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The Fatal Flaws of Flood Geology

The flood geology theory teaches essentially that the Biblical Flood of Noah buried all the fossils within a year's time, several thousand years ago. Although this theory accepts each miracle explicitly mentioned in the Biblical Flood story, the Institute for Creation Research (ICR) maintains that God uses miracles very sparingly; once He finished using a few miracles to get the Flood rolling, He let it operate according to natural laws to produce the geological features that are now seen in the earth's crust. This part of their version of the flood geology theory purports to explain the structure of the rocks in the crust, and thus makes testable scientific predictions: wherever this theory is naturalistic, it is a scientific theory deserving a scientific response.

The Great Deluge

The ICR flood geology theory relates the events of the Biblical Flood as follows: Before the Flood, a water vapor "canopy" in the upper atmosphere created a greenhouse effect, making the entire earth a tropical paradise. The oceans were shallower, the lands lower and more extensive than today. Because the greenhouse effect kept temperatures the same throughout the earth, there was no wind circulation and no rain, only a mist that watered the ground daily. Underneath the

earth lay vast underground water reservoirs.

To start the Flood, God performed some miracles: He made the animals seek out Noah's Ark, "opened the windows of the heavens" to empty the vapor canopy on to the earth, and "broke the fountains of the great deep" to overwhelm the continents with volcanically heated brines. During the course of the flood, the violence of the rains and volcanic waters catastrophically scoured and dumped sediments, burying all sorts of creatures as fossils in the process. *In and of itself*, this catastrophic erosion and sedimentation was perfectly naturalistic; it operated according to ordinary laws of physics and chemistry, only on a much larger and faster scale than erosion and sedimentation today.

One year later, to end the Flood, God performed one more set of miracles; he made the continents rise and the ocean basins sink along vertical faults. These new basins were necessary to contain all the ocean waters once they had been augmented with all the newly released canopy and subterranean waters. Thus ended the Flood of Noah; thus originated the face of the earth we see today.

Modern creationists no longer calculate precise Biblical chronologies because they say there may be small gaps in some of them. Even so, they believe that

God created the earth no earlier than ten thousand years ago, and brought on the Flood one or two thousand years after the Creation.

This account summarizes the flood geology model that Dr. Henry M. Morris, Director of ICR, expounds and defends in creationist classics like *The Genesis Flood* (Whitcomb and Morris, 1961) and *Scientific Creationism* (1974).

Despite all the miracles in the Biblical Flood story, the ICR members emphasize that their flood geology model is mostly naturalistic. They claim that this model

can interpret the known geological evidence in terms of known laws of physics and chemistry better than does orthodox geology. For instance, John C. Whitcomb in *The World That Perished* (1973) tells us that:

> *God maintains a definite* economy of miracles*. Otherwise, miracles would become commonplace and would thus lose their uniqueness and significance.... Apart from the specific miracles mentioned in Scripture, which were necessary to begin and to terminate this period of global judgment, the Flood accomplished its work of destruction by* purely natural *processes that are capable of being studied to a certain extent in hydraulics laboratories and in local flood situations today. [pp. 67–68; emphasis Whitcomb's]*

Thus Whitcomb, as well as his friend Dr. Morris (who wrote an enthusiastic foreword for the book quoted above) commits himself to explaining the bulk of the geological evidence naturalistically. How well do they succeed? This article can scarcely cover all relevant evidence, but it will nevertheless tackle this question.

Let's begin with the problems posed by fossil desert deposits.

Desert Deposits

You don't need a Ph.D. in geology to know that desert dunes and other desert deposits do not form under roaring flood waters. These require not only time, but also dry land. The Flood of Noah supplies neither.

The Old Red Sandstone, which looks for all the world like a collection of fossilized

desert dunes, was formed in Devonian times. It has outcrops extending from the British Isles to Poland and Russia's White Sea, and from Germany to Norway (Gilluly, Waters, and Woodford, 1968). Outcrops have even been found in Greenland and North America. In Devonian times, before North America and Europe drifted apart, these dunes covered an entire semi-arid continent.

