

# Comparing Flood models

**Robert W. Lawrence**

A recent issue of this journal contained an important exchange on the significance of dinosaur footprints within strata classified as Mesozoic. Garner *et al.*,<sup>1</sup> in commenting on a paper by Woodmorappe,<sup>2</sup> discuss the obvious difficulties of explaining these footprints if they were deposited during the Flood. Woodmorappe and Oard,<sup>3</sup> in their reply, conclude that the alternative of these forming after the Flood should be considered as dead and buried, once and for all. One would expect an irrefutable case in order to dismiss an alternative interpretation, so it is worthwhile examining the case made by Woodmorappe and Oard to see if the alternative can indeed be dismissed as not viable.

In the reply of Woodmorappe and Oard, they argue that Garner *et al.* have followed the error of Cuvier and classify them as holding a neo-Cuvierist position. Woodmorappe and Oard claim that the neo-Cuvierist position adopts an illusionary geologic column and ignores the complexity of the Flood, in assuming that dinosaurs would not have survived the first day of the Flood. These are both debatable issues and do not provide sufficient basis for rejecting an alternative view. We should consider these arguments before evaluating their conclusions.

First, it needs to be stated that Woodmorappe and Oard have not shown, either in their reply or in any previous work, that a logical conclusion of interpreting dinosaur footprints as post-Flood is to exclude evidence for the biblical Flood completely. There are alternative interpretations for recognizing Flood deposits, but they are not logical consequences of how dinosaur footprints are interpreted.

To begin, we should consider the geologic column. A common process during geologic mapping is to produce a representative column with both rock-types and fossils. Such columns have a degree of simplification and they tend to include layers with restricted distribution. Similarly, the geologic column is the nomenclature for an idealized composite representation of the observed fossil succession. Nomenclature is not a basis for correlation. Any time significance needs to be interpreted on a sound theoretical basis. The column is nothing more than a nomenclature for classifying the relative stratigraphic position of fossil assemblages. It provides a basis for predicting what kinds of fossils may occur above or below a certain fossiliferous layer and what kinds of fossils will not be found.

Even if aspects of the geologic column are artefacts of a flawed methodology, there is an obvious pattern observed on every continent. Throughout the world there are strata with extinct marine fossils, such as trilobites and graptolites, overlain by strata with both marine and terrestrial fossils,

including plant remains. Within the latter there is also a pattern of extinct terrestrial vertebrates and ammonites, followed by mammals and other vertebrates that are increasingly similar to modern forms and ecosystems. One does not need to consider the column to be 'valid' in order to describe the obvious pattern.

Woodmorappe and Oard consider that neo-Cuvierists adopt a form of speeded-up uniformitarianism. This may be so, but it does not logically follow that this approach is flawed. While it is the case that uniformitarian assumptions limit interpretation to exclude a biblical timescale; an assumption that all strata classified as Mesozoic and Tertiary must be interpreted as Flood deposits is equally limiting. Each interpretation needs to be assessed on its merits. It is not appropriate to assume that secular scholars are always wrong.

The second issue discussed by Woodmorappe and Oard is the complexity of the Flood. Two possible sources of information about the Flood are the Bible and strata deposited in the Flood. The Bible says that Noah's Ark was floated during the increasing waters that resulted from 40 days and nights of rain and the breaking up of the fountains of the deep. The waters prevailed for five months (150 days) until the Ark was grounded and no land was seen from the Ark for more than a further two months, while the water level continued to decrease. The requirement of areas of emergence of land during the Flood to explain dinosaur footprints is not definitely excluded in the biblical testimony but it is certainly not evident or expected.

