Chapter 16

Microorganism Layers Difficult to Accumulate Post Flood

Extensive, thick layers of microorganism skeletons are found in sedimentary rocks. The microorganisms include the calcium carbonate skeletons of coccolithophores called coccoliths and silica skeletons of diatoms. The former are chalk deposits and the latter, diatomaceous earth deposits. Both are difficult for both evolutionary/uniformitarian scientists and Flood geologists to explain, but even more difficult for post-Flood catastrophism.

Widespread, Thick, Pure Chalk

Coccolithophores are unicellular planktonic protists with two flagella of equal length and a third whip-like organ.[1] They are called nannoplankton because they are so small, between 5 and 60 microns in size. Coccolithophores live in the upper part of the ocean and utilize energy from the sun in photosynthesis. They are most abundant in tropical areas where they may reach concentrations as high as 100,000 cells per liter of sea water.

Figure 16.1. White Cliffs of Dover, southeast England (Wikipedia).

Coccolithophores have tiny calcium carbonate plates called coccoliths that are 3 to 15 microns in diameter. At death, the coccoliths fall very slowly to the ocean bottom. In deep water, they dissolve into a fine carbonate powder, and the calcium carbonate goes into solution. They can accumulate in relatively shallow water but very slowly. In today's ocean, coccoliths make up a minor proportion, about 26%, of the sediments in tropical and subtropical regions.

Coccoliths are found in the Mesozoic and Cenozoic, but they are most abundant in thick, widespread accumulations of chalk mainly located in the late Cretaceous, at the very end of the Flood in the K/T Boundary Model. The most famous accumulation in northwest Europe is the white cliffs of Dover (Figure 16.1), but the same chalk is also found in Ireland, northern France, at depth in the North Sea, and Denmark.

---

[1] Brasier, M.D., 1980. *Microfossils*, George Allen and Unwin, London, U.K., pp. 45–50.

Figure 16.2. Chalk from western Kansas (Beverly Oard provides the scale).

Chalk outcrops in other areas of the world. Extensive deposits are found in the central and southern Midwest of the United States (Figure 16.2). Chalk is also found in southern Israel (Figure 16.3). These chalks are relatively pure, those mentioned contain 88 to 98% calcium carbonate.[2] The chalks of northwest Europe also include the skeletons of other microorganisms and flint nodules. Flint is a form of silica or silicon dioxide. In southern England, the chalk is 1,330 feet (405 m) thick, and so the chalk deposit of northwest Europe represents a huge accumulation of mostly coccoliths.

All of the above chalks are dated at Late Cretaceous and said to have been deposited over millions of years. Evolutionary/uniformitarian scientists say coccoliths settle much too slowly for the biblical time scale; under today's conditions it may take more than a year for one plate to settle and a 100 years for plate fragments to make it to the bottom! A one-meter thick accumulation may take 100,000 years. A glaring problem for this uniformitarian explanation is the chalk is very pure, implying rapid deposition unlike conditions observed today.[3] In ordinary conditions, chalk settles very slowly, but as a result many other types of sediments dilute it, which is why coccoliths are a minor portion of the ocean bottom sediments today. Additionally, occasionally large fossils are found in chalk beds. Pterosaurs, birds, dinosaurs, and clams up to

---

[2] Snelling, A.A., 1994. Can Flood geology explain thick chalk layers? *Journal of Creation* 8(1):11–15.
[3] Snelling, A.A., 2009. *Earth's Catastrophic Past: Geology, Creation & the Flood*, Institute for Creation Research, Dallas, TX, pp. 925–930.

6.5 feet (2 m) long are found in the Niobrara Chalk in western Kansas.[4] The presence of large fossils strongly suggests the chalk is the result of mass flow, or a landsliding process, either of which can accumulate rapidly.

Figure 16.3. Chalk near Beer Sheva, Israel.

The purity of the chalk and the presence of fossils open up the probability the chalks are due to huge blooms of coccolithophores during the Flood caused by a sudden influx of nutrients in the surface water.[2,3] The mircroorganisms subsequently died and were deposited over a wide area, accumulating in widespread, thick, generally pure layers by landsliding.

