

evolution is a philosophy rather than a science, and should be taught as such in higher education (page 296). On the same page he says we must 'come clean' about alleged human evolution, and

'stop filling the classroom with over-imaginative "restorations" and "reconstructions" of ancestors that look part-ape and

part-human in defiance of the actual evidence! (Emphasis mine.)

Reviewer John Mitchell makes a pertinent comment on the flyleaf:-

'If a religious creationist had written it, no-one would have paid attention, but Milton is a professional science writer and well informed on what is going on in the departments of geology and

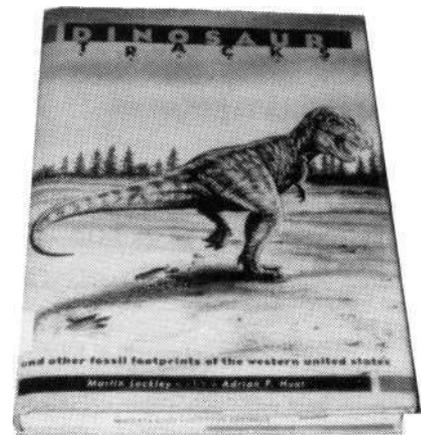
old bones!

¹ Although Milton is neither a Christian nor a creationist, he has dealt with both sides fairly. I highly recommend this work to all who are interested in the subject of origins. The Christian who wishes to have a store of non-creationist material with which to query evolution will find plenty of ammunition in this work.

Dinosaur Tracks and Other Fossil Footprints of the Western United States

by *Martin Lockley and Adrian P. Hunt*
Cambridge University Press, New York

Reviewed by Michael J. Oard



This is another book written by mainstream geologists that is valuable to creationists who are trying to understand the details of the Flood. As the title suggests, the book examines dinosaur tracks that, except for a few locations, were unknown about a decade ago. Due to the vast difference between the diluvial and uniformitarian paradigms for the explanation of the rocks, tracks are one of the few palaeoenvironmental indicators that can be relied upon. There is now a super-abundance of tracks, especially in the western United States, where an average of one track-site per week is being discovered. That is why a third book, so soon after two previous books,^{1,2} has been published on the subject.

The importance to the creationist of all the new information on dinosaur tracks is that:

- (1) tracks indicate a live animal, which in the Flood should have expired within 150 days of the Flood;^{3,4}
- (2) tracks can provide a creationist relative chronology for the Flood;
- (3) tracks provide evidence for

behaviour, which can give us clues to unique features during the Flood; and

- (4) tracks provide information on the track-bearing strata during the Flood in relation to sea level, relief, etc.

The emphasis of the book is on Mesozoic tracks, practically all from dinosaurs, with brief chapters on Palaeozoic and Cainozoic tracks. The world track record begins in the Devonian, but tracks do not become relatively abundant until the Carboniferous. Although both amphibians and reptiles supposedly had evolved by the Carboniferous, the authors admit that it is often difficult to distinguish their tracks from each other (page 33). Sometimes the 'age' of the strata is taken into account when identifying the type of vertebrate that formed a particular track (page 286).

The first sign that all is not well with the uniformitarian interpretation of tracks is shown by the tracks in the Permian, especially the abundant vertebrate tracks in the Coconino, De Chelly, and Lyons sandstones of the

Colorado Plateau of the south-west United States. These tracks are claimed to have been made in a desert environment of shifting sand, as observed today in the Sahara Desert. The authors state the problem quite well:-

'Perhaps even more puzzling than the abundance of tracks in desert settings is how they were preserved in what appears to have been an environment of dry, shifting sands . . . The notion of an arid desert crawling with amphibians is contradictory, to say the least. . .' (page 40).

Of course, they provide explanations for such enigmas.

The work of creationists Leonard Brand and Thu Tang⁵ comes under criticism (pp. 40-44). One curious aspect of tracks in the Coconino Sandstone is that some of them shift sideways while traversing up cross-bedded sand. Brand and Tang demonstrated with an ingenious experiment using salamanders in a sedimentation tank with flowing water

that the Coconino tracks were made in a current, implying that the Coconino Formation was made under water. Lockley and Hunt dismiss this seemingly-solid evidence by appealing to the assumption that the sandstones were formed in a desert environment (although some geologists have argued for a subaqueous environment) and that lizard tracks have been observed to run transversely across sand dune faces. The sand does possess some features reminiscent of a desert environment. For the creationist, this information plus the character of the abundant tracks suggest future avenues of research into the unique catastrophic processes during the Flood.

The Mesozoic dinosaur footprints in the western United States are indeed impressive. Of special note are the megatrack-sites. One is located in south-east Utah on the upper boundary of the Entrada Sandstone and is estimated to contain billions of footprints, all of fairly large, meat-eating theropods (pp. 150-158). The Entrada Sandstone is supposed to represent another one of those desert sand palaeoenvironments, which brings up the additional uniformitarian problem of what these large carnivorous dinosaurs would eat in a desert. Then there is the 'dinosaur freeway', a second megatrack-site that stretches from north-east New Mexico to north-west Colorado. The tracks are of generally two types and are found at multiple stratigraphic levels that supposedly span several million years. Since the strata containing the tracks likely are conformable, it better suggests herds of dinosaurs constantly on the move on a low strip of land during a rapid sedimentation event. Otherwise, why would only two types of dinosaurs use this 'freeway' over several million years?

