

# Dinosaurs in the Flood: A Response

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## ABSTRACT

*A response to Steven Robinson's criticism of my dinosaur extinction article is presented. Topics include the death of the dinosaurs in Noah's Flood; the possible fate of juvenile dinosaurs; dinosaur tracks; dinosaur eggs, nests and the number of horizons; and dinosaur graveyards. Since Robinson's critique stems from his belief in a pre-Permian Flood/post-Flood boundary, a number of brief criticisms to that model are offered. A response to the four main criticisms that Robinson presents on the Whitcomb/Morris Flood model are provided, suggesting that he has not given these and other so-called fatal contradictions enough thought. It is questioned whether the geological column can be used as an exact chronology of the Flood. That the 'Tertiary' is very diachronous within and after the Flood is demonstrated. It is questioned whether we know the pre-Flood geography, and whether we should uncritically accept uniformitarian palaeoenvironmental designations, ancient sea-levels, transgressions and regressions. Finally, the gigantic post-Flood catastrophism that is necessary in the pre-Permian model is questioned.*

## INTRODUCTION

I welcome this opportunity to respond to Steven Robinson's criticisms of my *Overviews* article on dinosaur extinction.<sup>1</sup> Robinson's paper is due to his belief that dinosaur fossils are the remains of **post-Flood** animals. I shall respond to Steven Robinson's paper by topics, since he sometimes brings up a given topic in more than one section.

Many creationists are likely perplexed at the many ideas brought forth by those trying to understand the global Genesis Flood. There are many reasons for this state of affairs. One main reason, I believe, is that geological data are complex and rarely complete for any area, so speculation is rampant. Another reason is because many creationists are attempting to look at the **details** and not at the general picture of the Flood. Consequently, different ways of viewing the details of the Flood are bound to occur. You add to this the problem of understanding the geological activity for a unique, global watery cataclysm, and the problems compound for creationists. This state of affairs is not necessarily bad in an area of study with so many unknowns. I believe it is generally healthy. This is within the spirit of **multiple working hypotheses**, advocated by

the geologist T. C. Chamberlin over 100 years ago,<sup>2</sup> but which is rarely followed by mainstream geologists today.<sup>3</sup>

In the process of refining the Flood model, or even developing a new model, it is incumbent upon each creationist researcher to extensively support his hypothesis with as many data as possible, quantitative data being best. He should also be open to changing or modifying his hypothesis, if a better hypothesis is published. Hopefully, we can build a solid Flood model in the future and do it in a cordial spirit.

## EXTINCTION OF THE DINOSAURS

Robinson was disappointed that I had not made more references to the two articles in Volume 10(1) of this journal that dealt specifically with dinosaur tracks and eggs<sup>4,5</sup> and his more general article on the pre-Permian model.<sup>6</sup> My dinosaur extinction article was not intended as a critique of the pre-Permian model, but to provide an overview of dinosaur extinction within the **main creationist model** at this time, which he calls the post-Cretaceous model. The main creationist model has generally been called the Whitcomb/Morris model, taken from the watershed book, **The Genesis Flood**.<sup>7</sup> The book is still very relevant in

spite of its being published in 1961. The model presented by Whitcomb and Morris still provides a sufficient general model which is clearly open to alteration and further development.

Johnson's Letter to the Editor<sup>8</sup> expressed surprise that there has not been more response from creationists on the pre-Permian model. Robinson says much the same thing when he points out that it is incumbent on me, as well as other creationists, to address their model and

*' . . . not carry on as if they [the arguments for their model] had never been made or were not significant! (p. 57)*

Although briefly, I have addressed the pre-Permian model.<sup>9</sup> Several other articles<sup>10-12</sup> and Letters to the Editor<sup>13-16</sup> have questioned the pre-Permian model, but until Johnson's Letter to the Editor and Robinson's paper, I had not seen any comment to these criticisms of the pre-Permian model.

I believe there are two main reasons why creationists have been slow to respond to the pre-Permian model:

- (1) active creationists are involved in their own research projects (I certainly am), and
- (2) some of the issues raised by the six articles on the pre-Permian model in Volume 10(1) will take much research to properly address.

Non-responses to some of the particulars does not mean that we will not eventually address the issues raised or ignore the model. Careful consideration of the arguments is important. Hasty responses tend to be off-the-cuff, rather than weighed considerations.

### Dinosaurs in Noah's Flood

Robinson claims I hold that dinosaurs (except for those likely on the Ark) survived the first 150 days of the Flood. He likely means that many dinosaurs survived the initial onslaught of the Flood **during** the 150 days, because he later says, according to the Whitcomb/Morris model, that *' . . . by Day 150. . . all dinosaurs had perished! (p. 57)* (I sometimes had difficulty understanding what Robinson was trying to say in his paper.) I have consistently maintained that all air-breathing animals that lived on land died within 150 days **as a maximum**.<sup>17</sup> Robinson emphatically believes that Genesis 7 teaches that all the animals perished by Day 40. I cannot be that dogmatic and have stated that a case can be made for all air-breathing land animals perishing within either 40 days or 150 days from a **straightforward** reading of Scripture.<sup>18</sup>

Genesis 7 is a general chronological sequence of the Flood, but backs up at times. For instance, verse 12 states that the rain fell on the Earth for 40 days and nights, then in verse 13 it backs up to the first day when Noah and the others entered the Ark. Verse 4 seems to indicate that all terrestrial animals died by 40 days. However, after the 40-day period, verse 17 indicates that the water prevailed more and more upon the Earth so that all the high mountains were covered. In verses 21-23 the text mentions that all terrestrial animals were blotted out, finally ending with a

total time of prevailing of 150 days. Although Whitcomb and Morris leaned towards the view that the Flood reached a maximum height in 40 days,<sup>19</sup> other creationists believe that 150 days cannot be excluded.<sup>20</sup> It seems to me that it is difficult to make a dogmatic case for either 40 days or 150 days, but we do know for sure that inundation was complete at 150 days. All that was left was to **'drain'** the water, which would have entailed tremendous tectonic and fluvial activity.

Warren Johns, in a recent letter to this journal,<sup>21</sup> claims all animals expired by Day 40 in the Flood because

- (1) the author of Genesis applied a reverse-order parallelism in Genesis 6-9, and
- (2) the unique word for a cataclysmic flood, *mabbul*, is used only in Genesis 6:17 and 7:17.

I believe he is reading too much into the text. When examined in detail, the reverse-order parallelism is general. For instance, in Johns' Table 2 a third 'complex chronology' from Genesis 8:14 is not included. Furthermore, the first 150 days is not balanced by 150 days of draining Flood water. If such a reverse-order parallelism during the Flood is significant, the first 40 days would only represent a fraction of the water rise, since the 40 days of Genesis 8:6 refers to only a fraction of the time the water drained. The reason *mabbul* isn't used after Genesis 7:17 could easily be due to the emphasis shifting from the Flood itself to the water of the Flood.

I agree that tracks and eggs upon thousands of metres of Flood sediments on every continent mean that Flood sediments were exposed periodically during the early stage of the Flood. I have given several reasons why exposed sediments during the early stage of the Flood would not be unusual, emphasising the western United States.<sup>22</sup> Woodmorappe states that a minuscule 1° tilt of a 100 km long transect of strata in water 1 km deep would expose a 43 km swath of land.<sup>23</sup> Of course, the exposure of various areas over the Earth need not occur at the same time.

I think Robinson is presuming much about swimming dinosaurs. We do not know how long a dinosaur could survive in water, how long the rising ocean took to inundate high ground how turbulent the water was over the whole Earth, etc. Dinosaurs need not be swimming or floating in the water for long. There are too many possibilities and too many unknowns to simply say my suggestions are unreasonable. I at least showed that some dinosaurs could swim, which Robinson accepts, and that is a starting point for any speculation on this subject. I need not demonstrate that dinosaurs were aquatic within the Whitcomb/Morris model to demonstrate I have a viable hypothesis.

As an alternative, I have suggested some dinosaurs remained on refugia before moving out onto newly-deposited, exposed Flood sediments:

*'It is also possible that many dinosaurs fled to higher ground at the beginning of the Flood and, as their refuges became inundated, fled to this newly arisen strip of land!'<sup>24</sup>*

How does Robinson know that dinosaurs '. . . were incapable of surviving even local floods . . .' (p. 57) based on the fossil record?

Robinson states in regard to what appears to be a dinosaur occasionally swimming, based on tracks in Connecticut:

*'There is no evidence, however, that a great cataclysm was raging at the time. The dark grey mudstones were deposited along the fluctuating margins of a lake.'* (p. 57)

How does Robinson know there was no cataclysm somewhere on Earth, nearby, or even where the dinosaur made the prints in Connecticut? How does he know about the margin of a fluctuating lake? It seems to me he is presuming much.