Several lines of evidence derived from this great geologic formation create difficulties for the flood geology model. For instance, the interfingering of these sandstones with marine sediments shows that the shoreline of this continent advanced and retreated several times. Thus the desert rocks are entangled with rocks that the flood geology model says were formed within the one-year-long flood. Also, redbeds, consisting partly of rust formed above sea level, are also

found in this formation. These would not have been formed in any catastrophic flood. The Old Red Sandstones also contain typical playas, complete with their characteristic cubic salt crystal deposits. These are desert salt-pan deposits formed after the rainy-season lakes evaporate. Today, in the Mojave Desert, playas can become lakes for a couple of weeks, only to dry out again, leaving a crust of salt deposits like those found in the Red Sandstone. Although a few freshwater ponds did exist on this ancient semi-arid continent, they dried up from time to time. So, we find fossil mud cracks in the shales that came from the dried-up pond bottoms, and we find fossil lungfish, a type of fish that can survive drought by building a mud cocoon in the pond bottom and breathing air. Hundreds of square miles of fossil sand dunes in these deposits contain cross-bedding and sand-blasted pebbles (ventifacts) of the sort found in modern desert sand dunes, and in no other kind of modern sediment. These different independent lines of evidence converge to show that the Old Red Sandstones almost certainly formed over thousands of years in a dry climate, not in any kind of flood catastrophe.

The Grand Canyon contains fossil desert dunes and other sediments that to all

appearances were deposited on dry land. The Permian Coconino Sandstones in the upper walls of the Grand Canyon have the frosted well-sorted wellrounded sand grains found only in land-deposited sand dunes (Shelton, 1966). Furthermore, many of the laminae of the cross-bedding contain fossil footprints that could only have come from reptiles or other quadrupeds climbing up the face of a slightly damp sand dune in the open air. (Those climbing *down* the slopes left no tracks because they simply slid.) ICR geologist Dr. Steve Austin has taught the theory that amphibians resting between underwater dunes made the tracks. His theory is very interesting, but rather implausible since the Flood must have been violently dumping several meters' worth of sediment per day.

The Canyon's Supai and Hermit Shales, found today beneath the Coconino Sandstones, look exactly like river deltas that formed above sea level (Shelton, 1966). Back in Permian times, many quadrupeds (probably reptiles) left their footprints in the soft delta mud. As the mud baked hard in the sun, it formed cracks. The hardness of the baked mud preserved the footprints and mudcracks until the flooded rivers of the rainy season buried them in fresh mud. These fossil prints and mudcracks are found today, as well as iron oxides that form in the open air, showing that these shales formed above sea level.

The pure quarz Navajo Sandstones of Triassic and Jurassic times in Zion National Park, Utah, also look exactly like desert sand dunes (Gilluly, Waters, and Woodford, 1968). They contain extensive cross bedding of the type found in sand dunes, and the frosted sand grains and sand-blasted pebbles found only in dunes formed on the land.

Certain formations in western Wyoming look exactly like deserts that bordered a fitfully receding sea in Carboniferous times (Houlik, 1973). In particular, the Mississippian Lodgepole Formation contains the type of carbonate

deposits and evaporites found forming in tidal flats today. The Amsden formation consists of sabkhas and desert dunes. Sabkhas are a kind of hardpan that forms in deserts after hard water seeps up through the ground by capillary action and evaporates leaving nodules of calcite, andhydrite, and other salts. They are seen forming extensively in Saudi Arabia today. Unless Houlik has grossly erred, these sabkhas, casts of evaporite crystals, and fossil dunes show that these Carboniferous deposits formed in a desert, not a flood.

