temporal range of the species from the mid-Hemphillian (Parmley, 1992) into the late Hemphillian.

BUFO WOODHOUSII Girard, 1854
(Fig. 1B)

Material—Two right ilia: UALP 23406, 23407.

Remarks—The ilial characteristics of *B. woodhousii* have been discussed previously (e.g., Tihen, 1962; Holman, 1971; Parmley, 1988a). The White Cone ilia compare well with living *B. woodhousii* in having high dorsal prominences with relatively steep anterior and posterior slopes. In Recent *B. woodhousii* the posterior slope is often shorter and steeper than the anterior one, as it is with the fossils (Fig. 1B).

BUFO sp. indet.

Material—One right scapula: UALP 23408.

Remarks—*Bufo* scapulae do not appear to be diagnostic at the species level, but they may be separated reliably at the generic level from those of *Rana* and *Scaphiopus* (Parmley, 1992). *Bufo* has a wider glenoid opening than *Rana* or *Scaphiopus*, mainly because of a more laterally deflected coracoid in *Bufo* which accommodates a robust humerus. In addition *Bufo* lacks the well-developed clavicular blade that is present on the clavicular process of *Rana* and *Scaphiopus* scapulae. Although not specifically identified, the fossil scapula clearly is too large to represent *B. pliocompactilis*.

Family PELOBATIDAE Bonaparte, 1850
SCAPHIOPUS (SCAPHIOPUS) sp. indet.
(Fig. 1C)

Material—One right ilium: UALP 23409.

Remarks—*Scaphiopus* was divided into two subgenera (genera of some, see discussion in Kluge, 1966) based (in part) on ilial characters (Zweifel, 1956; Chantell, 1964): *Scaphiopus (Spea)* and *Scaphiopus (Scaphiopus)*. *Scaphiopus (Spea)* ilia are identified by a wide subacetabular expansion, usually lacking a dorsal protuberance but if present, weak and rounded, no preacetabular fossa, and a weak dorsal acetabular rim. *Scaphiopus (Scaphiopus)* ilia are identified by a narrow subacetabular expansion, the presence of a dorsal protuberance that is usually ridge-like, preacetabular fossa present, and a strong dorsal acetabular rim. Within these definitions, the White Cone ilium best fits the *Scaphiopus (Scaphiopus)* complex in that it has a relatively narrow subacetabular expansion, a well defined ridge-like dorsal protuberance, and a preacetabular fossa. The dorsal acetabular rim is weak as in *Scaphiopus (Spea)*, but it appears to be worn. Beyond the subgeneric level, we are unable to assign the fossil to species because it does not match well with any extinct or Recent species of the *Scaphiopus (Scaphiopus)* group available to us. It may represent an extinct member of this subgenus, but additional fossil material is needed to determine this. It is worth mentioning, however, that the fossil clearly differs from the extinct Miocene species *S. neuter* Kluge. The White Cone ilium is less robust with a smaller dorsal protuberance and has a compressed ilial shaft rather than a round one as in *S. neuter* (Kluge, 1966).

Family RANIDAE Gray, 1825
RANA sp. indet.
(Fig. 1D)

Material—One right ilium: UALP 23418.

Remarks—*Rana* ilia are distinct at the generic level (Parmley, 1992) but are difficult to identify at the species level (Parmley, 1988b). In-