Robinson disagrees with my speculation on the brooding dinosaur (assuming of course that it was brooding) found in the Gobi Desert. My point was that uniformitarian geologists assume the sandstone was from a desert, just like with many other sandstones. So, they naturally think of the brooding dinosaur as being overtaken by a sandstorm in the Cretaceous, similar to the sandstorms that occur today in the Gobi Desert. What I wished to focus on was the time factor. How many animals would let themselves be slowly buried in a sandstorm? Granted, the sandstorm could have been violent, but it would probably take at least an hour to cover the dinosaur. The dinosaur likely would have fled by this time. Given the habits of animals to easily abandon their nests and babies, it seems that to bury a brooding dinosaur in sand the event must occur rapidly, before the dinosaur can utilise escapist thought. Therefore, it seems more logical that water was associated with the sand. Of course, if the sand came too fast, it would knock the dinosaur off the nest as Robinson mentions. I am sure that a scenario can be worked out where the watery sand rapidly buried the dinosaur, but was not fast enough to knock it off the nest. While this may be a tentative explanation, it should be recognised that the finding of a very rare brooding dinosaur requires special conditions. Robinson accuses me of filtering the evidence through the lens of my own ideology, which is half true. But Robinson is doing the same.

### Juvenile Dinosaurs

Robinson predicts **no** babies and no young juveniles in the fossil record and

*' . . . that all body fossils derive from animals that were once living at approximately the horizon where they are fossilised',* (p. 60)

I do not. We do not know enough about the Flood to make **absolute** predictions such as this. I was offering an explanation within the Whitcomb/Morris model for the observed fact that babies and young juveniles are rare, **except for in the 'nesting' horizons**, which I stated. As evidence that this situation is the case, I offered two quotations from the literature, the most recent being from

a 1994 article by John Horner:

*'Except for nest horizons, baby dinosaur remains are extremely rare in the fossil record, suggesting that most, if not all, baby dinosaur mortality occurred in the nesting area.'*<sup>25</sup>

This implies the bone-beds are the result of unnatural burial. I suggested that this situation could be explained during the early stages of the Flood in which the babies and young juveniles were unable to keep up with the fleeing adults. Since the early part of the Flood likely was the most violent, babies swept away in this initial onslaught would very likely not be fossilised. Robinson makes a point that the babies are not too fragile to be fossilised in and around the 'nesting' areas. Within the model of exposed Flood sediments during the Flood, these babies or embryos would be often buried *in situ* or nearly so, and therefore their skeletons would have a better chance of becoming fossilised. The babies, along with eggs and eggshells, that are found were laid **during** the Flood on newly-exposed land. Finding more baby dinosaurs in 'nesting' horizons would not refute a prediction I never made.

Robinson seems to think it unusual that some dinosaurs were pregnant before the Flood. I also do not think it a miracle of timing that they were '*just on the point of giving birth when they happened upon land*', (p. 60) As I have said before, the exposed strip of land or series of shoals near what is now the Front Range of the Rocky Mountains could have been exposed for many days or even weeks.<sup>26</sup> Finding eggs and eggshells in north-central Montana and southern Alberta would not be unusual. Based on many hundreds of bone-beds in this area, the number of dinosaur skeletons in the Two Medicine Formation and other formations in the area is likely well over 100,000. Surely, thousands of them would be pregnant and about to give birth when embarking on newly-exposed Flood sediments.

Robinson simply accepts the 'good mothering lizard' hypothesis of John Horner to explain the segregation of babies and adults:

*'The nesting areas were simply where the babies were safest and naturally belonged',* (p. 60)

There is controversy within uniformitarian circles over this hypothesis, which seems to be favoured by those trying to make the dinosaur-bird connection. We should ask ourselves whether the 'good mothering lizard' idea is credible? Do modern reptiles leave their babies alone in nesting areas, except to feed them?

I suppose the second quote I used in my dinosaur extinction article by Horner and Gorman could be misleading. I certainly did not mean it that way. Of course, palaeontologists are finding more babies, but in '**nesting**' horizons. Most of these babies are actually embryos that are not in whole eggs. It is true palaeontologists are finding many small bones in central Montana and southern Alberta. This was why Horner and Gorman's last chapter was titled: 'Babies Everywhere'.

As far as the so-called palaeogeographic explanation

of babies being fossilised in the 'upper coastal plains [that were] *seasonal wetlands*' (p. 60), Horner and colleagues now find eggs, though not as abundant as in the Two Medicine Formation, in other 'lowland' palaeogeographic areas where they once were thought unlikely.<sup>27</sup> Of course, 'upper coastal plains' and 'lowlands' are uniformitarian deductions based on palaeoenvironmental analysis, which will be discussed below.

### Dinosaur Tracks

The subject of dinosaur tracks often comes up in Robinson's paper. Robinson assumes that according to the Whitcomb/Morris model the tracks of dinosaurs, as well as birds and other terrestrial animals,

*' . . . will occur only at the pre-Flood/Flood boundary (below the Cambrian) and in strata after the Flood/post-Flood boundary (above the Cretaceous)'. (p. 58)*

In other words, vertebrate tracks **absolutely** cannot be made during the Flood. Since vertebrate tracks apparently do not appear before the Devonian and dinosaur tracks not before the Middle Triassic, which is supposedly the latter half of the Flood after all terrestrial animals should have expired, the pre-Permian model is supposedly the only solution. Is this really another puzzle for the Whitcomb/Morris model? Robinson's argument really is a straw man. How does he know tracks could not be made during a one-year global Flood? The lack of tracks before the Devonian has several possible solutions. First, the pre-Devonian strata are practically all marine. If the geological column is not an absolute or even general chronology of the Flood, then terrestrial vertebrates could have been buried and locally making tracks elsewhere, later making tracks and being buried in sediments on top of the Palaeozoic. Second, if the geological column is a general chronology of the Flood, then environments occupied by the terrestrial vertebrates before the Flood could have been overwhelmed after the marine sediments were laid down.

I pointed out that baby dinosaur tracks are rare. I did not mention the tracks in Korea because they are one of the rare exceptions, although the number of horizons is a challenge to explain. My purpose was to point out the **general** case, which would point to a general explanation. Rare exceptions can be explained by rare local effects. I did offer a Flood explanation for multiple horizons of tracks, such as occur in the Jindong Formation of South Korea and in the St Mary River Formation of southwest Alberta,<sup>28</sup> in a previous publication:

*'Slight changes in the configuration of the circular ocean gyres (on a mostly flooded Earth) could lay down repeating cross-bedded sandstones, and expose them for the dinosaurs to walk over. This would account for the dinosaur footprints found at different stratigraphic levels in a region.'*<sup>29</sup>

The Flood was a very rapid sedimentation event. While some Flood sediments would be temporarily exposed, oscillating sea-level would lay down sediments along the

edge of any exposed area. Dinosaurs moving back and forth, producing multiple horizons, would be **expected** if that area were small and being gradually overwhelmed by the Deluge. This would occur early in the Flood as the waters were rising.

The sauropod trackways on the multiple horizons in the Jindong Formation are **similar on each horizon**, and Lockley assumes one species.<sup>30</sup> Moreover, 70 per cent of the tracks are believed to represent individuals from a few months old to one year. There apparently were no hatchlings' tracks. There were some large adult sauropod tracks also. This unique assemblage of tracks, repeated about 150 times in a vertical sequence, points more to a small herd of various-sized sauropods trapped on a small island in the Flood. Otherwise, if the area were large and/or the time long, the same types of tracks would not repeat and other dinosaurs would have made tracks.

In order for tracks to be preserved in the fossil record, they must be buried rapidly within days or weeks.<sup>31</sup> In the Whitcomb/Morris Flood model, track burial often would have been within minutes or hours. Although small tracks would have been shallower and more susceptible to erosion, a quick burial should cover many of these small tracks — if that many existed. I used a modem (uniformitarian) comparison of small elephant tracks in Amboseli National Park to show that many small tracks are produced with adult tracks. If the tracks in Amboseli National Park were buried quickly, many of the small tracks would likely be preserved.

Of course, the number of babies of elephants cannot be exactly compared to dinosaurs. Elephants have one and sometimes two offspring every four to five years, while dinosaurs would have given birth to as many as 24 babies at one time, based on the maximum number of eggs found in clutches. If dinosaurs can be compared to crocodiles and other reptiles, or even birds for that matter, they would have given birth much more often than elephants. Although dinosaurs likely grew rapidly, this variable should not overcome the much higher birth-rate of dinosaurs during a four to five year period. Consequently, one should expect many more babies' and young juveniles' footprints mixed in with adults' and older juveniles' footprints than are observed — whether in the uniformitarian model, the Whitcomb/Morris Flood model, or even the pre-Permian model with its gigantic post-Flood catastrophism. Other juveniles' bones and tracks would not be a problem, because older juveniles should have been able to flee the encroaching Flood waters. The problem is the rarity of babies' and young juveniles' tracks, which is an unnatural assemblage.