Several times at the end of the Miocene epoch (six to eight million years ago), the Mediterranean Sea dried up, leaving extensive desert deposits on the sea bottom (Hsu, 1972). The Straits of Gibraltar opened and closed, causing these complex changes, as the *Glomar Challenger* discovered in 1970 by using echo soundings and deep-sea core samples. Each time the Mediterranean slowly dried up, first calcite precipitated around the rim of the basin of the Balearic abyssal plain, then anhydrites and gypsum further in, and finally rock salt in the center at the deepest point. This is just the order that these salts would precipitate if you set out a large saucer of sea water to dry. Successive dryings of the Mediterranean produced hundreds of meters of evaporites. Not only did evaporites form, but also land deposits like sun-baked mud cracks, wind-blown sand, and sabkha anhydrite nodules. Since algae can only grow where sunlight reaches, the stromatolites (a common algae deposit) found in deep sea core samples show that the Mediterranean sea floor, now two miles deep, was once dry land. The Rhone and Nile rivers cut their canyons thousands of feet below current sea level to feed the desiccated Mediterranean basin. Desert-style alluvial fans accumulated from debris washed by cloudbursts down the slopes of Sardinia; now these deposits lie far under the water. After the Mediterranean refilled with water for the last time, at the beginning of the Pliocene, sediments began to accumulate over the evaporites; the weight of these sediments forced evaporites up through weak spots in the sediments to form salt domes. Some of these salt domes are a few miles across, and hundreds to thousands of feet high. Even though such structures may not be

forming today, a dried-up Mediterranean could have easily formed them, whereas flood geology is hard pressed to account for such things.

Fossil Forests

In Yellowstone Park at Specimen Ridge, a nearby volcano buried 27 forests one atop the other in rocky debris in Eocene times. After a forest grew on top of some old volcanic debris, the volcano would shower fresh debris through the air on top of it and mudslides consisting of volcanic debris would flow through it. The trunks and branches left sticking above the volcanic debris rotted away. Then a new forest would grow on top all this new debris, repeating the cycle. Animal fossils are scarce because the animals living in the forests fled the area as soon as the volcanic dust made the air hard to breathe. However, the falling debris, which broke the branches off the trunks, preserved many fossil leaves and

twigs (conifers, deciduous trees, and ferns). As the rock erodes today, the petrified trees (which erode more slowly) stand upright and project above the ground. Complete root systems have been found in many of these trees. This entire deposit took over 20,000 years to form, double the maximum age of the earth allowed by ICR, and 20,000 times too long to fit into the Flood of Noah.

Erling Dorf (1964) has calculated all this. He noted that the oldest trees in each layer were about 500 years old when they were buried. Igneous rock requires 200 years to decay into a reasonable soil. Add these two figures, and we get the age per layer; multiply by 27 layers, and we get about 20,000 years, the minimum time in which a formation like this can arise.

Flood geologists, on the other hand, insist that Noah's Flood washed in heaps of uprooted trees between eruptions; they say the trees stand upright because dirt

which became entangled in the roots weighted down the bottoms enough to hold the trunks upright. Nevertheless, uprooted trees today that wash onto a beach lie on their sides. F. H. Knowlton (1914), referring to a 12-foot-tall 26'/2-foot-around fossil redwood, says, "The roots, which are as large as the roots of ordinary trees, are now embedded in solid rock." William B. Sanborn (1951) says concerning two nearby pines, "Each stands about 15 feet, and shows a complete root system." Charles H. Brown (1961) says that one of the methods of finding exact forest levels was to find "the expansion of the base of an upright tree trunk immediately above the root system." One would expect the trees to be stripped of most of their roots and buried on their sides if they had been uprooted and buried in Noah's Flood.

In an article in some obscure religious journal cited in Robert Kofahl's *Handy Dandy Evolution Refuter*, flood geologist Harry Coffin maintains that the tree rings within a given fossil forest layer do not cross correlate. Let's look into this.

Every year, a tree grows a new ring. If the rainfall varies from year to year where this tree grows, then all the rings in its wood will vary in diameter; the narrow rings grew during the dry years, and the wide ones during wet years. Dendrochronologists (tree-ring daters) correlate tree rings from different trees by comparing ring variation patterns in one tree with those in another to see whether they match.

