

REINVESTIGATION OF LATE TRIASSIC FISH SITES IN THE CHINLE GROUP, SAN JUAN COUNTY, UTAH: NEW DISCOVERIES

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FIELD INVESTIGATIONS of the Chinle Group, particularly the Owl Rock Formation, on Utah State Institutional Trust Lands in the area of Lisbon Valley (Figure 1.1) resulted in the collection of hundreds of specimens, consisting of fish, mollusks, tetrapod remains, plants, invertebrate traces, and tetrapod tracks, including coelophysoid theropod footprints. Exploration in the area was sparked by an interest in obtaining some of the well-preserved Late Triassic fossil fishes described by Schaeffer (1967) for the Utah Museum of Natural History in Salt Lake City.

Walter Elkington of Ogden, Utah discovered several *in situ* fish in the middle of the Owl Rock Formation. Minor

quarrying took place in 2004, followed by a week of extensive excavation at the same site in 2005. Several horizons of well-preserved fishes were quarried at this locality, now coined “Walt’s Quarry” (Figure 1.2).

The facies in Walt’s Quarry display a series of green, extraformational pebble conglomerate (0.1-4 cm grain sizes) commonly containing various sizes of bone fragments along with tetrapod teeth. These conglomerates are interbedded with reddish-brown, purple, gray, green, and yellow-brown sheets of mostly siltstone and fine-grained sandstone with occasional mudstone and friable shales. Many of the fish-bearing beds of fine sandstone and siltstone contain small, localized accumula-