Robinson disputes the significance of straight dinosaur trackways. He quotes Coombs as saying:

*'Most ichnocoenoses [track assemblages] have no coordinate directional orientation.'*<sup>32</sup> (p. 61)

He also mentions the lack of parallel sauropod tracks in the Jindong Formation of South Korea. Coombs is speaking

of a **preferred orientation** of a whole assemblage of trackways and not individual trackways. He is essentially saying that all the trackways in an area with multiple trackways mostly do not have a preferred **direction of travel**, but most often shown random directions taken as a whole. Lockley was referring to **more than one trackway side by side**, in which case there were no two trackways parallel to each other:

*'None of the small trackways from Jindong, and virtually none of the larger sauropod trackways, occur in parallel configurations indicative of gregarious progression. This stands in marked contrast to the abundance of parallel sauropod trackways at other locations. Interestingly, at least a dozen sauropod trackways curve. This suggests a pattern of milling around and changing direction that is rarely observed at trackway sites . . .'*<sup>33</sup>

None of the South Korea trackways shows evidence of gregarious progression (two parallel trackways), but at least a dozen curve. These are the rare exceptions. Lockley suggests that such a large abundance of curved tracks could be due to the young sauropods (a unique situation based on tracks) which are expected to romp much more than adults. Given the billions of tracks and the many thousands of trackways now found, straight trackways are significant and most unusual. Straight trackways are more indicative of animals fleeing, as I have often observed when hunting elk in Montana. When you see the same straight trackway pattern all over the world, the connection with the global Flood in Noah's day is not difficult to make.

Robinson points out, based on Garton's article,<sup>4</sup> that the lack of evidence for running in dinosaur tracks is a strong argument against the Whitcomb/Morris model. Robinson and Garton do not seem to think these situations through. Could there be other variables that result in lack of evidence for running? Maybe the dinosaurs were too heavy to run or run for long? I know that when elk are 'spooked', they will sometimes run for about a mile, then slow to a fast trot, and finally to a steady pace. After several miles, they will weave around a lot. Sometimes, elk do not run but trot away. Apparently, Robinson never considered Woodmorappe's explanation for a lack of evidence of running dinosaurs:

*'As for footprints in the geologic record not usually being indicative of running, this argument falsely assumes that animals must have been constantly frightened during the Flood, and/or never got habituated to Flood-related stresses. If there were fairly large areas temporarily exposed, there is no reason why the animals could not have calmed down and made normal footprints. Of course, if dinosaurs were ectotherms or part-ectotherms, they could not have run for significant intervals at a time without experiencing exhaustion. Clearly, normal strolling behaviour among dinosaur footprints is not evidence for the Mesozoic being post-Flood.'*<sup>34</sup>

I made the point that millions of dinosaur tracks found on top of the Entrada Formation around Moab, Utah, were made on what is considered by uniformitarian geologists as desert sand. Towards the end of his paper, Robinson claims the tracks were made at the **edge** of the desert that merges into a coastal plain deposit. Of course, this presupposes that the sandstone is from a desert and that the 'shoreline' can be found in the rocks. Coastal plains do exist today adjacent to some deserts and these coastal plains are dry. How does Robinson know such details of the palaeoenvironment and associated trackways?

Robinson figures it would take substantial time to make these many millions of tracks. From an estimate of the number of tracks at about 5 per square metre over 300 km<sup>2</sup>, 1.5 x 10<sup>9</sup> tracks would have been made. However, since footprints occur irregularly, it may not be valid to extrapolate the number of footprints from outcrops to such a large area. So this number could easily be much too large. I shall assume this number of tracks for the sake of the argument. Since the dinosaurs that made the tracks are bipedal, we can conservatively estimate that one dinosaur walking around on exposed sediments would make one track every second. One dinosaur would then make about 80,000 tracks a day. It would then take about 20,000 dinosaurs one day, 2,000 dinosaurs 10 days, or 500 dinosaurs 40 days to make all those tracks, which is not unreasonable. Robinson says the time to make all these tracks must be short because the Entrada Formation lies stratigraphically beneath the Glen Rose, Texas, megatracksite, which lies stratigraphically below the Dakota Group megatracksite in eastern Colorado, which lies stratigraphically below the north-central Montana egg site. Most of these locations are separated by well over 1000 km. The only way Robinson knows this information is because he takes the geological column as an **absolute** chronology of the Flood. No wonder he 'finds' so many contradictions in the Whitcomb/Morris Flood model! I doubt that a time-sequential/lithologic correlation between all these distant formations can be made.

### Eggs, Nests, Babies and the Number of Horizons

Eggs, nests, babies and the number of horizons is an important argument in the pre-Permian model because all this dinosaur activity is thought to have required too much time during a one-year Flood. Therefore, the dinosaurs must have lived after the Flood, according to the pre-Permian model. I emphasised the baby tooth wear because it demonstrates **how much we do not know** in regard to the dinosaurs, and that **one cannot depend upon the published literature**. One at first would think that such extremely worn baby teeth obviously required a fair amount of feeding time, but no. Horner and Dobb, still believing in altricial baby dinosaurs, tell us:

*'What about the worn teeth that we found first in the jaws of maiasaur nestlings, then in hypacrosaur*

*embryos? It's now clear that dental wear is not evidence of parental care. My original interpretation turned out to be a misinterpretation... That leaves only one explanation: while inside their eggs, the embryos ground their diamond-shaped teeth together . . .*<sup>35</sup>

May I suggest that this example is an indication of the state of information on dinosaur eggs, nests, babies and horizons?

This example has a further lesson to convey, namely, that we all depend very much on the scientific literature for our creationist models. All of us must make decisions based on someone else's word for it. It is impossible to do extensive field work on all aspects of a subject, although creationist field work should be performed as much as possible. And even extensive field work may not be enough to discover the truth. The rocks and nature are exceedingly complex, and there are examples (for example, the Spokane Flood controversy) where field geologists completely missed the obvious, mainly due to preconceived opinions. Both Robinson, I and all creationists, as well as mainstream scientists, must put faith in the scientific literature to some extent. The problem is exacerbated when we come to the literature of historical geology, because so many data are theory-laden. We need a thorough data check first before using the data. Unfortunately, in the process of research into historical science, we are all prone to be duped.

At the beginning of Robinson's paper, he points out both the egg-laying horizons on Egg Mountain and the baby hadrosaur 'nests', which are about two kilometres north of Egg Mountain. He also discusses eggs in the Pyrenees Mountains. The problem is that eggs are found on multiple stratigraphic levels, implying too much activity for too long in the early stages of the Flood. We do agree that dinosaur eggs, tracks, etc. must either be early Flood or post-Flood, because all air-breathing animals that lived on land had to be dead by 40 or 150 days. The section in my dinosaur extinction article on this subject was just a cursory view of Egg Mountain and other 'nesting' sites. I presented many questions on the subject, mainly for a very practical reason:

*'Before discussing this subject, the reader must be aware of the many unknowns associated with dinosaur eggs, which are subject to variable interpretation by mainstream scientists. Much of the detailed information has not been published.'*<sup>36</sup>

This continues to be the case.

I questioned the number of horizons only when the connection was made from isolated outcrops many tens of kilometres apart, and where they are not vertically stacked. In the cases where eggs were laid at multiple horizons, as on Egg Mountain, it would be a similar situation as for multiple track levels on exposed land, subject to periodic and rapid rises in sea-level during a rapid sedimentation event, that is, the Flood. I said there are anywhere from two to four horizons at Egg Mountain. This information was through the 'grapevine', since the data are mostly in the head of John Horner. One problem with the Egg

Mountain area is that in the early days of excavation poor records were kept, and the excavation methods were not state of the art, to say the least. For instance, the section on Egg Mountain containing the egg horizons was destroyed, being jack-hammered away in the early search for eggs.

Robinson makes the point that on Egg Mountain  
' . . . a cycle of nest construction, egg-laying and nurture of juveniles had occurred three times in succession'.  
(p. 56)

Towards the end of his paper, Robinson says that the 20 to 25 young dinosaurs scattered around the eggs on Egg Mountain

' . . . were almost certainly the hatchlings from the neatly broken eggs'.

However, new developments that can actually be found in the literature indicate that the embryos in the eggs were misidentified.<sup>37,38</sup> The juvenile dinosaur skeletons scattered among the eggs are **not** the same species as from the spiral egg clutches, some of which have broken tops. The 20 to 25 young dinosaurs are the hypsilophodont, *Orodromeus makelai*, but the spiral egg clutches are now identified as *Troodon*. Therefore, there is no evidence of the nurturing of juveniles at three successive times on Egg Mountain. As I have stated already, there is plenty of evidence on Egg Mountain and other 'nesting' areas for scavenging of eggs.

During the summer of 1997, I spent ten days examining various egg sites and bone-beds in north-central Montana and southern Alberta, accompanied by John Woodmorappe, Peter Klevberg and Ray Strom. We discovered that there are many divergent interpretations of the evidence. Many of the original interpretations of Egg Mountain and the Maiasaur 'nesting' area to the north are open to question. The stratigraphy of the area is also contentious. Unfortunately, some of this information probably will never be published, and the rest will be slow reaching the literature. We found out that John Horner defines a 'nest' from as little as a few eggshell fragments. So what he calls 'nests' are practically always broken eggshells. Whole eggs in this area are rare. There are only a few 'nests' in the whole world, 'nests' being defined as a bowl-shaped depression around the eggs. One of them is on the top of Egg Mountain (see Figure 1). Practically all eggs over the whole world were laid on a bedding plane with no evidence of a nest, digging, etc., as opposed to nest models displayed in museums and elsewhere. On our field trip, which included the Royal Tyrrell Museum of Paleontology in Drumheller, Alberta, one of the museum palaeontologists, who had twice been to China, related that all the eggs lie on flat surfaces with no lip structures, no evidence of digging, and within homogeneous sediments. Most reptiles bury their eggs. The above information is most unusual, and once again points to an abnormal condition of worldwide extent.