Nearly Pure Diatomaceous Beds with Large Vertebrate Fossils

Diatoms are unicellular algae, lacking flagella, and have a skeleton of silicon dioxide, or silica.[5] Their skeletons can be beautiful (Figure 16.4). Living diatoms are ubiquitous and abundant, inhabiting the oceans and a wide range of freshwater habitats. They are much larger than coccolithophores with a cell diameter of 5 to 2,000 microns (up to 2 mm), but they would still require weeks to years to settle at today's rates. Diatoms require light and so live in the

---

[4] Hattin, D.E., 1982. *Stratigraphy and Depositional Environment of Smoky Hill Chalk member, Niobrara Chalk (Upper Cretaceous) of the type area, western Kansas*, Kansas State Geological Survey Bulletin 225, University of Kansas, Lawrence, KS.

[5] Brasier, Ref. 1, pp. 39–44.

upper portion of water bodies. As they die they sink to the bottom and their skeletons accumulate. The resulting deposit is called diatomite or diatomaceous earth. However, the skeleton is subject to dissolution in deep water. They mostly collect on the sea bottom below areas of surface cold water where they mix with other sediments, diluting the purity of the diatom deposit.

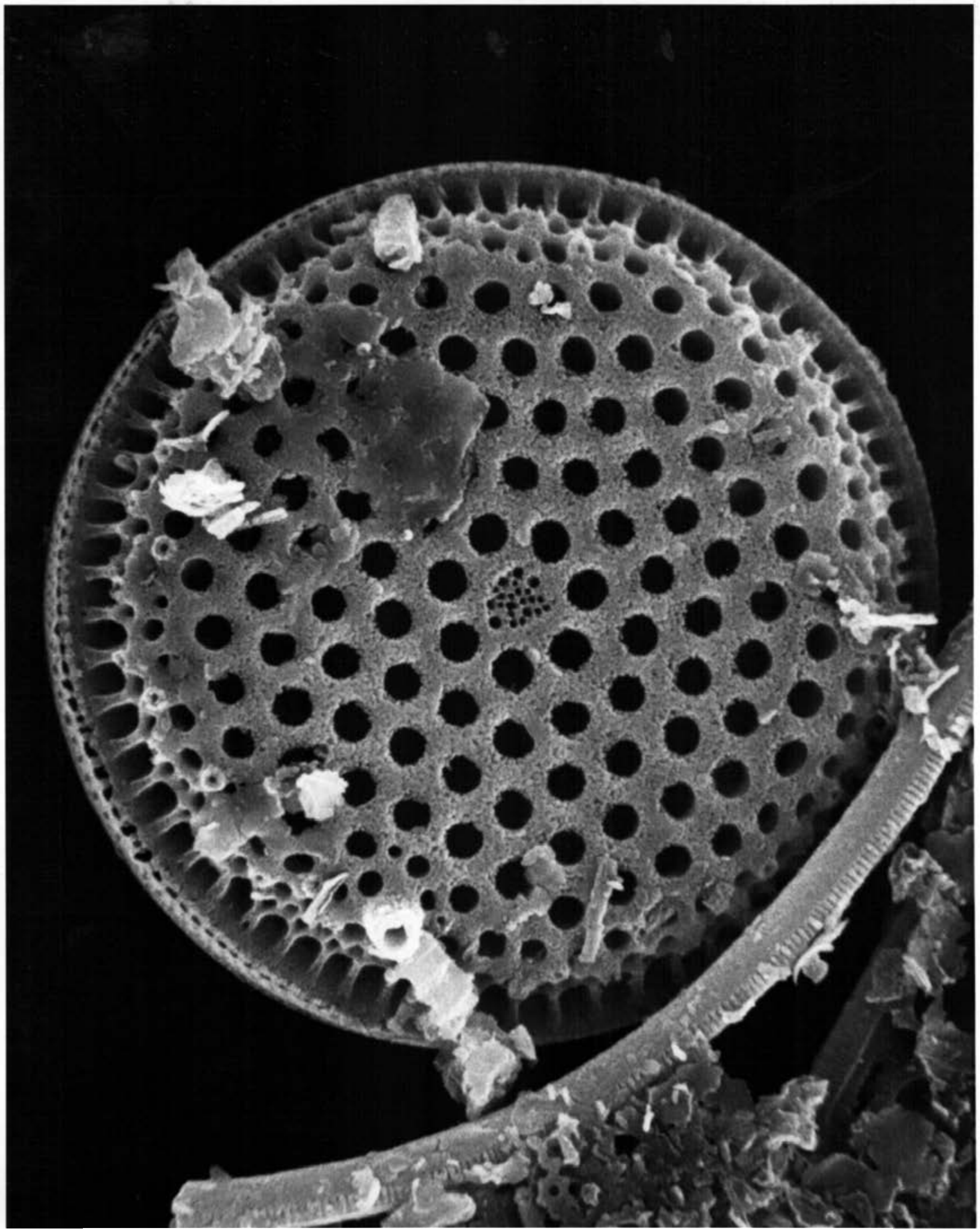

Figure 16.4. A scanning electron micrograph of a diatom magnified 4,000 times (courtesy of Ray Strom).

Whereas chalk is mainly found in the Cretaceous, diatomaceous earth is found in the Cretaceous and the Cenozoic. I will focus mainly on Cenozoic occurrences. One of the most significant deposits of diatomite is the Miocene deposit in the Monterey Formation, the early part of the late Cenozoic, in west-central California that has diatomite units up to 3,330 feet (1,000 m) thick.[6] Another relatively thick layer of diatomite, 260 feet (80 m) thick, comes from Peru where the Pisco Formation is 650 to 3,300 feet (200 to 1,000 m) thick and dated as Miocene and Pliocene, of the Late Cenozoic.[7]

As with chalk, the purity of the diatomaceous earth reveals it was deposited rapidly. Present day ocean deposits are diluted with other sediments, but those in the geological record are exceedingly pure, pure enough to be used in industrial processes.[8] In addition, the deposits have large fossils supporting the conclusion that they are a product of mass flow. One example is the whales up to 82 feet (25 m) long found in the diatomite of the Monterey Formation.