Scientists who study tracks deduce several unusual behavioural characteristics of dinosaurs, such as parallel sets of tracks presume gregarious dinosaurs. However, within the Flood model, such behaviours may be unusual, and mean nothing about normal dinosaur habits. There are also

a number of features of the tracks that not only are better understood within a diluvial model, but also tell us some of the unique events that occurred during the Flood. Just the preservation of billions of tracks indicates rapid sedimentation, since studies of modern tracks reveals that footprints deteriorate and are destroyed rapidly (page 18). The tracks are practically always found on bedding planes, generally capping sedimentary units, which suggests a cycle of sedimentation during the Flood followed by a brief exposure above the water. Why wouldn't the tracks be found throughout the beds if the sediment was deposited slowly over long periods of time?

The lack of relief on the track-bearing strata indicates a rapid sedimentation event forming flat strata, otherwise with erosion over millions of years we should follow tracks up hills and down into valleys. Unusual, stressful conditions are also indicated by the fact that practically all trackways are straight (page 165). Feeding animals often meander. Although there are spots in the world where juvenile tracks are abundant, generally they are rare (pages 121, 207). A more straightforward interpretation of this observation is that juveniles were less able to flee the encroaching Flood waters and hence were unable to make tracks.

Another uniformitarian puzzle that is better explained within a Flood paradigm is the nearly complete absence of tracks of stegosaurus, ankylosaurus, and ceratopsians, although they are certainly heavy enough to make tracks and their skeletal remains are common (pages 229, 231). Their thick armour and large bony plates suggest they were poor swimmers (there is evidence of swimming dinosaurs in the track record) and would easily succumb to the first inundation of their habitat.

Several other interesting tidbits for creationists can be gleaned from the chapters on dinosaur tracks. First, dinosaur bones and tracks are usually not found close together. Second, certain types of tracks show up where

they are not supposed to exist according to evolutionary theory (pages 259-265). Third, bird tracks, also found among dinosaur tracks, show that Cretaceous birds were already common and diversified (pages 211, 212, 225).

Perhaps the most controversial aspect of the book for creationists is the chapter on Cainozoic tracks. According to Scripture, all air-breathing, land animals died during the Flood within 150 days. What are we to make of obvious bird and mammal tracks in the Cainozoic of the western United States? These tracks include such notable occurrences as bird, reptile, mammal, and amphibian tracks in the Eocene Green River Formation of Utah; cat-like tracks in the Eocene Clarno Formation of central Oregon; and bird and mammal tracks in the Pliocene and Miocene of south-east California and northern Arizona. How these Cainozoic tracks fit a diluvial paradigm depends upon where the Flood/post-Flood boundary lies in the strata. Based on much geological and glaciologic data, I have come to believe the boundary is in the late Cainozoic of the uniformitarian system.⁶ Based on this belief, I have concluded that at least the Cainozoic track-bearing sediments in the western United States were laid down within the first 150 days of the Flood.

This conclusion may seem wrong to some creationists. However, there is copious evidence that perhaps up to 1000 metres of sediment has been stripped off the Rocky Mountains and the high plains of the western United States.⁷ At the same time, mountains were being uplifted. All this geological activity would take some time within the Flood year and is characteristic of the recessionary stage of the Flood, according to the biblical geological timescale recently proposed by Tasman Walker⁸ and Carl Froede.⁹ It makes sense that the strata that survived the strong scouring during the recessionary stage, including the exhumed Cainozoic strata as late as Pliocene, are from the inundatory stage — the first 150 days. This conclusion only applies

to the Cainozoic rocks in the western United States that contain obvious tracks. In other areas of the world, the Cainozoic strata, especially the strata not based on vertebrate index fossils, could be late Flood or even post-Flood. For example, the thick Cainozoic strata along the continental shelves, which is mostly dated from marine micro-organisms, may be late Flood to early post-Flood. Thus, the strata classified as Cainozoic by the standard geological establishment would be diachronous within the Flood model. This is an example of where tracks can

help us understand the events and chronology of the Flood. Thus for those creationists working on various aspects of the Flood model, this book must be read.

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7. Oard, Ref. 6, pp. 261-262.
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QUOTABLE QUOTE: Cosmology

'Yet at the same time it must be admitted that philosophy has played a major role in the development of cosmology

Bondi, Hermann, 1996. Cosmological wars. **Nature**, 384:323.

QUOTABLE QUOTE: Evolutionary Biology

'Some evolutionary biologists — like Richard Dawkins — have fertile imaginations. Given a starting point, they almost always can spin a story to get to any biological structure you wish. The talent can be valuable, but it is a two-edged sword. Although they might think of possible evolutionary routes other people overlook, they also tend to ignore details and roadblocks that would trip up their scenarios!

Behe, Michael J., 1996. **Darwin's Black Box: The Biochemical Challenge to Evolution**, The Free Press, New York, p. 65.