The other source of information is geological observation. Assuming that all of the so-called Phanerozoic strata were deposited before the end of the first 150 days of the Flood, a thickness of 15 km of sediments gives an average of 100 m of sedimentation per day.<sup>4</sup> Enormous erosion rates adjacent to the early Flood geosynclines would have been involved. Indeed, all air-breathing and land-dwelling animals would have been destroyed in a short period of such activity. Thus, the Bible and the geology have the same testimony. Nothing could have survived the deposition, deformation and exhumation of the geosynclines, which are hundreds of kilometres wide and comprise a significant proportion of the continental crust. Oard<sup>5</sup> admits that dinosaur fossils overlie these geosynclines. Thus, the opinion that this is an insurmountable problem for those who attribute dinosaur fossils to the Flood is well justified.

In their conclusion, Woodmorappe and Oard imply that there is inconsistency in having dinosaur fossils restricted to the earlier post-Flood deposits before the deposition of mammal fossils. Robinson<sup>6</sup> has already explained this within a colonization model; reptiles and birds multiplied more rapidly after the Flood than mammals. However, this succession of mammals following dinosaurs is more of a problem for the model of Woodmorappe and Oard. The mammals would have had to survive through all of the time of geosyncline formation and the deposition of dinosaur footprints and then to continue being buried until the last moments of the Flood<sup>7</sup>

in a distribution that matches modern patterns. Small aquatic creatures, with fossils in strata classified as Tertiary, such as the platypus in the Lake Eyre Basin of central Australia, and extinct beavers buried within their burrows in Nebraska,<sup>8</sup> would have been some of the first to be overcome with the raging torrents of the Flood, not the last.

The so-called fatal problem for neo-Cuvierists, according to Woodmorappe and Oard, is the large volumes of post-Flood sediment. If strata classified as Mesozoic and Tertiary were deposited after the Flood, there could have been approximately 5 km of sediments deposited in about 200 years. This represents an overall average of 25 m per year. This is conceivable during a period of high rainfall preceding duricrust formation. This is much less than the deposition rate of 100 m per day proposed by Woodmorappe and Oard for the Flood. Holt<sup>9,10</sup> has suggested that it would be too hazardous to live with such conditions. However, the rate throughout much of the post-Flood period could have been much less, as there is likely to have been a period of rapid erosion of unconsolidated Flood deposits early in this period. There could also have been single local catastrophic events. A formation of 200 m of sandstone could have been deposited in a few days. This is a major issue, but there is potential for developing an understanding within this paradigm.

Woodmorappe and Oard have not presented an irrefutable case for rejecting any post-Flood dinosaur tracks and egg-laying. They might do well to explain how they conceive of dinosaurs surviving the preceding geosynclinal events and how fossils of mammals and plants with increasing modern affinities came to be preserved in overlying and younger layers later, during the Flood.

### References

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3. Woodmorappe, J. and Oard, M., Reply to Garner *et al.*, Dinosaur footprints, fish traces and the Flood, *TJ* 17(1):57–59, 2003.
4. While 15 km may be an overestimate in some cases, the period of 150 days is also likely to be an overestimate. Thus, this estimated depositional rate is of the correct order of magnitude.
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## Michael J. Oard replies:

Although creationist geologists are making good progress on a number of fronts, the issue of dinosaur eggs and tracks continues to cause consternation.<sup>1–4</sup> Much of the problem presupposes that we know enough about the Flood and pre-Flood world to make statements that certain events *cannot* happen. I also see an impatience to come up with answers to the many geological questions related to the Flood. There are still many unknowns in geology and paleontology. It is better to gather geological data first and then, hopefully, a pattern will emerge, or at least we can prepare the way for the next generation of creation geologists to provide answers for tough questions.

I also see too much reliance on uniformitarian interpretations without checking into them thoroughly.<sup>5</sup> Uniformitarian interpretations derive from a radically different worldview that taints Earth history. Some uniformitarian interpretation may be correct while others are likely to be incorrect; we need to spend more time checking into both the interpretations and the raw data. (Sometimes, even the raw data is biased in geology and paleontology because uniformitarian geologists do not always report all observations, and they may not even see evidence contrary to their presuppositions.)