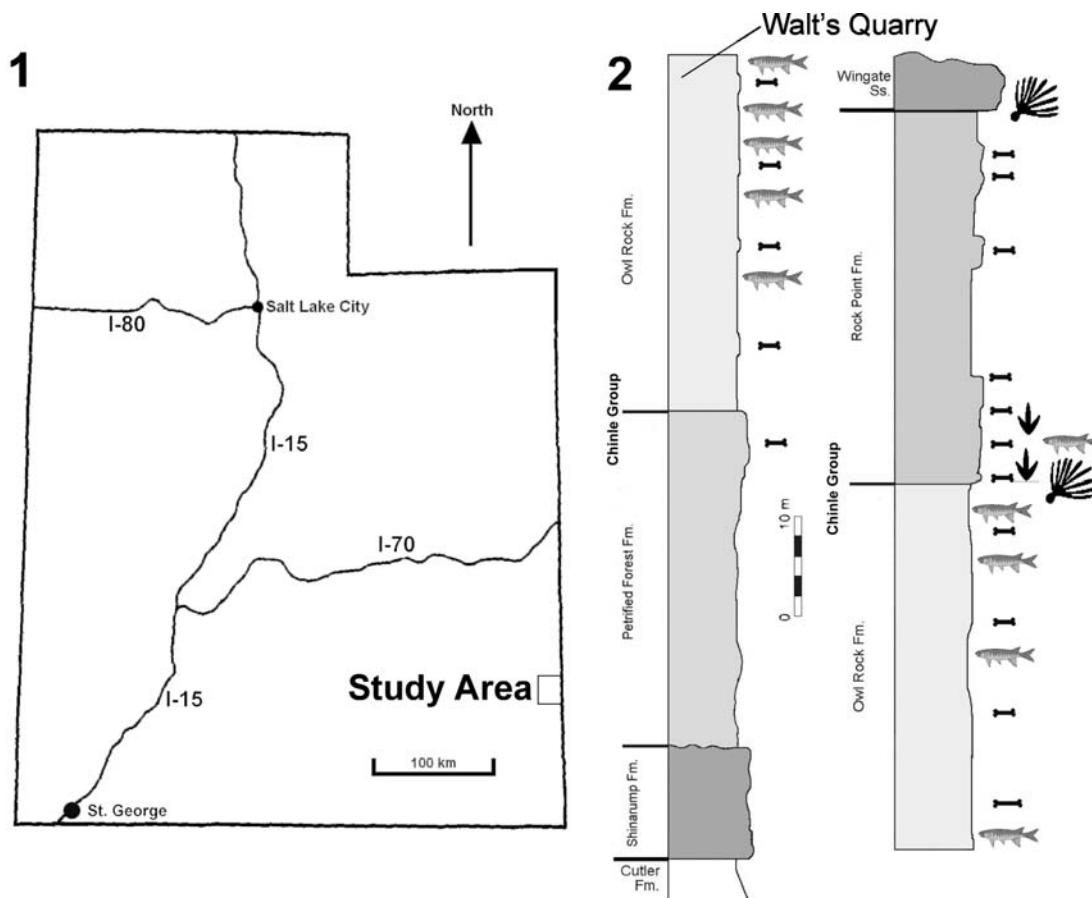


Figure 1. 1. Map of Utah showing the approximate study area (exact locality information available to qualified researchers at the Utah Geological Survey and/or the Utah Museum of Natural History); 2. Generalized stratigraphic section illustrating location of “Walt’s Quarry” within the Owl Rock Formation of the Chinle Group. The approximate localities for tetrapod bones, fish plants, and vertebrate tracks are indicated. Modified after Lucas measured section (pers. com., 2006).