Since Coffin says the petrified trees of Specimen Ridge have rings that vary enough in diameter to be worth trying to correlate, he implies that before the Flood, rainfall varied from year to year. In this, he contradicts the flood geology model without knowing it (if he assumes with Morris that no rain fell in pre Flood times). Also, since the trees all supposedly died within the same year in the Flood, the flood geology theory implies that if their rings vary in diameter at all, then *all* the trees *everywhere in the formation* should cross-correlate. Thus Coffin's claims do not stand up under analysis.

The Earth's Crust

Flood geologists claim that the ocean basins and the continents consist of essentially the same sort of crust; the main difference is that the ocean basins were lowered and continents raised along vertical faults. Their theory creates two problems.

Firstly, if the Flood washed over entire continents, then most of the sediments and sedimentary rocks of the world would be found in the ocean basins. The eastern Washington Scablands show (on a small scale) what the continents should look like if flood geology is true (Shelton, 1966). During the last ice age, a glacier dammed up a lake called Lake Missoula. When that dam melted, 2,000 cubic kilometers of lake water catastrophically denuded thousands of square kilometers of eastern Washington. However, similar denuded igneous rocks are seldom found outside of Washington State. On the contrary, the continents and continental shelves are covered as much as 12,000 meters deep with sediments and sedimentary rock, whereas ocean basins always bear less (usually far less) than a kilometer of sediment except where they abut a continental shelf. The continental shelves gather most of the sediments dumped by rivers. Few sediments ever get to the deep ocean basins beyond. The continental drift theory leads us to expect exactly this result, as any good encyclopedia will show. However, it is exactly the reverse of what flood geology predicts.

Secondly, the continents are mostly slabs of granite about 30 to 60 kilometers thick. The granitic continental crust stands higher above the ocean basins while having roots more deeply sunk than those of the ocean basins because granite is lighter than basalt, and hence "floats" more buoyantly upon the viscous mantle of the earth. These facts about sediments and buoyancy, well known to any freshman geology student, cause grave difficulties for flood geology.

Coral Reefs

Huge coral atolls and reefs require many thousands of years to form because the individual corals that constitute them grow so slowly. Under ideal conditions, corals grow as fast as 1.0 to 2.5 centimeters per year, but conditions are seldom ideal, and reefs as a whole grow much more slowly than the individual corals that make them up. The surf pounds broken coral branches into sand, and the red and green calcareous algae cement this sand together into a form far more compact than the original corals, so a reef complex consisting largely of cemented coral sand actually grows much more slowly than the original corals, only millimeters per year. Such slow growth rates imply that coral atolls and barrier reefs (both fossil and modern) needed tens of thousands of years to grow into their present form; the flood geology model supplies only a fraction of the needed time. The modern Eniwetok atoll, the fossil Rainbow Lake reefs, and the

complex geology of Hawaii are good examples to illustrate this.

H. S. Ladd (1960) has drilled deep holes on Eniwetok atoll to take samples of coral and coral derived rock. These core samples reveal a huge cap of coral that took millions of years to form. Over a thousand cubic kilometers of coral reef rock cover a sunken basalt volcano cone. Millions of years ago, this cone formed a volcanic island; the parts above sea level were worn flat by erosion. As it slowly sank, the coral reefs that had been growing on its rim grew upwards fast enough to keep at the surface of the ocean, forming a huge coral cap. The cores taken from the drilling show that the deepest corals are so old that they have become chemically altered from aragonite to dolomite. Occasionally in geological history, the volcano temporarily ceased to sink, and lifted the coral cap many feet above sea level (the modern Tonga islands are also former atolls heaved many feet above sea level); the core samples clearly show gaps in the coral where the coral was being weathered above sea level. The deepest core sample of all revealed coral as thick as 1380 meters. Assuming that Ladd is accurate, let us grant ICR two generous assumptions: (1) the reef as a whole grows a centimeter per year, and (2) we ignore the time

represented by erosional gaps. Given these assumptions, the atoll must be no less than 138,000 years old.