### The danger of diminishing the Flood

Robert Lawrence brings up many points related to the issue of dinosaur tracks and eggs, which are contentious. The first point is: How does placing the late Paleozoic through to the Cenozoic in the post-Flood period relate to the Flood? Lawrence contends that Woodmorappe and I have not demonstrated that a mid to late Paleozoic Flood/post-Flood boundary does away with the Flood completely. We have never said that such a position did away with the Flood, but that such a boundary diminishes the *significance* of the Flood, since a large proportion of sedimentary rocks are left to vague post-Flood catastrophic mechanisms. This opens up the possibility of further relegating the Flood to a lower position in the geological column, if advocates of this position discover some feature lower in the column that they deem takes too much time. British creationists will be aware that Steven Robinson has recently relegated the Flood/post-Flood boundary from the late Paleozoic to somewhere in the Precambrian, based on a strict reading of the geological column, a disputable exegesis of some parts of Genesis, and Phanerozoic events that supposedly take too much time:

‘Such features falsify all attempts to identify the Flood with any part of the Phanerozoic—the fossil record after the Precambrian.’<sup>6</sup>

This deduction presupposed a great deal of knowledge of the Flood. To accommodate all this post-Flood catastrophism, whatever it is, he relegates the date

of creation to about 19,000 years ago.<sup>7</sup> And, apart from the dubious success of accommodating the apparent post-Flood catastrophism, the serious entertainment of such a date for creation bloats the biblical chronologies to an extreme extent.

Such a diminished significance for the Flood can lead to total rejection. This happened in the time of Baron Cuvier. William Buckland, who gave up on the Flood when the 'diluvium' turned out to be glacial, is the most famous example of one who rejected the Flood altogether. Why not instead, examine the raw data related to these geological problems and then see if there are reasonable solutions within the Flood, which is supported by the big picture of geology and paleontology? In examining this raw data, one cannot rely just on the uniformitarian literature; we must also go out into the field and examine the rocks and fossils for ourselves. I have repeatedly found reasonable solutions within the standard Flood model by this approach.

The big picture includes the sheet nature of strata sometimes spread over a huge lateral extent. When you compare the type of erosion, transportation and deposition of sediments today with what we see in the sedimentary rocks, there is a huge difference. Sedimentary rocks of all ages are predominantly sheets, unlike today when sediments are commonly un lithified and two-dimensional. This includes the huge vertical and spatial extent of the rocks labelled as Precambrian, Paleozoic and Mesozoic. Even the Cenozoic forms large sheets out in the plains of eastern Montana, the Dakotas, and adjacent areas. The Cenozoic valley and basin fills in the Rocky Mountains are generally sheet-like over hundreds of square kilometres. In other words, the deposition was unlike today's and fits in with the energy and depositional pattern expected in a Flood that is more violent at the beginning and wanes with time, as 'The mountains rose; the valleys sank down' (Psalm 104:8a) to drain the floodwaters.

The sedimentary rocks also contain billions of fossils. Considering that fossilization is a very exceptional process in the modern world, all these fossils should point to the Flood. The stratification and fossils, plus much more information, are why we believe the geological evidence strongly indicates a late Cenozoic Flood/post-Flood boundary. Such a boundary would automatically place the dinosaur tracks and eggs within the Flood, and the fact that the tracks and eggs were made by living animals further constrains the time as the early Flood. Those who advocate post-Flood catastrophism need to come up with viable mechanisms to account for the sheet nature and sediments with billions of fossils and the other details of the rock record.

### How does the geological column relate?

Lawrence next brings up how the geological column relates to the Flood. I would agree that there is a pattern, as Lawrence states, but the exact pattern has not been determined yet. Evolutionists are always finding fossil surprises,

such as 'living fossils', or earlier than previously identified occurrences of fossils in their geological timescale,<sup>8</sup> which require manipulation of the data. Whatever the exact fossil pattern, there are at least two viable hypotheses to explain the order within the Flood: ecological zonation and Woodmorappe's TAB concept. There are likely other mechanisms that no-one has yet considered.