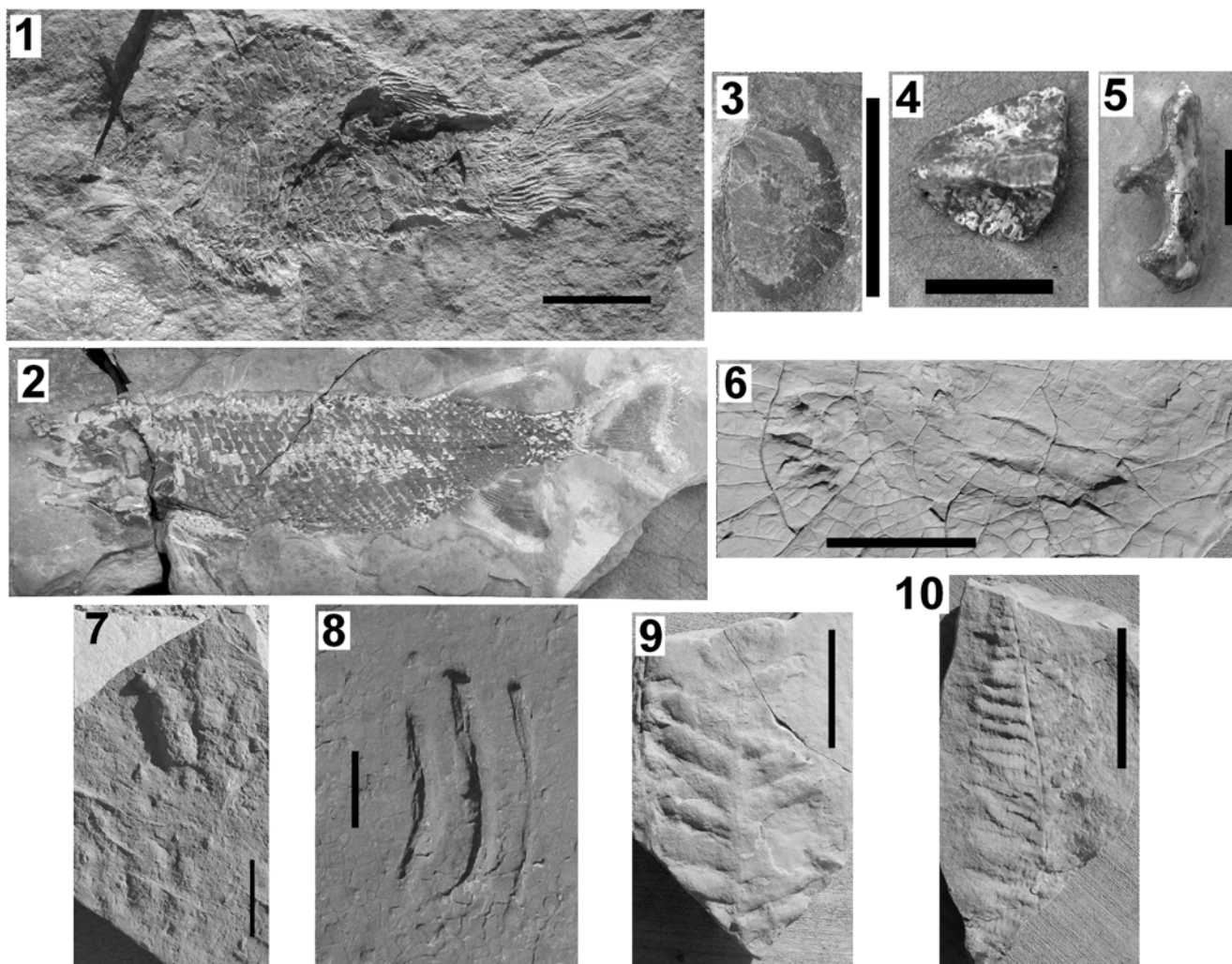


Figure 2. Body and trace fossils from the Upper Triassic Owl Rock and Rock Point formations, Chinle Group, San Juan County, Utah. 1. Nearly complete specimen of a semionotid *Semionotus* n. sp.; 2. Well-preserved redfieldiid *Cionichthys dunklei*; 3. Conchostracan arthropod found in possible "living position"; 4. Aetosaur scute; 5. Phytosaur mandible fragment displaying two partial tooth sockets; 6. Possible phytosaur tracks (*Apatopus*?); 7. Two partial *Grallator* footprints; 8. Very large phytosaur swim track; 9. Cycad leaf impression, cf. *Zamites powellii*; 10. Fern frond, cf. *Cynepteris*. Scale bars: 1, 3 and 4 = 2 cm; 2 and 5 = 1 cm; 8 = 10 cm; 6, 7, 9 and 10 = 5 cm.

tions of both extraformational pebbles with grains no bigger than 0.5 cm, and intraformational rip-up clasts of green and reddish-brown mudstone.

Within the 2.5 m thick package of Walt's Quarry, at least four very productive fish-bearing horizons have been identified, all showing excellent quality of preservation (Figures 2.1, 2.2). The following fish taxa have thus far been identified: *Synorichthys stewarti*, *Cionichthys dunklei* (Figure 2.1), *Cionichthys* sp., *Turseodus*? sp., *Lasalichthys* sp., *Semionotus* n. sp. (Figure 2.2), *Semionotus* sp., *Hemicalypterus weiri*, *Chinlea sorenseni*, and *Redfieldiidae* n. sp. Other fish taxa will undoubtedly be identified among the over 150 individual specimens collected in 2004-2005. Additional field work is planned for 2006 and future seasons.

The *in situ* positions of many of the articulated fossil fish were mapped and their orientation and distribution appear to be random, though this may change as additional data from

future quarrying is added. Associated with the fish fossils are gastropods, and large, three-dimensional conchostracans found in possible "living position" (Figure 2.3).

Most of the tetrapod bone fragments are unidentifiable due to predepositional weathering but several are identifiable, at least to higher taxon, including aetosaur scutes (Figure 2.4) and abundant phytosaur remains consisting of jaw fragments (Figure 2.5), a large partial ilium, vertebrae, teeth, and skull fragments. Phytosaurs from the Chinle and base of the overlying Wingate Sandstone have previously been described from the study area (Morales and Ash, 1993; Lucas et al., 1997). Other tetrapod taxa will no doubt result from further exploration and preparation.

Late Triassic tracks are known from terrestrial deposits at several dozen localities in Utah. Two track localities near the aforementioned body fossil sites are the first reported from this portion of southeastern Utah. All of the tracks recog-

nized during this study are preserved on talus slopes in blocks originating in the Rock Point Formation of the Chinle Group (Figure 1.2). The track-producing unit is a prominent ledge that forms a rim along the upper portion of the valley below the capping Wingate Sandstone. The initial discovery site (hereafter called IDS), located very close to Walt's Quarry, reveals over a dozen isolated footprints with possible affinities to phytosaurs (*Apatopus?*) (Figure 2.6), as well as poorly preserved prints of possible *Brachychirotherium* affinities, and theropodan *Grallator* tracks (Figure 2.7). Tracks at the IDS are preserved as natural casts, actual tracks, and underprints. Poorly preserved plant fossils (Figures 2.9 and 2.10) have been found in the same talus slopes with tetrapod tracks and invertebrate burrows below the IDS; they are tentatively identifiable and add to a reconstruction of the paleoenvironment.

The second track locality produced a number of very large swim tracks (Figure 2.8) preserved as natural molds. Possible terrestrial tracks also occur at this site, but their exact relationship to the large swim tracks has not been established at this time. Most of these tracks are interpreted as having been made by large swimming phytosaurs. These proposed phytosaur swim tracks are similar in appearance to others from the Chinle Group in southwestern Utah (Lockley and Milner, in press). Fully formed, terrestrial tracks bear evidence of four and possibly five digits. Other tracks are either elongate, linear scrapes or swipe marks preserved in thick, reddish-brown sandstone. Multiple footprints preserve four and/or five ungual impressions created as the animal became more buoyant in the water. Ripple marks and mud cracks present on fallen blocks suggest periodic subaerial exposure.

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