The flood geology theory allows no more than about 8,000 years for all modern reefs to form, only 5% of the time that Eniwetok needed to grow to its present state. If flood geology is true, then the modern reefs started growing only after Noah's Flood was over with. After all, the Flood itself would have killed off all corals by kicking up a slurry of clay particles in all the ocean waters. These particles would have taken years to settle out. Corals require clear water and cannot stand any turbidity. Even though modern creationists allow gaps in the Biblical genealogies, standard ICR works like Scientific Creationism (General Edition) allow no more than several thousand years between Noah's Flood and today. To fit Eniwetok into their time constraints, the ICR creationists are forced to ignore the findings of Ladd.

The fossil Rainbow Lake reefs formed in Devonian times where Alberta, British Columbia, and the Northwest Territories meet. As Hriskevich (1970), Langton (1968), and others show, these reefs trap important oil reserves. Since they are buried in and intertongue with other sedimentary rocks, they must have formed in the Flood of Noah, if flood geology is true. Nevertheless, they form solid winding barrier reefs consisting of intergrown dolomitized coral and coral-derived debris glued together by calcareous algae. In other words, they look just like modern barrier reefs, not like piles of loose coral that the tidal waves of Noah's Flood threw together by chance. One reef is over 240 meters thick. Unless petroleum geologists have grossly erred somehow, we calculate, using the generous growth rate of a centimeter per year, that this reef required 24,000 years of clear tranquil tropical surf to form, not a one year succession of muddy tidal waves.

If Harold T. Stearns' *Geology of the State of Hawaii* (1966) is correct, then

the many coral reefs and other complex geological features of Hawaii form grave difficulties for flood geology. For instance, a strata sequence exposed at sea level near Pearl Harbor (illustrated on page 84 of Steams' work) took many years to form, far too long for the Flood. This sequence contains reef limestone above sea level, which covers volcanic ash that had buried trees growing in place, which in turn covers another layer of reef limestone. Also, on page 21, Steams describes a core sample taken from a hole drilled 332 meters into the ground somewhere else in Pearl Harbor. This sample revealed 15 coral reefs separated by fossil soils, lignite (brown coal), and beach rock. Steams' example of ocean terraces will require some explanation.

Stacked above and below each other, ocean terraces look like steps in a staircase leading out of the sea. Each terrace represents an old shore line above or below current sea level; as the land and sea rise and fall, the surf cuts terraces at the different sea levels. Elevated and submerged terraces in Hawaii, New Guinea, Jamaica, and other tropical seacoasts often bear dead coral reefs (Goreau, 1979). Since many of these reefs took thousands of years to form, and since different terraces formed at different times, the stack as a whole took at least several times as long to form. Recorded history (which begins only a couple thousand years after the alleged Flood) knows no sea level changes amounting to hundreds of feet, so these terraces do not seem to fit very well into the postFlood period. These terraces look exactly like the kinds of reefs and beaches forming today, not like debris thrown together in some catastrophe like the Flood of Noah.

Stearns, reporting about the coral-bearing terraces of Hawaii in some detail, points out that many terraces contain fossil-bearing marine conglomerates. To the orthodox geologist, this is no surprise; river floods, land slides, storm waves, and turbidity flows are only a few of the processes known to bury and preserve animals and plants before they rot away so they can become fossils. However, the ICR creationists insist that no processes except for catastrophes the size of Noah's Flood can bury dead animals fast enough to fossilize. If this theory is correct, and if

these conglomerates were formed in the Flood, then the ICR creationists need to explain why these terraces look for all the world like the kinds of reefs and beaches forming by slow processes today.