Those who relegate the Flood/post-Flood boundary to the middle or late Paleozoic seem to take the geological column as an absolute sequence of the Flood and post-Flood period. I believe we need a thorough evaluation of the geological column. There are many aspects to the geological column that must be substantiated, and there seems to be much flawed logic and procedures in the way uniformitarian scientists developed the column and continue to uphold it as a global sequence.<sup>5</sup> Radiometric dates are simply fit to the column, so they are of no help.

In my geological travels, mostly in the northwest of the USA, I see evidence for a general order of the fossils in places, and exceptions in other places. For instance, the mountains of Montana are commonly Precambrian or Paleozoic; while the valley and basin fills, which came later, are commonly late Mesozoic and Cenozoic. This represents a general order to the fossils that is similar to the uniformitarian order. On the plains, the localities of dinosaurs and mammals are widely scattered, and so it is difficult to know whether the difference in fossils is really vertical or horizontal or both. In one location in northeast Montana there are Paleocene dinosaurs mixed with ungulates.<sup>9</sup> Of course, this and other locations of Paleocene dinosaurs are hotly disputed by evolutionists, indicating the circular reasoning that is part of the fossil order making up the geological column.

As stated by Woodmorappe and Oard,<sup>2</sup> those who advocate a Flood/post-Flood boundary in the mid to late Paleozoic, must explain the supposed order in the geological column *after* the Flood. Lawrence apparently believes Robinson<sup>10</sup> has solved the problem by advocating differential spreading or colonization, in other words the reptiles and birds multiplied faster than the mammals. But, the order must be explained in detail, including the order of microorganisms and plants, since those who advocate a Paleozoic Flood/post-Flood boundary also believe in an absolute geological column. Besides, would reptiles spread faster than rats and rabbits? And why would dinosaurs want to migrate that fast when they have lots of mammal meals available? And this does not even touch marine fossils. For instance, how are Cretaceous ammonites supposed to avoid admixture with Tertiary marine fauna during some vague post-Flood migration? Surely, the post-Flood scenario should result in a generally random order of the fossils, since postulated post-Flood catastrophism should bury all organisms in a local or regional area.

Lawrence states that the succession of mammals following dinosaurs is more of a problem for Woodmorappe and myself. I fail to see this, since there are mechanisms during



the Flood that can cause fossil order, but no workable mechanism, as far as I know, in the model of post-Flood catastrophism. The survival of mammals, as well as dinosaurs, during the initial onslaught of the Flood will be addressed later.

Lawrence goes on to state in that same paragraph that the mammals would have to be buried in the last moments of the Flood. This is assuming a *linear* sequence of the geological column compressed into the Flood. Woodmorappe and I question such linearity; we expect that the early Flood would generate more sediment and bury the land animals. The Bible says that all air-breathing animals that lived on land perished by Day 150. So all the mammals would have been dead and would generally be deposited in early Flood sediments. This makes the rock record compressed, especially in areas of the continent that likely emerged first, such as near the continental divide in western North America. (One must be careful in that the above scenario does not work with micro-organisms, and that some of these mammals could have been floating for awhile and been deposited in the Recessional Stage of the Flood.) This is why I can make a case that the ‘Cenozoic’ can be early Flood, late Flood and post-Flood, depending upon the location.<sup>11</sup> ‘Cenozoic’ sediments with mammals’ tracks and the giant beavers in corkscrew-shaped burrows in Nebraska can be explained by early Flood sediments that were deeply buried and subsequently exposed by late Flood erosion, as I have discussed before.<sup>12</sup> (I do not know enough about platypus distribution in Australia to comment.)