The eight Maiasaur 'nests' north of Egg Mountain, one



**Figure 1.** Plaster-jacketed eggs of *Troödon formosus* from on top of Egg Mountain. The eggs lie in a bowl-shaped depression. Note the upturned strata to the right of the eggs.

of which contained the 15 disarticulated and scattered babies one metre long, are now questioned by some. Many do not think the pits are nests. The sediments are contorted in the area of the remains. There is little if any sign of vegetation in the 'nests', as once indicated by Horner. One palaeontologist working at the site even believes the 15 babies were deposited along the side of a river in an eddy. Even the species of the babies is open to question. The reason the babies and the 'nests' are considered *Maiasaur* is because of an adult *Maiasaur* skull found 150 metres away. In the Egg Mountain area, there are very few skulls found, even in the giant bone-bed. Since the post-cranial skeletons of duckbill dinosaurs are nearly identical, the babies in the 'nesting' area could be from another species of hadrosaur. This opens up the possibility that the babies could really be embryos, since some hadrosaur eggs are large enough to contain a one-metre long embryo. For instance, at Devil's Coulee, just north of Montana near Warner, Alberta, there are at least two types of hadrosaur eggs in the area, **one type big enough to hold a one-metre long embryo**. At one spot on the Blackfeet Indian Reservation there are four types of eggs, indicating that different dinosaurs laid eggs in the same locality. So, the evidence that the eggs even had time to hatch and the babies to grow has diminished.

This brings up the point of the meaning of the half eggs, supposedly evidence for hatching. Half eggs are rare. The palaeontologist from the Royal Tyrrell Museum of Paleontology related to us that there are few if any half eggs in China. We found out from another palaeontologist that hatching is just one hypothesis for eggs having broken tops, and that scavenging is another viable alternative interpretation. One of the main evidences for hatching seems to be that uniformitarian geologists simply expect to find hatched eggs in sediments that represent many millions of years. At least three different types of carnivorous dinosaur teeth are found at the egg sites in north-central Montana and southern Alberta, which strongly suggests scavenging. Mammals and lizards are

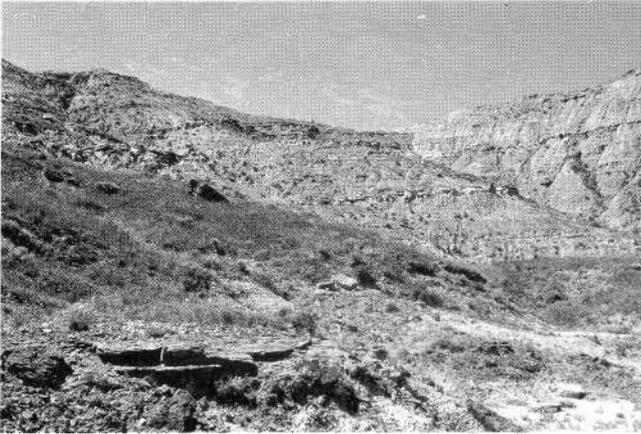
also commonly found in the egg areas. Robinson questions the scavenging hypothesis because he thinks that the dinosaurs would not be interested in eating during the Flood. This assumes that the dinosaurs knew they were in a global Flood and their demise was drawing near. The theropods were not overtaken '... in the very act of scavenging' (p. 66) by the Flood because there are rarely any theropod dinosaur fossils in the immediate area of the eggs. They are, however, found elsewhere in the Two Medicine Formation, usually as solitary fossils. I am sure the dinosaurs were frightened periodically, but just as Woodmorappe stated above in regard to dinosaur tracks, their state of stress should diminish, especially on exposed land, which they would not know would be temporary.

There is no doubt there are multiple egg horizons. We saw them at Devil's Coulee (see Figure 2) and at Landslide Butte near the Canadian border (see Figure 3). Although it is possible, as I have mentioned, that eggs could have been laid on multiple horizons on briefly exposed sediments during a rapid sedimentation event, we need to consider the strong possibility that at least some eggs were transported. At Devil's Coulee some eggs are found singly, which some palaeontologists suggest were transported. Strong evidence for transported eggs comes from the discovery of eggs within cross-bedded sandstone in Argentina.<sup>39</sup>

I appreciate Robinson relating more details of the new egg site in the Pyrenees Mountains of Spain. Living far from Spain, I had to depend upon the literature for my information. Of course, if Robinson believes the uniformitarian story for this complex area with its continental plate collision, multiple thrusting, shortening and thickening crust, a foredeep, uplifted land producing rivers and alluvial fans, etc., then certainly it does conflict with the Whitcomb/Morris Flood model. My point in mentioning this new egg discovery was only to demonstrate



**Figure 2.** Devil's Coulee, Alberta, dinosaur egg site showing multiple horizons. People viewing eggs on one horizon. At least one set of eggs excavated far left and several more egg clusters jacketed between the upper and lower horizon. (John Woodmorappe kneeling down for a close look at the eggs.)



**Figure 3.** Landslide Butte bone-bed and egg site, north-central Montana, in the Two Medicine Formation. One egg horizon located at the bottom of the picture, and a second in the saddle at the top of the ridge.

that embryos in whole eggs are very rare. This rarity is true, but there are many crushed eggs with embryo bones, especially in north-central Montana and southern Alberta. We found broken whole eggs and embryo bones at Landslide Butte. It is interesting that the '300,000 eggs' in Spain consist mostly of shell fragments. This has been the experience in Montana — practically all 'eggs' are actually eggshell fragments, most of which are less than 2-3 mm in diameter. And similarly, as in Montana, the eggs and eggshells in some cases are in clusters.

### Dinosaur Graveyards

Although most dinosaur burials show strong evidence of the action of water, often catastrophic, there is also evidence of giant mass flows. Again, there is **catastrophic variety**.

In my section on a watery catastrophe and dinosaur graveyards, my intention was to point out evidence for catastrophe. It did not matter to me whether the dinosaurs were drowned and buried rapidly, or died on an exposed strip of land to be later reburied during the Flood. I was interested in the **catastrophic action**. So, I was not selectively quoting Horner and Gorman. In the last paragraph of that selection in my article, I acknowledged that many bone-beds laid around for a while, for I said:

*'For instance, some bone-beds, especially those in Montana and southern Alberta, show signs of exposure on land for a while following death. This is indicated by the remains of carnivorous dinosaur teeth, and only teeth, found among the bones, as well as tooth marks incised onto the bones.'*<sup>40</sup>

Figure 4 shows likely teeth marks on a dinosaur bone from north-central Montana. Horner and Gorman do say in one place that the final burial occurred with the flesh still on the bones, which is contradictory to where they say the bones were already fossilised. The evidence for fossilisation comes from the clean bone fractures, which

could possibly be interpreted in ways other than by previous fossilisation (Woodmorappe, personal communication).

Further information that we gathered on our field trip indicates that there are many mysteries associated with this bone-bed, which contains an estimated 10,000 duckbill dinosaurs ranging in length from 3 m to 7 m. Especially interesting is that *'There wasn't one baby in that whole deposit'*.<sup>41</sup> Although Horner and Gorman said that some bones were vertical, a palaeontologist who guided us through north-central Montana, and who has worked the dinosaur bone-beds in the area for 20 years, said that he knows of no bones that are not parallel to the bedding, contrary to what Horner and Gorman claimed. The bone-bed shows evidence of transport by water and the volcanic catastrophe is a just-so story, he said, mainly because the ash bed is above the bone-bed. However, reworked and diagenetically altered (montmorillonite/smectite/illite) ash is very common in the Two Medicine Formation, so it would not surprise me if volcanism contributed to the final entombment of the dinosaurs in this huge bone-bed, as well as the many other bone-beds in the Two Medicine Formation.

The important point is that many bone-beds show the **same type** of fossilised dinosaur with no babies. Our palaeontologist guide estimates that there are hundreds of bone-beds in the Two Medicine Formation, mostly of hadrosaurs, and half of them are monospecific. There are many carnivorous dinosaur teeth in these bone-beds, strongly indicative of scavenging. He also stated that you do not see channels as some claim in this formation, but there are channels farther east in the Judith River Formation. The Two Medicine Formation that contains so many bone-beds and dinosaur eggshells has the appearance of horizontal layers of reworked volcanic material deposited rapidly as sheets (see Figure 3).