Evaporites and Shales

Several lines of evidence show that fine-grained evenly-layered shales and evaporites require many thousands -if years to form. Extremely fine sediment particles suspended in water settle to the bottom painfully slowly, and even slight turbulence keeps them in suspension. If you shake a jar full of dirt and water, the water will remain cloudy with clay particles long after the sand has settled out. Not only that, but the concentration of gypsum, calcite, and other dissolved salts in sea water is so low that thousands of cubic kilometers of sea

water would have to evaporate to precipitate these salts as a typical evaporite deposit. These processes of sedimentation and evaporation are so slow that thick shale and evaporite deposits could scarcely have formed overnight. Since the flood geology model requires that all sedimentary rocks be deposited within one year during the Flood of Noah, the ICR creationists must somehow explain these facts away.

One way they might try would be to suggest that shale-forming clay would settle rapidly out of the flood waters if those waters were supersaturated with clay. ICR has already proposed (quoting Soviet geologist V. I. Sozansky) that evaporites formed rapidly from supersaturated volcanic waters. However, if either of these two theories are true, then thin even laminations extending over many square kilometers are an insoluble problem. The clays and evaporites would have almost certainly settled out in huge globs to form amorphous strata-free rock. The ICR theory that the laminations were caused by a rapid succession of turbidity flows

does not satisfactorily explain how the fine stratification of the Green River shales or the Castilian evaporites could form in a one-year-long catastrophic flood. Let us discuss these two formations in more detail.

The finely stratified Green River shales of Wyoming, Colorado, and Utah are 600 meters thick. They accumulated at the bottom of a 30-meter-deep lake in Eocene times over a period of 5 to 8 million years (Bradley, 1929). Several lines of evidence show that each distinctly visible layer is a yearly deposit or "varve." The sedimentary deposits varied so much with the seasons that each varve clearly stands out. The average varve in this formation consists of a layer of clean microscopic clay particles alternating with a layer of hydrocarbons in the form of waxy pollen and spore particles (Clark and Steam, 1958). Apparently, the spring wind and rivers wafted spores and pollen to the middle of the lake, but during the rest of the year, the currents were too weak to carry anything but the finest clay to the center of the lake. In the varves of some of the near-shore limey sandstones in the formation, the sediment particles gradually decrease in size from 0.02 mm at the bottom of the varve to 0.006 mm at the top (Bradley, 1929). The width of the Green River varves varies in cycles of 11 1/2 years, 50 years, and 12,000 years, all superimposed on one another. The 11 1/2 – year cycle corresponds to the sunspot cycle, the 12,000-year cycle to the precession of the equinoxes. Both these processes affected the yearly rainfall, and hence affected the width of each varve. Bradley's concession that he cannot explain the 50-year cycle shows that he was not imagining these cycles. The same kinds of varves are forming today in Sakski Lake (Crimea), Lake Zurich (Switzerland), and Lake McKay (Ottawa, Canada). Only slow processes happening over many years can account for varve formation. Even if an occasional storm did stir up the sediments on the bottom, the sediments could not have settl, ed out so evenly unless the tranquil time intervals between storms were very very long and convective currents were largely absent.

Creationists (like Whitcomb and Morris, 1961) have argued against the varve

interpretation of the Green River shales by citing the beautiful fish fossils it contains. Supposedly, about 200 years' worth of sediment would have to accumulate to, bury one dead fish, and by that time the fish would have long rotted away. However, the precipitates found in this formation show that the lake bottom was unusually alkaline (Press and Siever, 1974). Some shallow lakes in Florida today contain algal oozes that do not decay as long as no oxygen gets into them (Bradley, 1929). Under such circumstances, fossilization would be no surprise.

Since there are no huge evaporite deposits forming today, geologists have debated the precise mechanism by which they formed in the geological past. This gives many creationists the excuse not only to reject the traditional lagoon model of evaporite formation, but also to cite the authority of Soviet geologist V. I. Sozansky as long as his theories seem to support flood geology. Actually, Sozansky's article implicitly contradicts the flood geology model in a couple of particulars — and other geologists have come up with models that explain the observed evidence more easily than the traditional theory, Sozansky's theory, or the ICR theory.