### Numerous difficulties with ‘post-Flood catastrophism’

Those who believe that the Flood/post-Flood boundary is in the middle or late Paleozoic, or the K/T for that matter, have copious, severe problems explaining geological and paleontological features without the Flood. They resort to what is called post-Flood catastrophism, about which I have heard or read very little. I would at least like to read some speculations on the nature of these mechanisms. Advocates of such Flood/post-Flood boundaries need to come up with viable post-Flood catastrophic mechanisms for huge erosion, transportation, and sheet deposition, sometimes



*The extensive sheet-like deposits in the Grand Canyon, and around the world, support the standard Flood model ‘big picture’ that these deposits are a result of the world-wide Flood of Noah.*

over tens of thousands of square kilometres. They need to come up with viable tectonic models plus explanations for enumerable other difficulties. Some of these difficulties, among very many, are: 1) Where is the record of dinosaurs, mammals and other organisms from the supposed record of the Flood in the early Paleozoic and Precambrian? 2) How is the Mesozoic and Cenozoic order of the geological column to be explained as a worldwide post-Flood sequence? 3) How are huge early Cenozoic coal seams that are up to 100 km long, 40 km wide, and 61 m thick, of nearly pure coal in the Powder River Basin of southeast Montana and northeast Wyoming to be explained by post-Flood processes?<sup>13</sup> 4) How are Cenozoic planation surfaces developed? 5) How are pediments formed? 6) How are water and wind gaps developed? 7) How can man and beast survive the volcanic winter from all the post-Paleozoic volcanism? 8) How would man and beast survive the devastation of large meteorite impacts? 9) Where does the energy for erosion and transport come from after the Flood? 10) What mechanism erodes the Rocky Mountains of western Montana and northern/central Idaho and lays down well-rounded quartzites from the Pacific coast to western North Dakota, sometimes at current speeds over 30 m/sec?<sup>14</sup> Some of these quartzites weigh up to 200 kg and are found on mountain tops, such as the northern Teton Mountains of northwest Wyoming, the Gravelly Range of southwest Montana, and the Wallowa Mountains of northeast Oregon.<sup>15</sup> All this occurred in the Cenozoic of geological time.

Dinosaur tracks and eggs that are found near where I live are on top of thousands of metres of sedimentary rocks from the Flood, as all participants in the dispute recognize. But, there has also been at least 300 m, and possibly more than

1,000 m, of erosion of these areas to expose the dinosaur eggs, tracks and bonebeds. What post-Flood mechanism would lay down many hundreds of metres of Mesozoic and Cenozoic sediments over tens of thousands of square kilometres, erode the strata as a sheet, and end with more channelized erosion with no trace of the eroded material downstream? The Flood is the mechanism that is able to accomplish all this work. Based on the geology of the Rocky Mountains and the adjacent High Plains, and from Scripture, the logical place to place dinosaur tracks and eggs is early in the Flood, during the first 150 days when all air-breathing animals that had lived on land died (except those in the Ark of course). The erosion of the area down to the level of observed tracks and eggs fits in neatly with the Recessional Stage of the Flood, thus constraining the tracks and eggs to be from the Inundatory Stage.<sup>16</sup> Any postulated post-Flood mechanism that can accomplish all this geological activity would have to be on par with the Flood itself. I do not find the Flood explanation of the Mesozoic and Cenozoic limiting but rather straightforward, while I find that the post-Flood explanation of these strata and fossils adds many times more problems than it purports to solve.

Lawrence disputes Holt's contention that the post-Flood period would be too hazardous for man.<sup>17</sup> Not to mention other parts of the world, the Middle East underwent much tectonics and sedimentation during the Mesozoic and Cenozoic.<sup>17,18</sup> I would say there is a severe problem of survivability.

### The logic of emerged Flood sediments early in the Flood

It is true, as Lawrence states, that areas of emerged land are not excluded in the biblical testimony, but to state that '... it is certainly not evident or expected' is to not think of the many processes that can cause emerged Flood sediments early in the Flood. Furthermore, Lawrence and others do not seem to have thought much about the unusual features of tracks and eggs that make a natural environment suspicious, such as predominantly straight trackways, tracks only on bedding planes, and few tracks of babies or young juveniles, unlike today.<sup>19,20</sup> I will discuss some of the mechanisms that would cause emerged Flood sediments.