### THE PRE-PERMIAN FLOOD/POST-FLOOD BOUNDARY MODEL

The above comments are in response to my dinosaur



**Figure 4.** Likely carnivorous dinosaur teeth marks on a dinosaur bone from north-central Montana.

extinction article. Since Robinson has asked for further response to the pre-Permian model, I shall oblige him.

### Distinguishing Between Competing Theories

In the first part of his paper, Robinson makes a point that particular Flood models should be open to falsification. In the last section, he states that we need to test theories and be open to drop them, **if need be**. I agree.

Based on Karl Popper, he reproduces an ideal order to test between competing models (p. 56). However, I do not think Robinson and others have performed the first step adequately: identify the problem. They bring up many seeming problems for the Whitcomb/Morris model, but they do not seem to investigate the data very deeply to know whether the data really contradict the model, and whether the problems they see can be explained either within the model or by minor 'tweaking' of the model. The Whitcomb/Morris model does have shortcomings. For instance, the successive forests in Yellowstone Park, Wyoming, were difficult to explain. After many years of study and thought by Steve Austin, Harold Coffin, and other creationists, that problem now has a reasonable solution — thanks to the eruption of Mt St Helens. Apparently, Robinson and others have concluded that the Whitcomb/Morris model is fatally flawed, and therefore they have progressed to step two and proposed the pre-Permian model. Robinson lists four supposedly fatal flaws, which I will briefly comment on.

For flaw one, Robinson claims the Whitcomb/Morris model would predict that terrestrial animal fossils would appear before marine fossils because the Earth was inundated by marine waters, while the reverse is true. He obviously is taking the geological column as an absolute Flood depositional sequence. Why can't marine waters produce marine fossils with progressive inundation of land sweeping terrestrial fossils over marine fossils in some areas? His flaw one presumes too much (see discussion of the geological column and palaeogeography below).

The second major problem is just a pure disbelief in ecological zonation and differential escape. These are only two of the mechanisms suggested by Whitcomb and Morris to account for fossil order. There have been additional proposals since then, such as Woodmorappe's TAB (Tectonically-Associated Biological provinces) model.<sup>42</sup> I believe the Flood was even more complex, and there were other significant factors, such as briefly exposed Flood sediments, that determined the Flood burial of the plants and animals. Most, if not all, of these proposed mechanisms can work during the Flood. As far as ecological zonation and differential escape are concerned, Robinson needs to prove his case instead of just appealing to the geological column. The fossils are predominantly a record of final burial after transport. Where the animals and plants lived before the Flood, and how far they were transported, are unknown.

Robinson states that, where locally observed, Cainozoic

strata lie above Mesozoic, which lie above Palaeozoic. This seems to be true for certain areas of Montana where I live, but still each local column is partially pieced together from scattered outcrops based on fossils and lithology. Lithologies sometimes repeat, and using fossils to date adds an element of circular reasoning. Contradictions to the assumed geological column can easily be eliminated. In mountainous western Montana, the fossil order is often reversed. This reversal is attributed to many overthrusts, which supposedly moved long distances uphill and at low angles, mostly parallel to bedding, and left little or no trace of movement. On the plains in the eastern half of the state, the strata are claimed by geologists to be well ordered with depth according to the geological column, which is convenient since you can only observe Cretaceous and early Tertiary strata on the plains. In fact, the Williston Basin in northeast Montana is held up as an example of a complete geological column.<sup>43</sup> However, in this area only the top of the column is observed, the remainder being inferred from **boreholes**. The dates for the strata in these boreholes are mostly based on microfossils, and not on vertebrates and macroscopic invertebrates. This makes a big difference, because microfossils are often said to be 'reworked', subject to the same form repeating in different ages (called iterative evolution), and they probably exhibit many morphological forms within each baramin.<sup>44</sup> Besides, in widely-spaced boreholes, lateral variability cannot be examined. Evidence of geological age based on data from boreholes seems equivocal.

If I understand the third major problem correctly, the sequence of events from Scripture (that is, the inundatory and recessive stages) supposedly are not seen in the geological column, minus the late Cainozoic. The signs of living animals in the Mesozoic and Cainozoic also are a supposed contradiction to the Whitcomb/Morris model. This third major problem is again assuming the geological column should be an exact chronology of the Flood. The signs of life in the Mesozoic and Cainozoic have already been dealt with above and in other articles.<sup>18,45</sup>

The fourth major problem is evidence of *in situ* fossils, such as various marine invertebrates and dinosaur eggs. Of course, chalk is not *in situ*, but deposited from the water column. The organisms making up the chalk could have been transported a long distance to the place of deposition, for all we know. Robinson and others have often mentioned hardgrounds as evidence of too much time. This assertion should be thoroughly checked. Already Robinson is discovering that there are early Palaeozoic hardgrounds, which will put the pre-Permian model into a real bind (the vanishing Flood problem that Woodmorappe and others have warned against). Dinosaur eggs have already been discussed. *In situ* fossils are likely the most serious challenge and need further investigation by creationists. I would first question whether the particular fossil or deposit is really *in situ*. One cannot rely on uniformitarian geologists simply telling us the fossils are *in situ*, because

*in situ* fossils are part of their everyday way of thinking. Creationists should first examine the raw data closely. Secondly, if a particular fossil or deposit is really *in situ*, the next question to ask is whether the feature can occur in a one-year global Flood. This latter question will be tough to answer, because we do not know all the intricate details of the Flood. We do not understand how the unique features in the Flood could form special deposits. What about possible unique effects of rapid currents? excess heat? electricity? pH changes? oxidation-reduction changes? ground water moving through sediments under great pressure of overburden? We do not even know the origin of all the sediments. We also do not understand scale problems well. In other words, our puny modern-day analogues, such as flash floods, may not correspond well with such a global inundation. Tornadoes can bore straw into wood, and hurricane winds can drive a board into a palm tree. Ordinary storms do not accomplish such feats, but turn up the energy<sup>46</sup> and highly unusual phenomena occur.

The big picture speaks of a global Flood — as Ken Ham says: *'billions of dead things buried in rock layers laid down by water all over the Earth'*. Just because some localised features cannot be explained yet does not mean there was no global Flood that laid down practically all the sedimentary rocks. That is why I ended my article on the Flood/post-Flood boundary<sup>9</sup> with the analogy of an explosion, which is worth repeating and is not meant to be critical of adherents to the pre-Permian model — it is for all of us to contemplate:

*'I liken the geological data to the observation of debris from an explosion. Looking over the debris, you can conclude there was an explosion. But if you put your microscope to various parts of the mess, you will question how this particular feature or that particular feature could ever be the product of an explosion. You would also be under pressure to doubt that an explosion had occurred if you listened too much to those who say it wasn't an explosion, but the product of slow and gradual processes over long periods of time.'*<sup>41</sup>

### Is the Geological Column an Exact Chronology of the Flood?

Throughout Robinson's paper, he frequently faults the Whitcomb/Morris model because it violates the succession of fossils represented by the geological column. He states:

*'... there is the further problem that the dinosaur record is confined almost entirely to the Mesozoic. Thus we must suppose that the animals survived "rapid erosion and sedimentation at the beginning of the Flood" but perished in the same numbers during its middle stage, when conditions were less hostile and sedimentation rates much lower'*, (p. 58)

The question of whether the dinosaurs were essentially confined to the Mesozoic brings up the whole question of whether the geological column is an exact, or even

approximate, representation of Flood chronology everywhere on Earth. (There is, of course, the problem of circular reasoning, in that a dinosaur bone or egg is automatically dated as Mesozoic.) The intensity of the Flood at the beginning was likely the most violent, but we do not know whether there were calm spots on Earth or not during the early stage of the Flood. Many dinosaurs probably did succumb during the initial onslaught of the Flood. They could have been either pulverised or floated on top of the water for a while.<sup>48</sup> Just because the later portion of the first 150 days were probably not as violent, does not mean that it wasn't violent enough to kill and bury dinosaurs, or bury already dead ones. Why couldn't Flood sedimentation show a general exponential decrease or some such non-linear trend, so that 'Mesozoic' — assuming the geological column is an exact chronological representation — would be deposited before the end of the 150 days?

Robinson further states in his section on end-Cretaceous extinctions:

*'... the suggestion that some dinosaurs lived on into the Tertiary only adds to the difficulty of identifying a part of the fossil record when no terrestrial animals were alive outside the Ark, corresponding to the period from Day 150 to Day 370 of the Flood'*, (p. 66)

Note how Robinson assumes the 'Tertiary' corresponds to the last half of the Flood in the modified Whitcomb/Morris model.

Near the end of his paper he writes: .