The traditional evaporite theory states that evaporites formed in shallow lagoons in arid areas connected with the open ocean by only a narrow strait. As the water in the lagoon evaporated, precipitating salts in the process, water from the open ocean coming through the strait replaced it. But as the lagoon became more restricted and briney, first calcium carbonate ($CaCO_3$) would precipitate out as aragonite or calcite (limestone), and then calcium sulfate ($CaSO_4$) would precipitate out as gypsum or anhydrite, and finally, rock salt (NaCl) would precipitate out. If rain diluted the brines of the lagoon every rainy season, then a varve of carbonate (rainy season) and anhydrite (dry season) might form every year. This model accounts well for small evaporite deposits forming today, but not for the big ones that formed in the geological past.

Sloss (1969) modifies the traditional lagoon theory. He argues from the results of his experiments that evaporites formed from layers of water of different concentrations (ordinary sea water at the surface, highly concentrated brines on the

bottom) that existed in a huge lagoon all at the same time. Schmaltz (1969) argues that huge evaporite deposits like the Castilian evaporites of Texas (450 meters thick and 20,000 square kilometers in area) and the Zechstein evaporites of Germany (600 meters thick) formed in deep basins like the Mediterranean Sea or Red Sea. If the straits connecting these modem seas with the open ocean were much shallower and narrower, then they would start depositing evaporites just like these ancient evaporites. His complex theoretical model explains in detail how several cycles of evaporite deposits separated by deep-ocean mud formed in the Zechstein evaporites of Schleswig-Holstein. It also explains the 1000 meters of evaporites now buried under deep-sea sediments at the bottom of the Gulf of Mexico. At the end of the Cretaceous

when it first formed, the deep Gulf of Mexico basin was joined to the open ocean only by a narrow strait. Schmaltz's model predicts that the evaporites will be reasonably pure and free of other sediments because the river-deposited sediments would be deposited close to shore. These more recent theories explain all the evidence well using everyday laws of physics and chemistry.

The varves of the Castilian evaporites of Permian times in Texas (just like the Zechstein evaporites) are the strongest evidence that these evaporites took hundreds of thousands of years to form. These varves consist of calcite alternating with anhydrite (Anderson, 1972). In both examples, the calcite contains a lot of plankton and organic matter: fusulinids, possibly some algae, and possibly some shells. Even though mobile living things would swim away from the inhospitable brines, at least some plankton got pickled to death and fossilized. Many of the varves in this formation extend as far as 110 kilometers. Although Anderson insists that the yearly varve interpretation is not proved beyond all doubt, he adds that no one has yet suggested a better interpretation. The concentration of the brines never could have fluctuated many thousands of times during the one-year Flood to precipitate such fine yet extensive alternating layers of calcite and anhydrite. So

many cubic miles of such microscopic crystals never could have settled out of the water in such even layers, all within a year's time. Since this formation contains over 260,000 couplets of thin calcite/anhydrite layers, the entire formation probably took 260,000 years to form.

ICR creationists who cite Sozansky's article to buttress flood geology have failed to account for his factual errors or for his statements that implicitly contradict their theory. In essence, Sozansky believes that the great evaporite deposits of the earth formed from volcanically heated brines erupting out of the ocean floor. He feels that the traditional lagoon model works fine for small modern deposits, but not for evaporites like the huge Castilian deposits. He argues that evaporites from such lagoons would contain fossils and other organic matter. He cites as an example the evaporites forming today in the Gulf of KaraBogaz in the Caspian Sea. The salt concentration kills, pickles, and preserves fish long enough for them to become fossilized in the evaporite deposits. Since the huge ancient deposits are allegedly free of organic matter, plankton, and so forth, Sozansky concludes that they formed by some totally different process.