After a few thousand metres or so of sediment is rapidly deposited in a 'geosyncline', sea level would shallow greatly because the crustal trough is being filled up. Then there are at least five viable mechanisms that would result in fluctuating sea level that can result in emerged sediments. One mechanism is twice-daily tides. These tides can be substantial on a globally or nearly globally flooded Earth due to a lack of continental barriers and/or resonance.<sup>21,22</sup> The height of these tides should be quite variable spatially due to the effects of the remaining uninundated land and sea-bottom topography. A second mechanism is multiple tectonics, both near and far, that will cause all kinds of tsunamis and waves. Just this mechanism alone would

cause massive sea-level oscillations. A third mechanism is general uplift of the area of exposed Flood sediments due to conditions in the lower crust or mantle, such as a heating event or change of mineral phase in the mantle. Fourth, meteorite bombardment in the ocean should result in huge tsunamis, which would spread out and decrease in energy with distance. Fifth, the dynamics of Flood currents results in sheet flows snaking over shallow land masses at high speed, just like the jet stream in the atmosphere.<sup>23</sup> These modelled currents can accelerate from rest up to about 80 m/sec, in about 40 days with the pattern of ridges and troughs moving very slowly. The most relevant feature, for this discussion, is that in the middle of the trough sea level can fall as much as 1,000 m, resulting in a large area of exposed land that can remain for tens of days. These are **not** *ad hoc* mechanisms but reasonable deductions within a global Flood.

### Flood and post-Flood deposition

Robert Lawrence's estimate of the amount of sediment laid down in the first 150 days is about 100 m/day. He is an order of magnitude too high. During the Flood some areas would have received high rates of sedimentation, but, on average, the depositional rates will be about 10m/day based on an average continental thickness of 1,500 m. Although I would agree that most of the sediment was laid down during the first 150 days, especially at the beginning, more sediment would have been added from copious volcanic emissions during the Recessional Stage. So, this would put the estimate for the first 150 days somewhere around 8 m/day. I would also add that the sediments laid down early in the Flood 'geosynclines' did not necessarily erode from the edge, but could have come from quite a long distance. We just don't know. The Recessional Stage would generally erode the top of the sediment column from the highest areas and redeposit the material mostly along the continental margins.

Regardless of the average deposition rate, Lawrence concludes that the geological activity very early in the Flood would have been too much for the air-breathing land dwellers. The question seems to come up as to where the dinosaurs and mammals were located while the Paleozoic sediments were being deposited on the continents. All these deductions presuppose that we know the pre-Flood geography, topography and bathymetry. We do not know any of these geomorphological features. Moreover, the addition of an average of about 1,500 m of sediments on the continents and continental margins, plus great tectonics, has catastrophically disrupted and changed the pre-Flood world. So, questions like 'Where were the dinosaurs and mammals early in the catastrophe?' assume that we know not only the pre-Flood geomorphology, but also the precise events of the Flood. They also assume that the globe was totally flooded soon after the start.

For all we know, much of the current ocean basins could

have been pre-Flood land while the current continents were pre-Flood oceans. If Mount Everest can rise more than 9,000 m out of the floodwaters, portions of the pre-Flood continents could have sunk thousands of metres and now be covered with sea water, in spite of the current observations of a felsic upper continental crust, a mafic ocean crust, and general isostatic balance. So, the dinosaurs and mammals could have been still on these pre-Flood continents while the ‘geosynclines’ were filling up. A further rise in the relative level of the sea could have chased them off into the water in which strong Flood currents swept them up on the shores of newly exposed Flood sediments. Some drowned, forming bonebeds along the shore, while some lived to make tracks and lay eggs before the exposed Flood sediments were finally covered by water. This is just one viable scenario.

On the other hand, the amount of sediment laid down in the post-Flood period, if the Mesozoic and Cenozoic were post-Flood, is far greater than that observed in depositional areas today. Lawrence’s average of 25 m/yr for 200 years is much too high, but nonetheless, it would still be large. Because of all this post-Flood activity, including deposition, Robinson is forced to postulate a post-Flood period of around 15,000 years,<sup>7</sup> which is really a Scriptural and archaeological stretch.

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