*'However, the truth is that the basic scheme and methods of the geological column are unassailable'*. (p. 67)

How can this be? Methods are closely linked to biases or the philosophical basis by which a person will investigate and interpret the data. Should we creationists blindly trust the philosophical biases and results of geologists who examine the prehistoric past? (The use of the geological column is a controversial question within creationism and can be argued one way or the other independent of the controversy over the Flood/post-Flood boundary.) Robinson has added to this discussion with his recent article in the British journal, **Origins**.<sup>49</sup> In a three-step process, Robinson first constructs a local column; secondly, correlates it to a regional column across England; and thirdly correlates the regional column to a global column. Robinson seems to have developed this progression by simply using information published by uniformitarian geologists, including their fossil correlations. However, I believe much more work is required at each of the three steps to establish the geological column as the burial sequence of the Flood. John Woodmorappe, Carl Froede, I, and others recognise a certain order in the succession of fossils, but we see many problems with the geological column being an exact chronology during the Flood (the example of the 'Tertiary' will be discussed in the next section). I shall illustrate some of the problems by using

Robinson's three-step procedure.

The first step is to construct a local column. I imagine that if the beds are tilted and there are plenty of outcrops, connecting the surface lithologies would be straightforward. However, if the strata are flat and lithologies repeat, it may be a problem developing a local column from scattered outcrops. Unless you have a long canyon such as the Grand Canyon or good borehole control, there may be problems knowing how the strata 'behave' in the subsurface. Subsurface stratigraphy can be exceedingly perplexing. Even when you have good borehole control, such as in oil fields, the correlations don't always work very well.<sup>50</sup> Ideally, the local column can be constructed lithologically without reference to fossils, the interpretation of which is theory laden.

Once you construct your local column, which most likely would be only a small part of the geological column,<sup>51</sup> you need to correlate it regionally. Here is where I can visualise the problems increasing by an order of magnitude. One must decide how large the local and regional sequence should be. The surface correlations must be reliable, keeping in mind that most regional correlations are from scattered outcrops. Then very good subsurface borehole control and seismic reflection data are required. These must be interpreted accurately. One must decide how representative the standard geological literature is for each area. Can one really rely on fossil correlations in this construction? What do fossil correlations mean within a creationist paradigm? Then there are the myriad of problems with facies changes, reworking, faults, folding, thinning and thickening of lithologies, erosional unconformities, repeating lithologies, etc.<sup>12</sup> I doubt whether any of these steps is easy; many miscorrelations undoubtedly have been made. In a criticism of seismic stratigraphy, Andrew Miall writes:

*'Many of us have problems correlating sections convincingly across a single sedimentary basin. Real stratigraphic data are generally fuzzy and full of problems and anomalies.'*<sup>52</sup>

Once an accurate regional column has been theoretically established, the third and final procedure is to tie all the regional columns from around the world into one main geological column. The problems would increase by one or two orders of magnitude. This final step goes back to the origin of the first geological column constructed mainly from northwest Europe. There are many stories about its original development, usually found in introductory textbooks on geology.<sup>53</sup> But how much mythology surrounds this development? Just as Hutton and Lyell have been mythologised to the level of scientific sainthood,<sup>54</sup> what about William Smith and the construction of the first geological column?

The little reading I have done on the subject makes me suspicious of the extension of the first geological column from Europe to other areas of the world. For instance, based at first on A.E. Ramsay's suggestion of a now-defunct

Permian 'ice age' in England, **late Palaeozoic** 'glaciations' were soon discovered all over the Earth, many in the Northern Hemisphere.<sup>55</sup> During the process of tying down the date of the 'ice age' by fossils, the marine fossils supported a late Palaeozoic age, but the associated flora was dated as Triassic or Jurassic, based on similarities to fossil plants in Europe and North America.<sup>56</sup> In the end, the late Palaeozoic date prevailed.

Throughout the above three steps to build a global geological column, multiple correlations of strata are required. Creationists need to closely examine these correlations, because geologists can see correlations where none exist. In a psychological experiment, Edward Zeller asked a group of geology graduate students to correlate four lithological successions.<sup>57</sup> The correlations were finished within five minutes. Some students defended their correlations with rigour and even refused to change their correlations when new data were presented. These correlations should have been impossible, because three of the four lithological successions were randomly generated!

Woodmorappe and others have raised many questions over the years about the geological column. I do not see many, if any, of these questions being answered. Although Woodmorappe has published a critique of ammonoid biostratigraphy,<sup>58</sup> Robinson ignores his work and simply says: *'Ammonoid biostratigraphy appears now to be well established'*<sup>59</sup>

### **Tertiary' Strata Very Diachronous Within and After the Flood**

Parodying the Whitcomb/Morris model, Robinson states that the Tertiary represents about the last 300 days of the Flood, during the prevailing and recessive stages. Therefore, Tertiary mammal and lizard tracks are supposedly a contradiction to all air-breathing, land animals perishing by Day 150. Robinson assumes this contradiction dooms the Whitcomb/Morris model. It is true that in the Whitcomb/Morris model the 'Tertiary' period is considered as late Flood. But this is one spot where the Whitcomb/Morris model needs some 'tweaking'.

Both Tasman Walker and Carl Froede have recently proposed a creationist geological timescale or model.<sup>60,61</sup> The Genesis Flood portion of the model is similar to the 21 weeks of 'prevailing' and 31 weeks of 'assuaging' in the Whitcomb/Morris model.<sup>62</sup> Walker has simply subdivided the two main stages of the Flood into five phases and included defining criteria (see Figure 5). The inundatory stage would generally be the stage in which a vast amount of sediments was deposited although I lean towards Whitcomb and Morris' view of 21 weeks for this stage. The recessive stage would be the erosion and redeposition of the top of these strata as the continents rose up out of the ocean. The abative phase would be the time when the continents first rose out of a totally flooded Earth. The water would rapidly flow off the continents as a sheet,

EVENT/ERA	STAGE	DURATION	PHASE
Flood Event	Recessive	100 days	Dispersive
		200 days	Abative
	Inundatory	30 days	Zenithic
		20 days	Ascending
		10 days	Eruptive

**Figure 5.** Geological Flood model of Tasman Walker.

eroding sediments as a sheet and forming large-scale erosion surfaces in many areas. After the continents were partially out of the water, the water flow would become more channelised, flowing around mountain ranges. This is the dispersive phase. We can observe the two phases of the recessive stage of the Flood over the lands of the Earth: (1) vast sheet erosion forming planar erosion surfaces,<sup>63</sup> and (2) many eroded valleys and canyons, many of which display youthfulness.

This is the big picture and supports the Flood/post-Flood boundary being generally in the late Cainozoic.

The sediments of the abative and dispersive phases should be deposited along the edges of the rising continents, and indeed they appear as the thick sediments on the continental shelves and sometimes in the deep ocean as turbidites. In the United States, much of the sediment in the lower Mississippi River Valley, the coastal plain and the Gulf of Mexico would likely be from the draining of the Flood waters.<sup>64</sup> Most of this sedimentary rock and the rocks of the continental shelves have been labelled 'Tertiary'. Most of the erosion surfaces on the continents are also dated as 'Tertiary'. In Montana and southern

Canada, large gravel-capped erosion surfaces forming high plateaus on the high plains (see Figures 6 and 7) contain Tertiary mammal index fossils. So far, the Tertiary as discussed is as expected according to the 31 weeks of 'assuaging' in the Whitcomb/Morris model.

During the recessive stage, great erosion of sediments deposited during the inundatory stage occurred. These eroded sediments have been called the 'Erodeozoic' by Holt.<sup>65</sup> The western United States, including the Rocky Mountains, the high plains and the valleys between mountain ranges, show copious evidence of hundreds of metres of erosion, first as a sheet and then more channelised.<sup>66</sup> Since hundreds of metres of sediment have been eroded during the recessive stage, it is expected that the consolidated sediments that remain are from the inundatory stage, especially those sediments below erosion surfaces. In many parts of the West, some of these consolidated sediments are labelled 'Tertiary' based on fossil mammals. Some of these sediments are found on top of the Colorado Plateau, in large intermontane basins of the western United States, and sometimes as the highest sedimentary rocks of the high plains. It is in these scoured erosional remnants, very likely from the inundatory stage of the Flood, where you find the fossil tracks of mammals.<sup>67</sup> For instance, there are reptile, bird, mammal and amphibian tracks in the Eocene Green River Formation in Utah; cat-like tracks in the Eocene Clarno Formation of the John Day county of central Oregon; and bird and mammal tracks in the Pliocene and Miocene of southeast California and northern Arizona. I have seen the Clarno and Green River Formations, and there has been much erosion of these formations with local erosion surfaces on top (see Figure 8). There is other evidence of 'live' mammals in 'Tertiary' sediments, such as mammal graveyards of predominantly the same animal. Erosional remnants from the inundatory stage likely would include the unique spiral burrows,



**Figure 6.** Cypress Hills, Canada, flat erosion surface. The erosion surface is about 130 km east-west and 15 km north-south. The plateau is about 300m above the surrounding plains and about 650m above the rivers to the north and south. The surface has been locally dissected by glacial processes.



**Figure 7.** Conglomerate Cliff, Cypress Hills, Canada. The top of the western and central Cypress Hills is composed of about 30m of massive coarse gravel or conglomerate. Clasts weigh as much as 25 kg and are well-rounded quartzites and cherts derived from the Rocky Mountains, 300-400 km away!