Of course, the creationists would like to prove that the evaporites were catastrophically deposited by volcanic brines during the one-year flood. It is no surprise, then, that *Scientific Creationism* insists that "the studies of the Russian geophysicist Sozansky" have "shown almost conclusively" that orthodox geology is in error. However, Sozansky is a doubtful ally. For one thing, even if his theory is true, the creationists must still explain away the varve evidence. Sozansky never explicitly accounts for the varves. He would have to assume that each varve came from one big eruption, and that the eruptions were separated by

enough time to let the salt crystals settle. Also, as we have seen, the Castile evaporites do contain a lot of plankton and organic matter. Schmalz's deepbasin theory shows why it does not contain fossil fish graveyards like those of the Gulf of

Kara-Bogaz. Even so, Anderson's discoveries of plankton in the Castilian deposits contradict Sozansky's assertions that the great evaporite deposits are free of organic matter. Finally, the ICR creationists have insisted that "The very existence of fossils, especially in large numbers, is evidence of catastrophism at least on a small scale." (Scientific Creationism, p. 100.) They insist that fossils are not forming today because only a violent catastrophe can bury plants and animals in mud before they rot away. The work just cited quotes Sozansky whenever his thesis seems to support ICR creationism, yet never ever even mentions Sozansky's fossil fish graveyard, much less refute it.

Fossil Species

According to the flood geology theory, all "kinds" of plants and animals alive today (not to mention dinosaurs and mammoths and other animals now extinct) lived on the earth before the flood. The Bible says Noah was to take specimens of every type of living air-breathing land animal aboard the Ark (Gen. 6:19-21; 7:2, 3, 8, 9, 15). Thus flood geology predicts that the fossil record should consist mostly of animal and plant species alive today. The extinct fossil species should be mostly delicate types sensitive to environment, because the Flood and the rugged conditions inside the Ark would have killed such creatures off. These predictions fit poorly with the available evidence.

George Gaylord Simpson (1967), world famous paleontologist, says that nearly all fossil species and genera are extinct today. Very few modem species or genera are found as fossils at all. Even so called "living fossils' like the crossopterygian (lobe finned) fish are no exception. The fossil Paleozoic eusthenopteron and the modem latimeria are both lobe-finned fish. However, the latimera resembles the eusthenopteron no more than I resemble a gorilla. The creationists have yet to answer this objection.

Many delicate species of animal survive today in spite of the predictions of the

flood geology model. Creationists have not been able to explain the technology by which Noah kept delicate koala bears and marmosets alive on the Ark. Pupfish survived a divine cataclysm only to be threatened with extinction by man-made reservoirs. We already saw how the muddy flood waters would wipe out corals (not to mention many other forms of sea life). The creationists have to postulate so many miracles to keep these creatures alive through the Flood that it would be much simpler and easier for God to create them all from scratch again after the Flood, and just forget the floating zoo.

Flood Geology Vs. Orthodox Geology

So far, we have covered a small sample of the many types of geological evidence that flood geology cannot easily explain. Personally, it persuades me that flood geology is totally erroneous. Nevertheless, ICR creationists are bound to argue, "So what if you evolutionists can come up with a few difficulties? There is no theory anywhere that is totally free of them. Besides, the problems with orthodox geology are far more serious than any of the real or imagined difficulties you can dream up against Biblical catastrophism. Can *you* explain how an even layer of sandstone, the Saint Peter Sandstone. which covers much of the United States, was formed? Can you explain how the fossils in the so-called `Lewis Overthrust' got into the wrong order for evolution? The evolutionist. excuse that the `older' rocks were shoved on top of the younger ones is lame because *Genesis Flood* and other creationist writings have conclusively proved that there is no trace of evidence that any sliding took place. Until you can answer these grave difficulties, how can I take your evolution theory seriously?"

Actually orthodox geology has no such difficulties. Creationists misunderstand the nature of sedimentary facies, and there is plenty of physical evidence having nothing to do with fossils that the Lewis Overthrust is genuine. Creationists often

quote their sources badly out of context, sources that prove thrust faulting is very real.

But, it will have to be the task of a future article to investigate these and other alleged difficulties in detail. For now, it is sufficient to say there are fatal flaws in the creationist flood geology model, flaws that render it inadequate to scientifically support the Flood or tell us anything about the age of the earth.

By Christopher Gregory Weber

This version might differ slightly from the print publication.

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