[9] Creationist researchers from Geoscience Research Institute, Loma Linda University, California, found 346 whale skeletons in the Pisco Formation.[7,10] They were so well preserved that even some soft tissues have been unearthed. As with the large fossils found in chalk, these well-preserved large vertebrates imply mass flow processes rather than slow deposition from the surface layer of the ocean. It is obvious large animals could not have been preserved in the slow rain of diatoms we observe on the ocean bottom today.

The Difficulty of Accumulating Chalk and Diatomaceous Beds Post-Flood

The evolutionary/uniformitarian model of slow accumulation of chalk and diatomaceous earth over millions of years has severe problems. Huge blooms within the Flood are the most probable explanation for the relatively pure, widespread layers of microorganisms, although specific details need to be worked out.

Is it possible chalk and diatomaceous beds can be explained by post-Flood catastrophism? Not knowing the nature of these post-Flood catastrophes limits comment on them, but we can deduce it would be difficult for the chalk and diatomaceous beds to form after the Flood. Post-Flood catastrophes would most likely be local or regional and not continental. Potentially they could result in the deposition of a wide range of rapidly deposited sediments. But it would be very challenging to have them result in widespread, thick, pure deposits of the skeletons of microorganisms. It is likely these skeletons would be mixed with many other types of sediment. It seems nearly impossible for any post-Flood scenario to explain the chalk and diatomaceous beds.

The chalk beds are predominantly dated as Cretaceous. This indicates that placing the Flood/post-Flood boundary below the K/T is unlikely. Diatomite, being mostly Cenozoic, would make it difficult to place the boundary below the late Cenozoic.

---

[6] Brasier, Ref. 1, p. 43.

[7] Brand, L.R., Esperante, R., Chadwick, A.V., Porras, O.P., and Alomia, M., 2004. Fossil whale preservation implies high diatom accumulation rate in the Miocene-Pliocene Pisco Formation of Peru. *Geology* 32(2):165–168.

[8] Snelling, Ref. 3, p. 926.

[9] Snelling, A.A., 1995. The whale fossil in diatomite, Lompoc, California. *Journal of Creation* 9(2):244–258.

[10] Oard, M.J., 2004, Dead whales: telling tales? *Creation* 26(4):10–14.