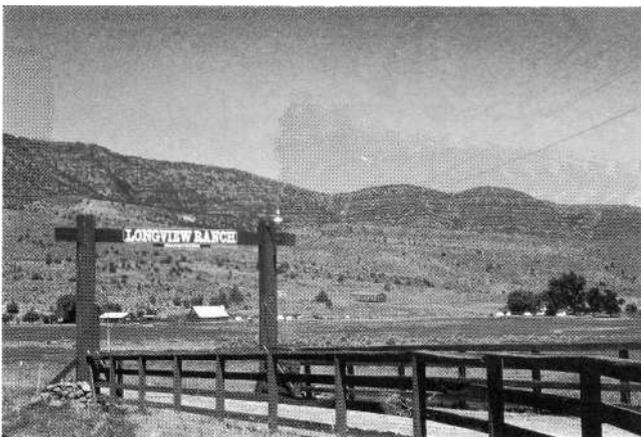
sometimes with fossil rodents in them, called the 'Devil's Corkscrews' (see Figure 9), found in Miocene sedimentary rocks of western Nebraska.<sup>68,69</sup>

The evidence strongly suggests that these tracks and these 'Tertiary' sediments are from the inundatory stage of the Flood — deposited within the first 150 days and satisfying the Biblical criterion of all air-breathing terrestrial animals killed by Day 150. The existence of live mammals on Flood sediments can be explained in the same way as indications of live dinosaurs on Flood sediments.<sup>70</sup> So there is not a serious problem with 'Tertiary' tracks, or even 'Tertiary' dinosaurs, as Robinson alleges. The problem is more with our concepts, such as

*' . . . we have animals trying to escape the deluge right to the time when Noah steps out of the Ark', (p. 59)*

There is also evidence that large portions of the 'Tertiary' of the deep sea are post-Flood. In the ocean, the sediments of the deep sea are dated mainly by microfossils, not by vertebrates and macroscopic invertebrates. In these 'Tertiary' sediments, ice-rafted debris is sometimes discovered. Assuming the researchers are correct, that the debris is really ice-rafted, this debris has been discovered as old as late Oligocene (about 25 million years ago within the evolutionary fossil-dating scheme) around Antarctica<sup>71</sup> and mid Miocene (11 million years ago) in the northern North Atlantic.<sup>72</sup> According to my ice age model,<sup>73</sup> ice-rafted debris would represent late ice age time, because ice sheets would not descend to sea level and calve icebergs for quite a while, especially since the oceans started off quite warm in the ice age after the Flood. Consequently, much of the 'Tertiary' oozes based on microfossils likely are post-Flood. This also lends credence to Larry Vardiman's use of the Tertiary oozes as a general record of post-Flood oceanic cooling.<sup>74</sup>

In summary, there is evidence that the 'Tertiary' was laid down during the inundatory stage, the recessive stage, and after the Flood. For those who wish to use the



**Figure 8.** Scoured valley with pediments (the flat surfaces at the base of the ridge descending toward the middle of the valley) in the John Day country of central Oregon. Pediments are likely an erosional remnant of the dispersive phase of the Flood.



**Figure 9.** Spiral burrow from an extinct beaver from the Miocene of western Nebraska.

geological column as an exact or even a general sequence for Flood deposition, the 'Tertiary' period is greatly time-transgressive or very diachronous. The Whitcomb/Morris model can simply be 'tweaked' to account for a very diachronous Tertiary. This is also the reason I hold that the Flood/post-Flood boundary is generally in the late Tertiary or late Cainozoic. It is possible post-Flood sediments may be 'Pliocene' or even 'Miocene' in an area. It is equally possible that some 'Pleistocene' deposits are Flood sediments, especially if the deposits are disconnected from the ice age. Each individual location must be evaluated on its own merits.

### Pre-Flood Geography?

Robinson has made a case in his paper, and in an earlier paper,<sup>75</sup> that practically all the pre-Flood land of the world was inundated by the Devonian. Robinson also assumes in general that the present continents

*' . . . are undoubtedly fragments of the supercontinent before the Flood. It follows, therefore, that the Lower Palaeozoic marine animals fossilised in, say, Iowa, hundreds of miles inland from the pre-Flood shore, must have been transported enormous distances . . . '*<sup>76</sup>

Since most of the pre-Devonian strata are marine and cover much of the continents, he reasons that there was no land left for the dinosaurs and mammals to wait their turn to be buried above the marine sediments. This is a good point and needs to be addressed, but it assumes much.

We really do not know the pre-Flood nor the early-Flood palaeogeography. Assuming that all present continents really do have marine sediments upon igneous and metamorphic basement rocks, the pre-Flood and early-Flood land could have been in the present ocean for all we know. Robinson simply dismisses this idea by saying that *' . . . none of today's ocean floors are older than Mesozoic'.*<sup>77</sup>

Has he examined this uniformitarian deduction to find out whether it has any validity in a creation model? Robinson describes the violence of the Flood as

*'massive crustal warping . . . the surrounding land*

*collapsed . . . the waters swept over the land, slicing through folds. . . leave a planar surface traceable over hundreds of miles . . .*<sup>78</sup>

I believe these are adequate descriptions of the tectonics, and rapid erosion and deposition, at the beginning of the Flood. However, all this violence at the beginning of the Flood does not mean there were no areas of land that survived the initial onslaught, only to be destroyed later by Day 150, by such violence as described by Robinson. Therefore, the dinosaurs, as well as other animals, could have found refuge on those areas until the land was finally overtaken, in which case the animals could have been transported and buried on top of Palaeozoic sediments in those areas where they are observed in vertical sequence. Many of the dinosaurs could have made it alive to newly-exposed Flood sediments where they made tracks and laid eggs. They certainly did not need ' . . . to keep as one herd all the while that they were tossing in the sea. . .' (p. 58) in order to explain monospecific bone-beds. Many palaeocurrent directions in the dinosaur-bearing sediments and sediments containing mammals in the high plains of the United States are generally from the west. There could have been a land-mass along or off the current Pacific Coast, or even well out in the Pacific Ocean, where the animals lived before the Flood. One reason dinosaurs did not become fossilised in the 'Palaeozoic' is because the Palaeozoic is simply a record of the destruction of marine environments. There is much room for further details within the Whitcomb/Morris model.

### The Uncritical Acceptance of Palaeoenvironments

Need I remind the reader that the difference between how the uniformitarian geologist and how the creationist views the rocks is like the difference between night and day? Whereas the uniformitarian geologist would view a large rock outcrop and envisage slow processes with a little water over a long period of time, the creationist would see rapid deposition by the Flood in a short period of time. The uniformitarian would further tell us about the palaeoenvironment of the deposit — its palaeogeography, palaeoecology, and even its palaeoclimate. He bases his analysis on certain properties of the sediment, which is based essentially on his uniformitarian assumption.<sup>79</sup> But even within his own paradigm, I have found that many palaeoenvironmental interpretations are simplistic and often do not even conform to present processes. How much more should a creationist be sceptical of palaeoenvironmental analysis? However, it seems that Robinson and others accept these uniformitarian palaeoenvironmental interpretations uncritically, while railing against other creationists for their scepticism. It is no wonder to me that they feel compelled to invent the pre-Permian Flood hypothesis.

Some of the many palaeoenvironmental interpretations Robinson believes, from his paper, are:

- (1) a lacustrine environment (p. 57),
- (2) the palaeoclimate (pp. 59, 60),
- (3) a terrestrial environment (p. 59),
- (4) the western interior seaway (p. 57),
- (5) dinosaurs died in local floods (p. 57),
- (6) sea-level curves (p. 59),
- (7) aeolian sand (p. 60),
- (8) upper coastal plain (p. 60),
- (9) orographic cycles (pp. 61, 62),
- (10) plate tectonics just like the uniformitarian scientists envisage it (p. 62),
- (11) ancient seashore (p. 61),
- (12) tidal sandstone (p. 62),
- (13) prodelta shales (p. 62),
- (14) transgressions and regressions (p. 59),
- (15) fluvial channels (p. 63),
- (16) lacustrine limestones (p. 63),
- (17) seasonally flooded savannah (p. 57), and
- (18) seasonal wetlands (p. 60).

If Robinson and others were as critical of these uniformitarian concepts as they are of the Whitcomb/Morris model, they might find that many of these palaeoenvironmental designations are built upon sand. It is possible some of these palaeoenvironmental concepts have meaning within the Flood, but every one of them needs justification.

### Ancient Sea-Level Curves, Transgressions, and Regressions

Robinson believes the uniformitarian analysis of transgressions and regressions, with their corresponding Palaeozoic, Mesozoic and Tertiary sea-level curves. The basis for transgressions, regressions and ancient sea-levels should be critically examined by creationists. There are mainly two methods for inferring ancient sea-levels :-

- (1) patterns in seismic reflection profiles,<sup>80,82</sup> and
- (2) assuming a similar height/area ratio as today and determining what sediments are marine.<sup>83,84</sup>

Both methods are based on many uniformitarian assumptions. The first method requires accurate recognition of seismic patterns, palaeobathymetric control, accurate fossil dates, known tectonics, the rate of coastal sedimentation, and accurate identification of coastal deposits. Once you figure out the ancient sea-level for a local area, you need to correlate the transgressive/regressive cycles regionally and then globally. Although accepting the general Phanerozoic pattern of sea-level, Miall has been especially critical of third-order seismic cycles (1-10 million year periodicity), claiming that correlations from area to area are probably circular reasoning, and that correlations can easily be made because there are so many cycles.<sup>85,86</sup> Within the Flood paradigm, the seismic patterns can be due to other variables besides sea-level, such as rapid currents eroding and spreading sediment, and changes in current directions.<sup>87</sup>

The second method assumes accurate palaeogeography,

accurate marine and terrestrial palaeoenvironmental designations, accurate dates, that today's height/area ratio applies to past continental areas, etc.<sup>88</sup> During the Flood, today's height/area ratio surely would not hold, not to mention the other assumptions.

The two methods are said to be independent, and since the sea-level curves derived by the two methods generally agree on the large-scale features and sometimes on the small-scale patterns, the 'agreement' is claimed to justify the results. This is a common argument: the agreement of supposedly 'independent' dating methods or results proves the uniformitarian and evolutionary paradigm. However, in the case of the sea-level curves, I do not believe the curves are independent of geological concepts, which would put constraints on any postulated sea-level curve. Some of the geological constraints are:-

- (1) significant marine Palaeozoic sediments on the continents, implying high sea-level;
- (2) the late Palaeozoic 'ice age', which would cause falling sea-level;
- (3) the western interior seaway and other seaways on other continents, implying a high Cretaceous sea-level;
- (4) the disappearance of these seaways followed by Tertiary 'terrestrial' sedimentation, implying a Tertiary regression;
- (5) the many Quaternary ice ages, resulting in frequent oscillations in sea-level; and
- (6) the melting of the 'last' ice age, which would raise sea-level to the present.

Creationists need to beware of the results of the uniformitarian paradigm. Roy Holt suggests that if any creationist uses these curves for the post-Flood period, then it implies that sea-level overflowed God's bound for the sea, and also flooded the Plain of Shinar where Noah and his family settled after the Flood.<sup>89</sup>

Sea-level curves bring up the vast subject of transgressions and regressions, as well as what is a marine versus a terrestrial palaeoenvironment. Robinson is correct that uniformitarian geologists use other data besides fossils to determine a terrestrial environment:

*'In reality, of course, geologists do not "assume" that a sediment is terrestrial, but infer it from the evidence of sediment source (for example, highlands), sediment type, sedimentation patterns both on the large and the small scale, and fossils . . . / (p. 64)*

Geologists often make highly subjective interpretations regarding sedimentation patterns, and it seems that similar sediment types and patterns can occur in both presumed marine and terrestrial environments. I will adhere to the following statement I made in the dinosaur extinction article:

*'Defining a terrestrial or marine environment can be challenging and is normally based on the fossils'.<sup>90</sup>*

A marine fossil is a good palaeoenvironmental indicator for an ocean environment in both the uniformitarian and creationist models. Within a creationist Flood model, it is

difficult to understand how a marine fossil could end up in a pre-Flood terrestrial environment that was not later destroyed. A terrestrial organism, however, would very likely be deposited in a marine Flood environment. So, finding normally marine fossils among terrestrial fossils would not be unusual to creationists; for example, shark teeth among dinosaurs in eastern Montana,<sup>91</sup> plesiosaurs in a terrestrial dinosaur area, near Drumheller, Alberta, Canada,<sup>92</sup> and a hundred sting-rays in the Green River Formation of southwest Wyoming.<sup>93</sup> It is difficult to know the frequency of such anomalous occurrences due to lack of reporting. The uniformitarian geologist always has explanations for these anomalous occurrences. In the examples above, the sharks and sting-rays are simply freshwater varieties, and the plesiosaur swam up a river from the ocean and died.

If one views the contact at a supposed transgression and regression, it is often sharp. This is not what I would expect in view of the complexity of modern coastal environments, with a surf, tidal currents, wind currents, rip currents, storm-generated currents, and other processes that operate to complicate the sediments.<sup>94</sup> Nummedal writes:

*'The complexities of shallow marine storm sedimentation are great, and many of the simplified models commonly presented in the geological literature are wrong'.<sup>95</sup>*

Therefore, sharp or even gradual contacts should be very rare for real transgressions and regressions; chaos should reign.

A simple method for determining transgressions and regressions in a vertical sequence of strata is by analysing lithological changes. A transgression is presumed to have occurred where a sandstone changes upward to a shale or mudstone, then to a marl or carbonate, and vice versa for a regression. When you view such sequences, there often are sharp to gradual transitions between these types of rocks. You do not see the chaos that should occur in the sediments if they were due to changes in sea-level. Uniformitarian geologists can infer transgressions and regressions when there are none. For instance, Zeller showed that transgression and regression cycles can be marked off on a **random** vertical section of sandstone, shale and limestone, with the added allowance for erosional events. He concludes:

*'From the preceding story, it will be seen that our stratigraphic section, composed of randomly selected lithologies, does indeed show most of the characteristics that can be expected in a truly cyclic [transgression and regression] sequence. Let the reader be assured, however, that the writer's humble efforts at creating confusion are of truly minute proportions when compared to those of nature'.<sup>96</sup>*

For the creationists, such vertical changes in lithology could occur by other mechanisms during the Flood. For instance, a change from sandstone to shale to marl could simply

represent decreasing current velocity. In this situation we would not expect to see evidence for a coastal environment, but sharp or gradual changes, as are commonly observed.

### What is the Nature of post-Flood Catastrophism?

I and other creationists have already posed many questions for the pre-Permian model. I will emphasise only a few.

The pre-Permian Flood model must postulate that all the sediments labelled Permian, Triassic, Jurassic, Cretaceous and Tertiary are due to post-Flood catastrophism. I realise that it would be difficult to give details, but Robinson and others should at least tell us the nature of these catastrophes. These catastrophes would have laid down about half the sediments in the world.<sup>98</sup> For instance, the pre-Permian model would have to account for 10 km of post-Flood Mesozoic and Cainozoic sediments in the northern Gulf of Mexico (even if the Flood/post-Flood boundary is placed at the Cretaceous-Tertiary, 7 km of sediments would have been laid down after the Flood.)<sup>98</sup> Along the continental shelf from Cape Hatteras to Long Island, New York (200,000 km<sup>2</sup> area), the sediments on the continental shelf and slope are up to 18 km deep, all claimed to be Jurassic, Cretaceous and Tertiary.<sup>99</sup> If these thick sediments are to be placed into a few hundred or a few thousand years after the Flood, the sedimentation rates would have been many thousands of times more than at present.

If the proponents of the pre-Permian model believe what the geologists tell us about these geological periods, there must also have been huge meteorite impacts, enormous volcanism, huge basalt flows, rapid horizontal movements of plates, and practically all the continental and mountain uplifts in the world, during post-Flood time. Just one basalt flow of the Columbia River Basalts, the Roza Flow, has been estimated to have injected enough SO<sub>2</sub> into the atmosphere to cause a severe nuclear or volcanic winter.<sup>100</sup> This would have blocked practically all sunlight for several months worldwide! This is just one of the several hundred flows in the Columbia River Basalts, which is one of many flood basalts on the Earth that would be attributed to post-Flood time. A strong earthquake or tsunami today kills a lot of people. These would be but a geological 'twitch' compared to the post-Flood activity postulated in the pre-Permian model. Have the proponents of the pre-Permian model seriously considered how man and beast would survive after the Flood? How would Noah and his family survive if he walked out onto a Carboniferous surface with all the post-Carboniferous sediments yet to be deposited in the Middle East?

If all the post-Carboniferous fossilised vertebrates represent organisms that left the Ark, then how do advocates of the pre-Permian model explain the separation of the fossils as postulated in the geological column? For example, wouldn't post-Flood catastrophes entomb

mammals and dinosaurs together? How would all the vegetation grow and be gathered together to make the huge Tertiary coal seams, such as the ones in the Powder River Basin of Wyoming and Montana? Just one coal seam, the Big George Seam, in the Powder River Basin is approximately 100 km north-south, 40 km east-west, and 61 m thick — almost pure low-clay, low-ash coal!<sup>101</sup> How would Tertiary warm climate plants and animals survive at high latitudes and at mid latitudes in continental interiors after the Flood when the present winter climate, based mainly on sun angle, would freeze them?<sup>102</sup>

Proponents of the pre-Permian model claim that Scripture, especially Genesis 6:7 and 7:23, teaches a total annihilation of terrestrial animals at the outset of the Flood so that no fossil traces would be found. I continue to question whether these verses support such an interpretation in view of Genesis 6:13 and 7:22. Genesis 6:13 indicates that both man and the animals were destroyed **with** the Earth or the surface of the Earth. He did not make the Earth or the surface of the Earth disappear. Genesis 7:22 simply says that man and the animals **died**. It seems obvious to me that the meaning of Genesis 6:7 and 7:23 is that man and the animals died during the Flood and their kinds were not annihilated.

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